

STRATEGIES TO SUSTAIN A QUALITY IMPROVEMENT INITIATIVE IN NEONATAL RESUSCITATION IN A DISTRICT HOSPITAL IN GAUTENG

by

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This research is dedicated to my loving husband Marius, my two beautiful sons, Ivan and Ewald, and my supportive parents who always believed in me. Most importantly this research is dedicated to all the neonates that die unnecessarily in South Africa.

DECLARATION

I, Carlien van Heerden, declare that this thesis entitled, “**Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng**” is my own work, and that all the sources used or quoted in this research study have been indicated and acknowledged by means of complete references. As in action research I was the facilitator of this research process and was assisted by a steering group. I further declare that this work has not been submitted for any other degree at any other institution.

Researcher’s signature

Witness’ signature

Date signed

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I am deeply grateful to the Lord our God for giving me the ability, perseverance and love for neonates to complete this research study. I know that He has something special planned for me.

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ABSTRACT

STRATEGIES TO SUSTAIN A QUALITY IMPROVEMENT INITIATIVE IN NEONATAL RESUSCITATION IN A DISTRICT HOSPITAL IN GAUTENG

The neonatal mortality rate globally and in South Africa is high. South African district hospitals have the highest early neonatal mortality rates. Modifiable and avoidable causes contribute to this rate. The causes are associated with patient-related factors, for example, immaturity or illness, administrative factors such as inadequate facilities or equipment for resuscitation, and healthcare provider factors such as insufficiently trained or an insufficient number of staff. Competent resuscitation is a critical intervention for the survival of infants in need of respiratory or cardiac support in the neonatal period. The lack of neonatal resuscitation skills contributes to the high mortality rates in these settings. This multifaceted problem persists in spite of various neonatal resuscitation training in district hospitals.

This prompted the following main research question: *How can a quality improvement initiative in neonatal resuscitation be sustained in a district hospital in Gauteng?* The aim of this study was to explore and describe the existing situation regarding neonatal resuscitation to enable the researcher and stakeholders in the specific district hospital in developing strategies to sustain the neonatal resuscitation quality improvement initiative in an effort to decrease neonatal mortality. In addition, to determine what changes occurred as a result of these strategies and whether these changes were sustainable.

The Problem Resolving Action Research model was the methodology of choice and the National Health Service (NHS) Sustainability Model was used as the theoretical framework for the study. The study was conducted in three cycles. Each cycle answered a sub-question:

CYCLE 1: *What is the existing situation regarding factors influencing neonatal resuscitation and neonatal mortality in a district hospital in Gauteng?*

CYCLE 2: *What strategies can be implemented to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng?*

CYCLE 3: *What were the changes that occurred as a result of the strategies for a quality improvement initiative in neonatal resuscitation that were implemented? Were the strategies implemented to sustain a quality improvement initiative sustainable?*

A literature review was done to determine the background and rationale and for the purpose of literature control. Both qualitative and quantitative methods of data collection and analyses were used to determine the existing situation regarding neonatal resuscitation, develop and implement the strategies, and to evaluate the changes. Ethical considerations and methods to ensure trustworthiness and validity and reliability were taken into consideration and adhered to.

Based on the findings it could be concluded that the strategies to sustain a quality improvement initiative in neonatal resuscitation had the probability of sustainability. Furthermore there was also a marked decrease in the neonatal mortality in the maternity section of this district hospital. Based on the findings the researcher was able to make conclusions and recommendations for practice, education and future research.

Key words: strategies, sustainability, quality improvement initiative, neonatal resuscitation, district hospital, neonate

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LIST OF ACRONYMS AND ABBREVIATIONS

AAP	American Academy of Paediatrics
AHA	American Heart Association
CARMMA	Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa
Child PIP	Child Problem Identification Program
CPAP	Continues positive airway pressure
CTG	Cardiotocography
DHIS	District Health Information System
DoH	Department of Health
DoHA	Department of Home Affairs
EDC	Every Death Counts
EMS	Emergency services
ENMR	Early neonatal mortality rate
ESMOE	Essential Steps in Management of Obstetric Emergencies
H_A	Alternative hypothesis
HBB	Helping Babies Breathe
HIE	Hypoxic ischemic encephalopathy
H_0	Null hypothesis
ILCOR	International Liaison Committee on Resuscitation
KMC	Kangaroo Mother Care
KMCU	Kangaroo Mother Care Unit
LNMR	Late neonatal mortality rate
MDG	Millennium Development Goal

M&M	Mortality and morbidity
MRC	Medical Research Council
NaPeMMCo	National Perinatal Mortality and Morbidity Committee
NGO	Non-governmental organisations
NGT	Nominal group technique
NHS	National Health Service
NICU	Neonatal intensive care unit
NMR	Neonatal mortality rate
NRP	Neonatal Resuscitation Programme
PDSA	Plan-Do-Study-Act
PEEP	Positive end expiratory pressure
PIP	Peak inspiratory pressure
PPIP	Perinatal Problem Identification Program
PNMR	Perinatal mortality rate
PRAR	Problem Resolving Action Research
PRC	Patient Rights Charter
RCP	Royal College of Physicians
SAHR	South African Health Review
SANC	South African Nursing Council
SiPAP	Synchronised positive airway pressure
StatsSA	Statistics South Africa
UK	United Kingdom
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

CHAPTER 1: RESEARCH OVERVIEW

1.1 INTRODUCTION

This is a study about strategies to sustain a quality improvement initiative in neonatal resuscitation. Globally, many neonates die unnecessarily – many can be saved through effective resuscitation (Bradshaw et al. 2008a:1294-1304). South Africa made a commitment towards attaining Goal 4 of the Millennium Development Goals (MDG 4) set by the World Health Organization (WHO) which aims at reducing the under-5 child mortality rate by two-thirds between 1990 and 2015. It must be noted here that neonatal mortality is part of the under-5 child mortality rates (Bradshaw et al. 2008a:1294-1304; Bryce et al. 2008:1247-1257). Although this study did not intend to deal with the fact that under-5 mortality (in some instances referred to as ‘child mortality’) measurements or statistics include that of the neonatal mortality rates (NMRs), it was considered important by the researcher to mention it here because when referring to ‘under-5 mortality’ or ‘child mortality’ it is inclusive of the NMRs.

According to Bradshaw et al. (2008a:1298-1299), data from the Saving Babies Report (2003-2005) indicate the neonatal mortality in South Africa contributed to approximately 30% of the under-5 mortality rate in the early 2000s. Greenfield (2011:39) reported in 2011 there had been no decrease in perinatal mortality in South Africa since 2001, but Lloyd and de Witt (2013:1) point out that the neonatal deaths in South Africa had, in fact, increased since 2011 as it accounted for approximately 40% of the under-5 mortality rate in the country in 2013.

Neonatal deaths refer to the number of infants who die during the first month of life; this period is considered the time of highest risk for child deaths (Bradshaw et al. 2008a:1294-1304). Neonatal deaths can be subdivided into early and late neonatal deaths with early neonatal deaths occurring from birth to seven days and late neonatal deaths being from seven to 28 days (Pattinson 2011:60). The three main causes of neonatal deaths in sub-Saharan countries (which includes South Africa) are immaturity related (preterm birth), birth asphyxia and infections (including HIV/AIDS) (Bradshaw et al. 2008a:1294-1304; Bradshaw et al. 2008b:1-15; Pattinson 2009:23-28, 39-83; 2011:29-35, 60-91).

According to Pattinson (2011:29-35), South African district hospitals (see section 1.7.5 for clarification of the term ‘district hospital’) have the highest early neonatal mortality rates (NMRs). Modifiable and avoidable causes contribute to this rate. The causes are associated with patient-related factors, for example, immaturity or illness, administrative factors such as

inadequate facilities or equipment for resuscitation, and healthcare provider factors such as inadequately trained staff or an insufficient number of staff.

Competent resuscitation is a critical intervention for the survival of infants in need of respiratory or cardiac support in the neonatal period (Gardner et al. 2011:55-56). A lack of neonatal resuscitation skills contributes to the high mortality rates in South African district hospitals (Pattinson 2009:23-28, 39-83; 2011:29-35, 60-91). When looking at consecutive Saving Babies Reports, it can be concluded that this multifaceted problem persists in district hospitals in spite of various neonatal resuscitation training in these hospitals.

Gardner et al. (2011:55-56) support the concept that neonatal resuscitation is multifaceted. They describe effective resuscitation as a competency that needs to be learned and practised by healthcare providers in an appropriate environment. The high neonatal mortality in district hospitals and the lack of its improvement over the past decade as mentioned by Greenfield (2011:39) and described by Pattinson (2011:29-35) also signify there is a complex and multifaceted lack of sustained quality care over a period of time in these hospitals which impacts negatively on the neonatal patients' survival rate. Placing the lives of neonates at risk is unacceptable and calls for a quality improvement initiative with clear strategies to sustain quality resuscitation of neonates in district hospitals.

The National Health Services (NHS) Institute for Innovation and Improvement in the United Kingdom (UK) identified a trend in healthcare to implement multiple quality improvement initiatives (Maher, Gustafson & Evans 2007:n.p.). Although quality improvement initiatives led to improvement, it could not be maintained. The lack of sustaining quality improvement initiatives in healthcare settings gave rise to the development of the NHS Sustainability Model and Guide. The NHS Sustainability Model is used to predict the likelihood of the sustainability for a quality improvement project focuses on ten factors concerned with the process, staff and organisation to sustain change (see Chapter 3, section 3.3.4). The Master Score System (see Annexure Q) forms part of the Sustainability Model and is an evaluation instrument which determines whether a quality improvement initiative is sustainable. The Sustainability Guide provides practical advice on how to increase the likelihood of sustainability for a quality improvement initiative (Maher et al. 2007:n.p.). The NHS Sustainability Model and Guide formed the theoretical framework of this study.

By using the NHS Sustainability Model (from here on referred to as the Sustainability Model) strategies were developed to address factors related to the process, staff and organisation of a district hospital in Gauteng with the aim of sustaining a quality improvement initiative in neonatal resuscitation to reduce the neonatal mortality rates.

1.2 BACKGROUND AND RATIONALE

The number of childhood deaths compared to the number of births is an indication of the quality of a country's healthcare system (Alderman & Behrman 2004:vii). In South Africa uncertainty surrounds the estimates of under-5 mortality due to the incomplete vital data on birth/death registrations. The South African Health Review (SAHR) (2010) deals with measuring the health systems in South Africa and southern Africa and their progress towards meeting the 2015 MDGs. The issue of improving health information through quality data is raised and reinforced by the following statement: "If we cannot measure what we are doing it is difficult to make informed choices" (SAHR 2010:viii). Nevertheless, the NMR (although as part of the under-5 mortality rates) makes the reduction in neonatal mortality part of the MDG 4.

In South Africa two national systems as well as the Perinatal Problem Identification Programme (PPIP) and Child Problem Identification Programme (Child PIP) (overseen by the Medical Research Council [MRC]) gather information regarding mortality. The first national system is the District Health Information System (DHIS) which collects data for the stillbirths and neonatal deaths that occur in public healthcare facilities. The second national data base is managed by the Department of Home Affairs (DoHA). The DoHA lists all deaths in the country (including stillbirths and neonatal deaths) from the public as well as private health sectors and forwards the data to Statistics South Africa (StatsSA). These two databases only record deaths and do not focus on records regarding the pathological or health system causes of death; thus, the Perinatal Problem Identification Program (PPIP) collects data in this regard. The National Perinatal Mortality and Morbidity Committee (NaPeMMCo) is tasked to audit these data sets (NaPeMMCo 2011:5). The perinatal, neonatal, infant and child deaths in South Africa are monitored by the Perinatal Problem Identification Programme (PPIP) and Child Problem Identification Programme (Child PIP).

Determining the accurate NMR in the country is a problematic issue since it is embedded in a paradoxical reality. Firstly, the PIPP and Child PIP collect and analyse the data on these deaths from mainly public healthcare facilities. Secondly, this data do not reflect the statistics for all the public healthcare facilities in the country but only that of public healthcare facilities that voluntarily participate in the programmes. Thirdly, perinatal, neonatal, infant and child deaths although recorded separately are read as one statistic. Finally, the pathological or health system causes of death are only recorded in the PIPP and Child PIP and therefore they are not representative of the whole country but only of the facilities that participate in these programmes.

According to the NaPeMMCo Report (2008-2010), the adjusted NMR for South Africa based on data from the DHIS was 16.1/1 000 in 1990 that fluctuated to a NMR of 13.9/1 000 live births by 2008 (NaPeMMCo 2011:29). The trends in the NMRs in the country further show the mortality was 18/1 000 live births in 1990 which escalated to 23/1 000 live births in 2004. In 2008, however, the NMR was 20/1 000 with a further decline to 18/1000 in 2010 (World Bank(a) neonatal mortality rates, [s.a.]); World Bank(b) World Development Indicators, [s.a.]).

However, the data from StatsSA indicated the neonatal mortality rate for South Africa in 2008 was 14/1 000 live births with no change in the NMR from 2000-2008 (Lloyd & de Witt 2013:1; Velaphi & Rhoda 2012:67). The Rapid Mortality Surveillance system was founded to monitor the mortality trends recorded on the national population register. The Rapid Mortality Surveillance Report 2011 indicates the NMR for South Africa was 14/1 000 live births in 2011 (Bradshaw, Dorrington & Laubscher 2012:i). In the Saving Babies Report of 2010-2011 (which reports on the PPIP data) the neonatal mortality rate was indicated as 21/1 000 live births (Lloyd & de Witt 2013:1). It is not clear what the real neonatal mortality for South Africa is since these statistics were based on various reports, given these facts it seems that the neonatal mortality for South Africa is currently still higher than the target set by the WHO. This is in comparison to other developing countries that made progress towards the MDG 4 by implementing quality improvement initiatives.

Similar to South Africa, Brazil is a developing country with an emerging economy (Sousa, Hill & Dal Poz 2010:1-2). Yet, unlike South Africa, Brazil showed a significant decline in its NMR. Compared with an NMR rate of 28/1 000 live births in 1990 when the MDG 4 was set, it declined to 12/1 000 live births in 2010 (World Bank(b) World Development Indicators, [s.a.]).

Over the past ten years Brazil has initiated various quality improvement initiatives on national level which contributed to the significant decline in the child mortality and neonatal mortality rates in the country. The country addresses problems experienced in the Brazilian context by following a holistic approach thus focusing on various key interventions. The key maternal and child interventions include piped water, contraceptive use and antenatal care, delivery attendance by a medically trained person, caesarean delivery, and immunisation. Furthermore, a solution to oral rehydration (in the form of oral rehydration salt, commercial preparations and or homemade solutions made with salt and sugar) were implemented. A unified health system providing appropriate access to comprehensive healthcare was also implemented which further helped to curb the child and neonatal death rates ensuring that

Brazil was well on track with reaching their MDG's (Barros et al. 2010:1877-1889; Victora et al. 2011:1863-1876). The Countdown to 2015 Decade Report (WHO/UNICEF 2010:8) also indicated that Brazil showed progress towards MDG 4 with their under-5 mortality rates which declined from 56/1 000 live births in 1990 to 22/1 000 live births in 2008. Considering that Brazil's approach to the challenge of NMR rendered sound results, it can therefore be posited that if a holistic approach is used to address key problem areas specific to NMR in the context of South African district hospitals, the expected outcome will be a decrease in these rates. The current reality is that it was impossible to achieve the MDG 4 by 2015 since only two years remained before 2015 when this research study was commenced in March 2013.

At this point it is important to look at the verisimilitude of the dilemmas related to neonatal deaths and the NMRs in the context of South African district hospitals. The collected and analysed data from the PIPP show in South Africa compared to all other categories in the neonatal period the early neonatal death rate (first seven days of life) per birth weight category is the highest in the district hospitals (Pattinson 2011:39). The three main causes of early and late neonatal deaths in South Africa are immaturity related (preterm birth), birth asphyxia and infections (including HIV/AIDS) (Bradshaw et al. 2008a:1294-1304; Bradshaw et al. 2008b:1-15; Pattinson 2009:23-28, 2011:29-35). Pattinson (2009:23-28; 2011:29-35) further notes the Saving Babies Reports for two consecutive years, 2006-2007 and 2008-2009, both identified the same problems in South African district hospitals associated with early neonatal deaths. These problems pertain to healthcare providers not being skilled in neonatal resuscitation and, secondly, administrative problems including the lack of facilities and equipment, not enough trained staff to manage patients effectively, and insufficient transport. However, as proved in the case of Brazilia (Barros et al. 2010:1877-1889; Victora et al. 2011:1863-1876), addressing the causes of neonatal deaths through a holistic healthcare approach and quality improvement can undoubtedly reduce the NMRs over time.

The management and staff of the district hospital selected as the setting for this study identified neonatal mortality as an area of concern to be addressed as part of quality improvement. The probable factors causing neonatal deaths identified by these professionals correlated with the 2006-2007 and 2008-2009 Saving Babies Reports (Pattinson 2011:29-35) and the Every Deaths Counts Report (Bradshaw et al. 2008a:1294-1304; Bradshaw et al. 2008b:1-15). Most of the major causes of neonatal deaths have relatively simple interventions which can reduce the mortality. Many of these causes are avoidable; in many cases illnesses can be reversed thus reducing mortality. Avoidable measures include prevention, early identification of risk factors and effective resuscitation –

which include recognition of a need for support, assistance with breathing and cardiac compressions – and appropriate post-resuscitation care (Gardner et al. 2011:55-56; Meaney et al. 2010:1462-1472; Pattinson 2009:23-28, 39-83; 2011:29-35,60-91). These interventions in turn rely on adequate resources, namely, facilities, equipment and trained staff (Pattinson 2011:29-35, 60-91).

The neonatal period is the highest risk period for mortality in all life phases because an infant has to adapt from an intrauterine to an extra uterine life and prove its ability to sustain its own life. Most newborn infants will make this transition without any intervention, but roughly 10% of newborns require some form of resuscitation to support them. Less than 1% has a need for extensive support such as cardiac compression (Kattwinkel et al. 2010:1400-1413). By implication, this means that 100/1 000 newly born infants need resuscitation at birth and if not done proficiently, it can lead to a need for advanced neonatal resuscitation or even death.

Healthcare providers should be competent in the skill of at least basic neonatal resuscitation. A person skilled in neonatal resuscitation should be present at the birth of all babies. Furthermore, those caring for neonates after birth should also be competent in neonatal resuscitation so as to prevent and/or reduce neonatal deaths. This competency should be sustained to bring about change in decreasing neonatal mortality in healthcare settings (Duran et al. 2008:43-46; Meaney et al. 2010:1462-1472; Pattinson 2011:57-58). Training in neonatal resuscitation has proved to improve competency and significantly reduce neonatal mortality (Bissinger & Ohning 2009:1-22; Chopra et al. 2009:29-39; Couper, Thurley & Hugo 2005:1-10; Meaney et al. 2010:1462-1472; Wall et al. 2009:s47-s64). However, it is unclear what the best strategies are to implement and sustain competent neonatal resuscitation as Meaney et al. (2010:1462-1472) point out.

As mentioned earlier, the NHS Institute for Innovation and Improvement (2007) in the UK developed the Sustainability Model to address the problem of quality improvement initiatives that, although undertaken with good effect, are not maintained over a period of time. *Sustainability* is defined in the Sustainability Model as follows: “Sustainability of change for improvement exists when a newly implemented process continues to improve over time and becomes ‘the way things are done around here, and certainly does not return to the ‘old’ processes that existed before the improvement project begins” (Allen et al. 2007:9). This definition places the emphasis on the sustainability of something that can be considered a positive change which leads to quality improvement and consequently become the normal practice and not just an addition to old ways of practising (Allen et al. 2007:9).

The key factors of sustainability include the support of managers and healthcare leaders to treat quality care as a priority so that the positive changes can become normal practice. To achieve this and to reflect on changes, the collaboration of stakeholders is very important – they must have ownership in the quality improvement initiative. Moreover, a culture of improvement and engagement of qualified staff is needed to improve sustainability (Allen et al. 2007:16-23).

The sustainability of a quality improvement initiative in this study was centred on prevention, early identification of risk factors, neonatal resuscitation, and post-resuscitation care entailing a holistic approach towards improving the neonatal outcomes. Therefore, the focus was not only on neonatal resuscitation (the practice of neonatal resuscitation) as a competency and skill, but also on the problems related to staff and organisation.

1.3 PROBLEM STATEMENT

The complexity of finding data specific to the neonatal mortality rates in the global, sub-Saharan Africa or South African contexts create a challenge. Since the MDGs were formulated in 2000, globally and on national level data in reports, reviews and research on statistics and other health-related issues versus the MDGs on neonatal mortality have not always been dealt with separately but have sometimes been included as one statistic in the under-5 (child) mortality rates.

According to Nannan et al. (2012:iv-v), the estimated under-5 mortality rate in South Africa in the ten year span from 1997-2007 fluctuated between 50/1 000 and 75/1 000 live births. Bradshaw et al. (2008b:1-15) and Bryce et al. (2008:1247-1257) agree that in 2008 the mortality rate of children younger than five years in South Africa was 69/1 000 live births.

The neonatal mortality rate in South Africa is high and with only two years remaining (this study commenced in 2013) South Africa would in all probability not reach the MDG 4 set by the WHO to reduce the mortality rate by two-thirds by 2015 (Bradshaw et al. 2008b:1-15; Bryce et al. 2008:1247-1257). Statistics clearly show South Africa has made little progress towards the attainment of the MDG 4 as Velaphi and Rhoda (2012:67) and Lloyd and de Witt (2013:1) confirm the NMR target for 2015 is to reduce the rate of 21/1 000 live births noted in 1998 to 7/1 000 by 2015. Over a two year time period the NMR declined from 20/1 000 in 2008 to 18/1 000 in 2010 (World Bank(a) neonatal mortality rates, [s.a.]); World Bank(b) World Development Indicators, [s.a.]).

The early NMRs are the highest in district hospitals (Baleta 2011:1303). In addition to the causes of neonatal deaths related to immaturity and health problems (Bradshaw et al. 2008a:1294-1304; Bradshaw et al. 2008b:1-15; Pattinson 2009:23-28; 2011:29-35), there are also avoidable and modifiable healthcare problems that contribute to the high mortality rates in South Africa's district hospitals (Bradshaw et al. 2008a:1294-1304, Bradshaw et al. 2008b:1-15; Chopra et al. 2009:29-39; Pattinson 2009:23-28, 2011:29-35). Avoidable and modifiable healthcare problems include healthcare provider and administrative problems that lead to inadequate care or health problems not being appropriately managed. It had to be determined whether these problems applied to the specific district hospital in Gauteng where this study was conducted.

A very important avoidable problem of neonatal morbidity and mortality in South African district hospitals is poor quality neonatal resuscitation as noted by Pattinson (2009:23-28; 2011:29-35, 57-58). Factors contributing to inadequate neonatal resuscitation include the lack of staff, inadequately trained staff, limited equipment for resuscitation, and the lack of well-equipped transport facilities (Pattinson 2009:23-28; 2011:29-35). *Pre-resuscitation*, the prevention of neonatal causes leading to the need for resuscitation, early recognition of the need for resuscitation, quality *neonatal resuscitation* (intervention) and *post-resuscitation* care need to be addressed in order to reduce neonatal mortality and morbidity in general, but also in the particular district hospital. In-service training can improve certain aspects related to the practice of neonatal resuscitation, but to improve and sustain it over a period of time implies that the process, staff and organisational issues need to be addressed over a period of time. It corresponds with the problems regarding sustainability as addressed in the Sustainability Model described by Maher et al. (2007:n.p.). The Sustainability Model addresses factors regarding the process, staff and organisation for sustainability of a quality improvement initiative (Allen et al. 2007:25-29).

Despite the clear guidelines and recommendations set by the Saving Babies Report (Pattinson 2009:23-28; 2011:29-35, 57-58), neonatal mortality remains a challenge in South Africa. This statement is based on the fact that the same guidelines and recommendations keep on recurring in consecutive Saving Babies Reports (Pattinson 2001:55-63; 2009:23-28; 2011:29-35, 57-58). At the time of this study it was not known whether quality improvement initiatives had been implemented in the selected district hospital to decrease neonatal mortality and, if there had been such initiatives, what kind they have been or to what extent quality improvements had flared up or had been sustained.

According to Maher et al. (2007:n.p.), quality improvement initiatives have a 70% chance to fail because of the lack of sustainability. For quality improvement initiatives to be sustainable

a holistic approach should be followed and the focus should be on the factors regarding the process, staff and organisation which are captured by the Sustainability Model (Maher et al. 2007:n.p.). By taking Brazil as an example, it is evident that quality improvement initiatives to reduce neonatal mortality and morbidity were not only multifactorial, but had to be sustained to create measurable improvement (Barros et al. 2010:1877-1889; Victora et al. 2011:1863-1876).

A successful long-term initiative to reduce neonatal mortality and morbidity in the particular district hospital therefore needs to focus on the multifactorial and complex reality. Stakeholders need to be involved to sustain the quality improvement over a period of time to enhance its impact. It will depend not only on the healthcare providers, but also on other factors that influence neonatal outcomes in the district hospital. If these aspects are not addressed, the neonatal mortality and morbidity in the particular district hospital may remain unchanged or may even increase. To ensure optimal outcomes for neonates at this particular district hospital there was an urgent need to address the identified issues related to healthcare provider and administrative problems. It was important to sustain improved practice over a period of time and not just to create a short-term solution.

The proposed solution was to involve stakeholders to address the practice of neonatal resuscitation in the district along with the process, staff and organisational factors that influenced neonatal resuscitation, and to formulate strategies based on the theoretical framework of the Sustainability Model. If these strategies to sustain a quality improvement initiative in neonatal resuscitation could be maintained, it was expected to contribute towards decreasing neonatal mortality in the particular district hospital. The researcher in collaboration with the stakeholders therefore embarked on a quality improvement process to initiate change in neonatal resuscitation in this district hospital with the aim of sustaining change over time to eventuate a decrease in neonatal mortality.

1.4 RESEARCH QUESTION

The main research question addressed the purpose of the research. Four sub-questions needed to be answered in order to address the main question.

1.4.1 Main research question

The main research question was:

“How can a quality improvement initiative in neonatal resuscitation be sustained in a district hospital in Gauteng?”

1.4.2 Sub-questions

The four sub-questions were:

- *“What is the existing situation regarding factors influencing neonatal resuscitation and neonatal mortality in a district hospital in Gauteng?”*
- *“What strategies can be implemented to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng?”*
- *“What are the changes that occurred as a result of the strategies for a quality improvement initiative in neonatal resuscitation that was implemented?”*
- *“Were the strategies implemented to sustain a quality improvement initiative sustainable?”*

1.5 RESEARCH AIM AND OBJECTIVES

The overall aim of this study was to explore and describe the existing situation to enable the researcher and stakeholders in the specific district hospital to develop strategies to sustain the quality improvement initiative implemented in neonatal resuscitation for decreasing neonatal mortality. In addition, to determine what changes occurred as a result of these strategies and whether the changes were sustainable. The objectives of this study were therefore:

- to explore and describe the existing practices of neonatal resuscitation and the factors influencing neonatal resuscitation
- to develop and implement strategies to sustain the quality improvement initiative in neonatal resuscitation
- to determine what changes occurred as a result of the neonatal resuscitation strategies that were implemented
- to determine the sustainability of these strategies.

1.6 PARADIGMATIC ASSUMPTIONS

The following paradigmatic assumptions will be discussed: meta-theoretical, theoretical and methodological assumptions.

1.6.1 Meta-theoretical assumptions

The researcher believes neonates are a vulnerable group and should be protected as such by healthcare workers to the best of their ability. Therefore, it is the healthcare providers' responsibility to be a voice for the neonates and to protect them from illness, harm and death. To address the challenges related to neonatal mortality, collaborative partners need to be identified and must work together in addressing all these issues of concern. Moreover, to bring about change, change must first be created within individuals in order to create changes in practice. It is important to reflect on current practices to identify the issues and work together in collaboration to find solutions to improve the mortality and morbidity of the vulnerable neonatal group.

The researcher's point of departure in this study was the world philosophy of pragmatism. Pragmatists rely on the fact that reality is forever changing and that learning takes place by applying experiences and thoughts to problems that may arise from these changes (Cohen 1999:2). Various approaches can be used to address these problems (Creswell 2009:10). By following the action research process in this study the participants had the opportunity to learn from their experiences and to address problems regarding neonatal resuscitation in practice. Furthermore, they had the opportunity to reflect on the changes that occurred as a result of the implementation of the strategies to sustain a quality improvement initiative in neonatal resuscitation. Moreover, they had the opportunity to take ownership in this study as they had to take responsibility for the implementation of the strategies.

The assumption in this study was that neonatal resuscitation is a competency that has to be performed by healthcare providers caring for neonates in different settings when the need arises. This competency is a learned skill based on knowledge; it is a skill which can be influenced by other factors such as the process of implementation, the organisation, management and healthcare environment (including facilities and equipment). This being said, it was clear that the challenges associated with neonatal resuscitation were complex, multifaceted and practical problems which could be addressed by action research.

1.6.2 Theoretical assumptions

The Sustainability Model and Guide from the NHS Institute for Innovation and Improvement (Maher et al. 2007:n.p.) formed the theoretical basis of this study. The researcher obtained permission to use the NHS Sustainability Model as the theoretical framework (see Annexure F). Figure 1.1 below illustrates the NHS Sustainability Model.

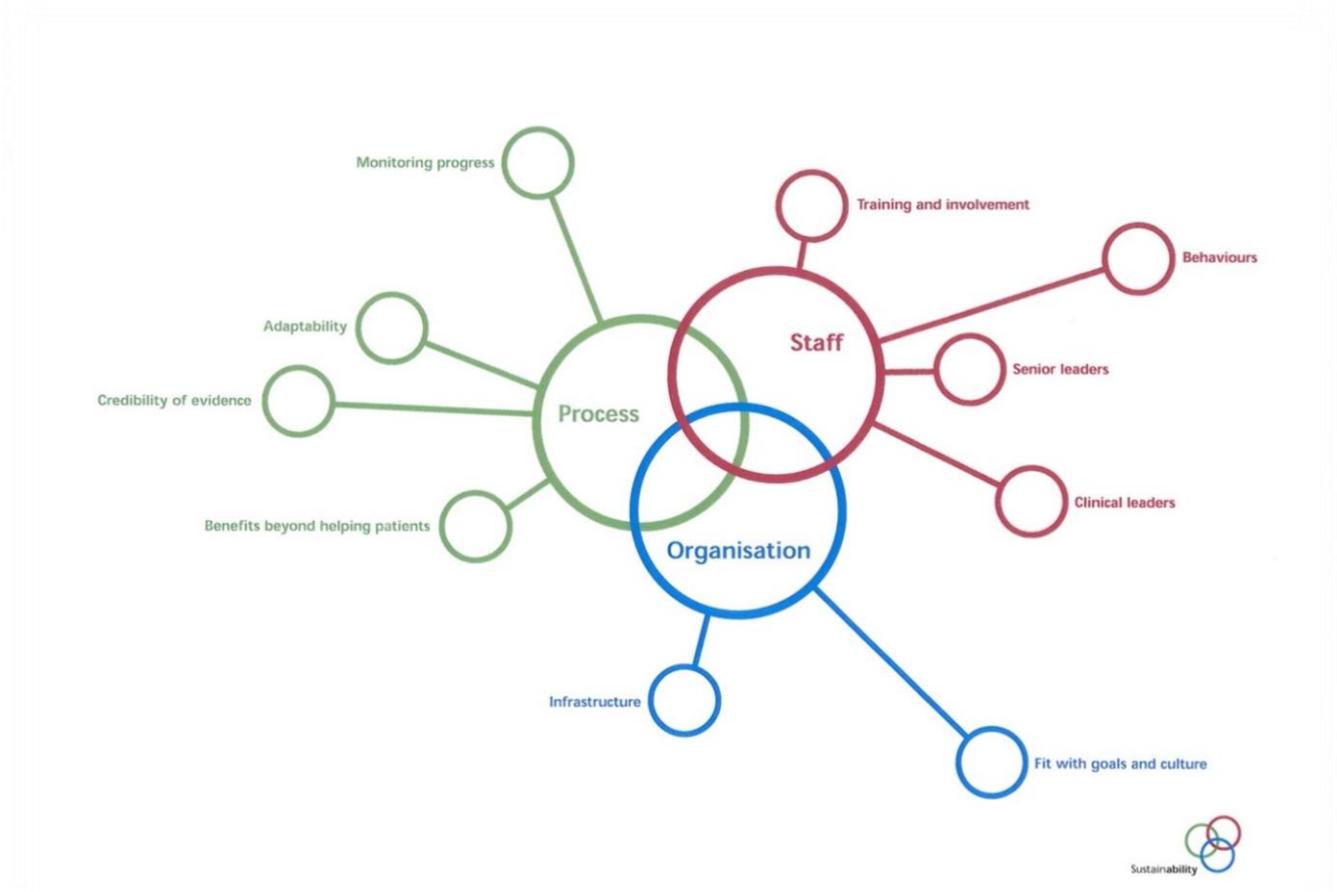


Figure 1.1: NHS Sustainability Model (Maher et al. 2007:n.p.)

The NHS Sustainability Model and Guide were developed to support and increase the sustainability of quality improvement initiatives for healthcare services and patients. The Sustainability Model is a diagnostic tool that can be used to predict the probability of the sustainability of a quality improvement initiative. The Sustainability Guide provides practical advice on how one can increase the probability of the sustainability of a quality improvement initiative. The Master Score System which forms part of the Sustainability Model is an evaluation instrument used to evaluate the sustainability of a quality improvement initiative (Allen et al. 2007:25; Maher et al. 2007:n.p.).

The NHS Institute for Innovation and Improvements' working definition (Maher et al. 2007:n.p.) for sustainability is as follows:

Not only have the process and outcome changed, but the thinking and attitudes behind them are fundamentally altered and the systems surrounding them are transformed as well. In other words the change has become an integrated or mainstream way of working rather than something 'added on'. As a result, when one looks at the process or outcome one year from now or longer, one can see that at a minimum it has not reverted to the old way or old level of performance. Further, it has been able to withstand challenge and variation; it has evolved alongside other changes and perhaps has continued to improve over time. Sustainability means holding the gains and evolving as required – definitely not going back.

The purpose of the Sustainability Model was for it to be used by teams or individuals to assist them with self-assessment against key criteria for sustaining change, and to identify and understand the barriers for sustainability in their own context. Moreover, as Allen et al. (2007:26) and Maher et al. (2007:n.p.) confirm, this model could help them to identify the strengths in sustaining quality improvement initiatives and to do planning for sustainability as well as progress monitoring over time.

In the case of the current study the Sustainability Model helped the research team to understand the lack of sustainability of previous improvement initiatives. It guided them in identifying the strengths and positive outcomes that can result from sustaining a quality improvement initiative in neonatal resuscitation in the district hospital. Furthermore, it guided the formulation of strategies to bring about sustainability in the quality improvement initiative relating to neonatal resuscitation. The Master Score System (see Annexure Q) was used in the last cycle (CYCLE 3) to evaluate the sustainability of the strategies for a quality improvement initiative in neonatal resuscitation (Allen et al. 2007:26; Maher et al. 2007:n.p.).

The Sustainability Model consists of the ten factors listed below relating to the process, staff and organisation that play a crucial role in sustainability of quality improvement in healthcare (Allen et al. 2007:26; Maher et al. 2007:n.p.).

- *Training and involvement*
- *Attitudes*
- *Senior leaders*
- *Clinical leaders*
- *Fit with goals and cultures*

- *Infrastructure*
- *Benefits*
- *Credibility of evidence*
- *Adaptability*
- *Monitoring progress*

The research problem was multifaceted and a holistic approach was needed to resolve it. The challenges identified applied to the process, staff and organisation of a district hospital in Gauteng. The Sustainability Model addresses three main areas (see Figure 1.1), namely, Process, Staff and Organisation (Allen et al. 2007:30-37; Maher et al. 2007:n.p). The factors related to process, staff and organisation will be discussed in detail in Chapter 3 (section 3.3.4). Communication, collaboration and reflection form an important part of addressing these factors during a quality improvement initiative. The changes that occurred should become part of the job descriptions of the staff members.

The Sustainability Model formed the theoretical framework of the current study and was used continuously throughout all three the cycles of the action research process. As a result, the model addresses sustainability holistically and can be applied to current issues regarding modifiable and avoidable causes of neonatal mortality. Moreover, the Sustainability Model aims at the achievement of effective change which will create a platform for continued improvement as suggested by Allen et al. (2007:26).

1.6.3 Methodological assumptions

Action research is a research approach which includes the interpretation and explanation of an existing situation and the implementation of change within a specific context. In action research participants are involved in both the change and the research process and the researcher can be the facilitator of change. Both qualitative and quantitative methods of data collection may be used. These are the principles of action research as described by Meyer (2010) (cited in Gerrish & Lacey 2010:56).

Maree et al. (2010:124-125) describe the characteristics of action research as being practical and aimed at developing solutions to practical problems which have the potential to change practice. Action research is therefore focused on change and is aimed at the empowerment and transformation of participants. Furthermore, action research is a cyclical process of planning, implementation and reflection of which the findings can be used to inform practice. Finally, it is an interactive form of knowledge development.

The focus of this study was on the sustainability of strategies for a quality improvement initiative in neonatal resuscitation. The principles and characteristics of action research suited the aim and objectives of the study and was therefore the methodology of choice. In order to address the challenges experienced it was important to explore and describe the existing situation regarding neonatal resuscitation to find solutions to practical problems. Through the action research process participants were empowered. Both qualitative and quantitative methods of data collection were used. Change was implemented with the strategies and the changes that occurred and the sustainability of the strategies were developed.

1.7 CLARIFICATION OF KEY CONCEPTS

The key concepts being clarified include strategies, to sustain, quality improvement initiative, neonatal resuscitation, district hospital, and neonate.

1.7.1 Strategies

The United Nations International Children's Emergency Fund (UNICEF) UK Baby Friendly A 'strategy' is defined as "a plan, method, or series of manoeuvres or stratagems for obtaining a specific goal or result: a strategy for getting ahead in the world" (Dictionary, Definition of strategy, [s.a.]). It is also defined as "a method or plan chosen to bring about a desired future, such as achievement of a goal or solution to a problem" (Business dictionary, definition of strategy [s.a.]).

Initiative (UNICEF UK 2009:5) explains the purpose of a strategy as follows: when action is required from stakeholders to 'achieve a desired outcome', the strategy should include the problem, provide a desired outcome for the future, and indicate a solution to the problem.

In the context of this study the concept 'strategies' refers to a plan to sustain a quality improvement initiative in neonatal resuscitation in a district hospital. This plan was developed and approved by the stakeholders and included a vision for the future in order to reach a desired outcome. In the context of this study it was to decrease the NMRs thereby contributing towards achieving the MDG 4.

1.7.2 Sustainability

To 'sustain' something is defined by Hornby (2010:1507) as "to make something continue for some time without becoming less".

Allen et al. (2007:9) state the NHS Institute for Innovation and Improvement (2007) definition of sustainability reads as follows: "Sustainability of change for improvement exists when a newly implemented process continues to improve over time and becomes 'the way things are done around here,' and certainly does not return to the 'old' processes that existed before the improvement project begins." This definition places the emphasis on the sustainability of something that can be considered a positive change which may lead to quality improvement and become the normal practice and not just an addition to old ways of practicing (Allen et al. 2007:9).

'Sustainability' in the context of this study refers to the sustainability of the quality improvement initiative in neonatal resuscitation. This improved outcome should become the normal practice and normal way of doing things related to neonatal resuscitation in the selected district hospital in Gauteng.

1.7.3 Quality improvement initiatives

The concept 'quality improvement initiatives' in the healthcare domain describes the attempt to change the behaviours of clinicians to improve the quality of patient outcomes. This is achieved by changes in practice. These changes take place by implementing consistent, appropriate and efficient best practice interventions. The quality improvement initiative leads to improved care and patient outcomes (Fan et al. 2010:2279).

In the context of this study the quality improvement initiative followed a holistic approach to bring about changes not only in the behaviours of staff but also in the process (neonatal resuscitation) as well as in the organisation of the selected district hospital in Gauteng. The collaboration of stakeholders and reflection on practice could bring about changes to improve the outcomes of neonates in the selected district hospital in Gauteng.

1.7.4 Neonatal resuscitation

'Neonatal resuscitation' refers to the specific steps that need to be taken to rescue or resuscitate a neonate in order to establish breathing and circulation; however, the

appropriate step(s) depend(s) on the infant's individual needs of the neonate(s) (Verklan & Walden 2004:105-120, Lee et al. 2011:1-19). Neonatal resuscitation involves the prevention of risk factors and deterioration, early identification of need for support (pre-resuscitation), and the facilitation of an open airway, breathing and circulation (also known as the ABCs of survival [intervention]) as well as care after resuscitation which include monitoring and newborn care (post-resuscitation care) (Gardner et al. 2011:55-71; Verklan & Walden 2004:105-120). Basic neonatal resuscitation includes maintaining an open airway and providing ventilation with a bag and mask. Advanced neonatal resuscitation is basic neonatal resuscitation with the addition of supplemental oxygen, chest compressions, endotracheal intubation and the administration of certain medication, for example, adrenalin as well as the administration of fluids, depending on the needs of the neonate (Wall et al. 2009:s47-s48; Lee et al. 2011:2).

In the context of the current study the focus was on basic resuscitation with the addition of cardiac compressions. Basic neonatal resuscitation included the following: the prevention of risk factors and early identification of a need for support, facilitating and establishing an open airway for breathing and circulation to enhance neonatal outcome, and post-resuscitation care. But, these steps or interventions depend on the infant's individual needs. The practice of basic neonatal resuscitation is not the only important factor to ensure the successful resuscitation of neonates. Additional factors surrounding the process, staff and organisation (for example, sufficient equipment and staff, competent staff and so forth) are also recognised as pivotal for successful neonatal resuscitation.

1.7.5 District hospital

A district is a peripheral area and comprises of a "well-defined population living within a clearly demarcated administrative and geographical area" (Chatora & Tumusiime 2004:23). In the context of South Africa a district is a demarcated geographical area within a province and can fall in a rural or urban area.

To place the concept 'district hospital' geographically into perspective, it needs to be explained that the health system in South Africa provides health services on national, provincial, regional and district levels. In the public health system of South Africa there are various levels of hospitals; these include tertiary hospitals (level 3), regional hospitals (level 2) and district hospitals (level 1) (Cullinan 2006:11). At district level, hospitals and healthcare clinics render healthcare services mainly to communities in the rural areas. District hospitals

in South Africa form part of the district health system. Their role is supportive to primary healthcare while also serving as gateways to specialised care. District hospitals provide level 1 (generalist) services to in- and out-patients. Patients are referred from a community health centre or clinic to a district hospital. Typically, the district hospital has between 30 and 200 beds and a 24-hour emergency service as well as an operating theatre (Department of Health [DoH] National Norms and Standards for District Hospitals 2002:1-60).

In the context of this study the concept 'district hospital' refers to a particular hospital in Gauteng (one of the nine provinces in South Africa) that serves as a receiving hospital for clinics and is the gateway to a tertiary hospital for neonates in need of specialised care. This hospital (as the setting for this study) is described in more detail in section 1.9 in this chapter.

1.7.6 Neonate

According to the WHO (2005), the neonatal period commences at birth and ends after 28 completed days after birth (WHO, Health info statistics, 2005). A neonate therefore refers to an infant during the first 28 days of life (Verklan & Walden 2004:102).

In this study the concept 'neonate' refers to any newborn or infant up to 28 days old that has been born in or admitted to the maternity section of the selected district hospital in Gauteng.

1.8 SIGNIFICANCE OF THE STUDY

Action research was used to develop and implement strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng. The theoretical framework was based on the Sustainability Model of the NHS. The strategies were expected to bring about positive change in practice that could be continued over an extended period of time. Consequently, the improved change could become the norm of practice. Additionally, it could serve as a benchmark for the implementation of future quality improvement initiatives on other aspects of care in this particular hospital as well as for improved neonatal resuscitation in other healthcare settings within a similar context in South Africa.

If the strategies to sustain a quality improvement initiative in neonatal resuscitation could be implemented in the context of a district hospital in Gauteng, the expectation was that it would

be transferable to other district hospitals with a similar context in the province Gauteng as well as in district hospitals in the other eight provinces in South Africa. This quality improvement initiative did not only focus on neonatal resuscitation as an intervention but also on factors related to the process, staff and organisation of a district hospital that could have an influence on effective neonatal resuscitation. Consequently, these strategies were developed and implemented from a holistic approach as it was a multifaceted problem that needed to be resolved. By implementing and evaluating these strategies the findings could be used to inform policymakers and other decision makers.

If these strategies could be implemented to change policy, it could provide a practical contribution towards sustainable development and the generation of knowledge and skills in neonatal resuscitation for all healthcare providers delivering and caring for neonates. It could also assist the management of hospitals to address problems regarding neonatal resuscitation and neonatal mortality holistically. Moreover, it may have an impact on the promotion of problem solving and the development of quality healthcare in the selected district hospital. If this project were to be successful the strategies might be taken to the Department of Health for possible implementation in other district hospitals in order to reduce NMRs.

1.9 THE RESEARCH SETTING

The study setting refers to the site of data collection (Polit & Beck 2008:766). A district hospital situated in a rural area in Gauteng was used as the setting. At the time of this study the district hospital had a total of 551 beds as well as an emergency room and operating theatres. Patients were referred from 32 surrounding clinics to this district hospital. Patients in need of more specialised care which is not provided in the district hospital were referred to a tertiary hospital.

The setting is described as at the time the study commenced (2013). The maternity section comprised of a labour ward, a postnatal ward and a neonatal intensive care unit (NICU) which includes a Kangaroo Mother Care unit (KMCU).

According to the hospital records there were on average over 5 000 deliveries a year in the labour ward of which most were normal vaginal deliveries. The labour ward consisted of 10 rooms allocated for deliveries of which three were allocated for high risk patients. There was a central area for stock and a resuscitation/baby area. This area included a radiant heater, working suction unit and oxygen. A closed incubator and bassinets were used to keep

neonates warm. There were no monitoring devices such as saturation monitors to monitor neonates, although there was an emergency trolley with some equipment and stock needed for resuscitation. According to the off duty roster, on average 25 permanent nursing staff members were on the workforce of the labour ward (advance midwives and professional nurses as well as nursing auxiliaries and enrolled nursing auxiliaries). These staff members rotated to cover the ward in 12-hour shifts.

Babies were mainly delivered in the labour ward and mostly by midwives. Facilities for caesarean sections were also available. If a newly born baby needed resuscitation at birth, the midwife resuscitates the neonate before transferring the neonate (with the consent from the doctor) from the labour ward to the Neonatal Intensive Care unit (NICU). If doctors were available they would resuscitate the neonate. Neonates were only transferred to the NICU once they had been seen by a doctor in the labour ward. Sick or premature newborns were transferred to the NICU for specialised treatment. After delivery, the healthy babies were moved from the labour ward to the postnatal ward where they were cared for by enrolled nursing and enrolled nursing auxiliaries with registered nurses/midwives in charge.

The NICU admitted on average between 1 200 and 1 300 neonates per year according to the hospital records. The NICU was a 35-bed unit with 12 KMC beds. Of these 35 beds, 4 were placed in a small ICU room where neonates in need of intensive care were taken. This room had only one radiant heater and three closed incubators. Equipment such as SiPAP, Neopuffs, Ivacs and saturation monitors were available. There was also an emergency trolley as well as a mobile suction machine available in the room allocated for intensive care patients.

The NICU additionally had a room for premature babies, a phototherapy room, and an isolation room for babies who had not been delivered in the hospital (for example, babies born at clinics or at home) or babies who had been discharged but then readmitted from home. A room was allocated for babies who needed to gain weight before discharge. Newborns that needed to gain weight (mostly low birth weight or premature babies) before they could be discharged were kept with their mothers round the clock in the KMCU. In the NICU midwives and registered nurses as well as enrolled nurses and enrolled nursing auxiliaries provided nursing care for the neonates. Based on the duty roster there were on average 20 nursing staff members on the permanent workforce of the NICU (these included all the categories of staff as well as day and night staff). These staff members also rotated in 12-hour shifts.

The postnatal ward was a 60-bed unit. Care for mothers post-delivery after normal vaginal deliveries and also on day 1 and 2 after caesarean section was provided. In the postnatal

ward there was a baby room with suctioning and oxygen equipment and some closed incubators. When the neonates were not rooming in with their mothers they were observed in the baby room. The examination of neonates and immunisations also took place in this baby room. The room adjacent to the baby room had an emergency trolley with some emergency equipment. Furthermore, there were two examination rooms and two separate rooms used as antenatal clinics. On average, the permanent workforce in the postnatal ward comprised of 24 nursing staff members consisting of all categories of staff, based on the duty roster. They also rotated in 12-hour shifts.

Healthcare providers working in the maternity section of the district hospital were involved in this study. They included: the management of the maternity section (matron); medical doctors (including a paediatrician, an obstetrician, medical doctors and doctors doing their community service); operational managers (also referred to as unit managers – unit managers/operational managers are in charge of a ward) from the labour ward, postnatal ward and neonatal intensive care unit; professional nurses; midwives as well as enrolled nurses and enrolled nursing auxiliaries.

1.10 RESEARCH DESIGN AND METHODOLOGY

In this section an overview will be given of the action research design, research setting, population, and sample as well as the data collection processes.

1.10.1 Action research and the action research design

Meyer (2010) (cited in Gerrish & Lacey 2010:257) views action research as a research approach. Piggot-Irvine (2009:14) states action research is fundamentally a research strategy which brings about change through action, developing and improving practice while at the same time generating and testing theory. Action research is committed to changing a system into a desirable direction by making use of active collaboration, co-learning and empowering participants in bringing about change (Maree et al. 2010:124-143). Collaboration is essential for action research and therefore all stakeholders should be involved in the research process. Reflection *in* action and reflection *on* action is imperative to action research because this is the element that influences change (Piggot-Irvine 2009:2).

The action research design of choice for this study was the Problem Resolving Action Research (PRAR) model described by Piggot-Irvine (2009:14). The PRAR model is a spiralling process of planning, acting, observing and reflecting. The model is upward in

direction (see Figure 1.2) to indicate that action research is a continuous improvement approach (Piggot-Irvine 2009:3). Using the PRAR model in this study meant the research process took place in cycles. Consequently, research and problem-solving occurred simultaneously which contributed towards addressing practical concerns where a problem had been identified (Piggot-Irvine 2009:2, 5).

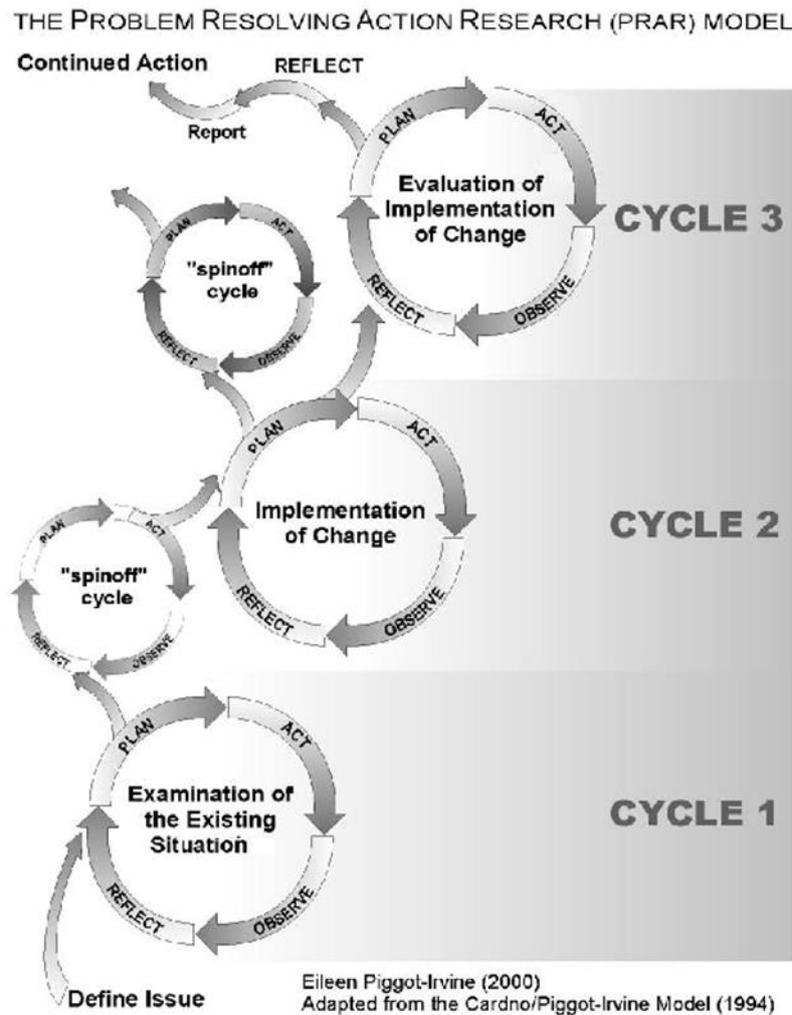


Figure 1.2: Problem Resolving Action Research (PRAR) model (Piggot-Irvine 2009:3).

In each cycle of the research process there were four steps: planning (PLAN), action (ACT), observation (OBSERVE), and reflection (REFLECT) (Piggot-Irvine 2009:2). The participants in the study played an important role in solving the practical problems in the particular setting and were involved in the research process. They were responsible for the development of a plan of action to address the problems at hand; they acted to implement this particular plan

and observed the effects of their actions in the specific context and, lastly, they reflected on the findings to form a basis for future planning (Piggot-Irvine 2009:2-6).

The researcher's main role was to facilitate the research process (O'Brien 2001:1-10; Piggot-Irvine 2009:1). When practical concerns are addressed, the results are positively fed back into practice consequently solving the problem and facilitating change in practice (O'Brien 2001:1-2). Action research is a valuable tool for improvement, change management and professional development (Brink, van der Walt & van Rensburg 2009:118; Maree et al. 2010:124-129; O'Brien 2001:1-10; Piggot-Irvine 2009:1-17). By addressing these practical concerns the results (in this case the strategies to sustain a quality improvement initiative in neonatal resuscitation) are positively fed back into practice. This action then should result in solving the problem and facilitating change in practice.

1.10.2 Study population

A population by definition is the entire group of individuals that the researcher is interested in. The population has some common characteristics and meet the inclusion criteria of a sample (Burns & Grove 2009:42, 344; Polit & Beck 2008:337-339; Brink et al. 2009:123-124). The population for all three cycles in this study comprised of the entire group of individuals caring for neonates in the maternity section in the selected district hospital (View Chapter 4, section 4.7 for more details).

1.10.3 Sample and sampling

A sample by definition is a subset/fraction of the whole of the population selected to participate in the study. A sample will therefore consist of a selected group or unit of analysis (Burns & Grove 2009:343-345; Polit & Beck 2008:339-340; Brink et al. 2009:124). Purposive sampling was used, which is a form of non-probability sampling (Brink et al. 2009:133-134; de Vos, Strydom, Fouché & Delpont 2002:201-202; Maree et al. 2010:176-178). As the quality improvement initiative was part of an action research study in a real-life situation, it implies that all the staff of the maternity section was directly or indirectly involved in this study. The sample for all three cycles therefore consisted of a purposefully selected group which had to meet the inclusion criteria as recommended by Polit and Beck (2008:339-340).

The criteria for inclusion in this study required the participants to be healthcare providers delivering and caring for neonates in the maternity section (labour ward, postnatal ward and NICU) of the particular district hospital irrespective of their years of working experience or

qualification. The healthcare providers included senior leaders (matron, operational managers/unit manager of the labour ward, postnatal ward and NICU), clinical leaders (shift leaders and doctors) as well as all categories of nursing staff. These healthcare providers had to choose to voluntarily participate. Healthcare providers not involved in the delivery and care for neonates in the maternity section of the district hospital were excluded from the study. The inclusion criteria were the same for both the quantitative and qualitative data collection processes.

The population remained the same throughout the study. The sampling remained the same for all data collection techniques except for the focus group interview held in CYCLE 1 and CYCLE 3. In CYCLE 1 the focus group interview was held with the doctors only and in CYCLE 3 the focus group interview was conducted with the steering group and stakeholders (including the doctors and professional nurses and midwives) (See section 1.10.2 and section 1.10.3 as well as Chapter 4, section 4.8 for more details and Table 1.1 for an overview of the population and sample).

Before commencing this study a steering group was established. The steering group consisted of stakeholders from practice which included senior leaders (matron and operational managers) and clinical leaders (shift leaders and doctors) and at least one healthcare provider from each of the clinical areas namely, the labour ward, postnatal ward and NICU in the maternity section of the district hospital. The steering group decided on a name for the steering group and also discussed their vision, individual roles, the functioning of the group and its ethical responsibilities (see Chapter 4, section 4.5). The steering committee drove the research process and initiated the action research process. The researcher was an outsider and only acted as a facilitator.

Conversely, during the course of this action research study the steering group grew smaller and the members changed. For example, the paediatrician who was originally part of the steering group was replaced and the new paediatrician did not wish to continue. The obstetrician also decided to quit and the operational manager of the labour ward resigned. However, there were four members who were constant during the whole of the research process and the fifth member was part of the group for 11 months. Unfortunately, due to staff shortages no other professional nurses were able to join the steering group. In the end the steering group consisted of the researcher, the operational managers of the three units, one professional nurse and the matron from the maternity section.

1.10.4 Discussion of cycles

This study was conducted in three cycles. Each cycle consisted of four steps (PLAN, ACT, OBSERVE and REFLECT). The application of the PRAR model in this study is illustrated in Figure 1.3.

Before commencing with the first of the three cycles, a steering group was established (see discussion in section 1.10.3). According to O'Brien (2001:1-10), action research is a holistic approach to problem-solving and allows for several different research tools to be used during the research process. To answer the main and sub-questions posed, the research process and methods followed in this study were adapted from Piggot-Irvine's Problem Resolving Action Research (PRAR) model (Piggot-Irvine 2009:3).

An overview of the method, sample and sampling, data collection and data analysis of each of the cycles will now be discussed. A detailed discussion regarding each of the three cycles will follow in Chapter 4, section 4.8.

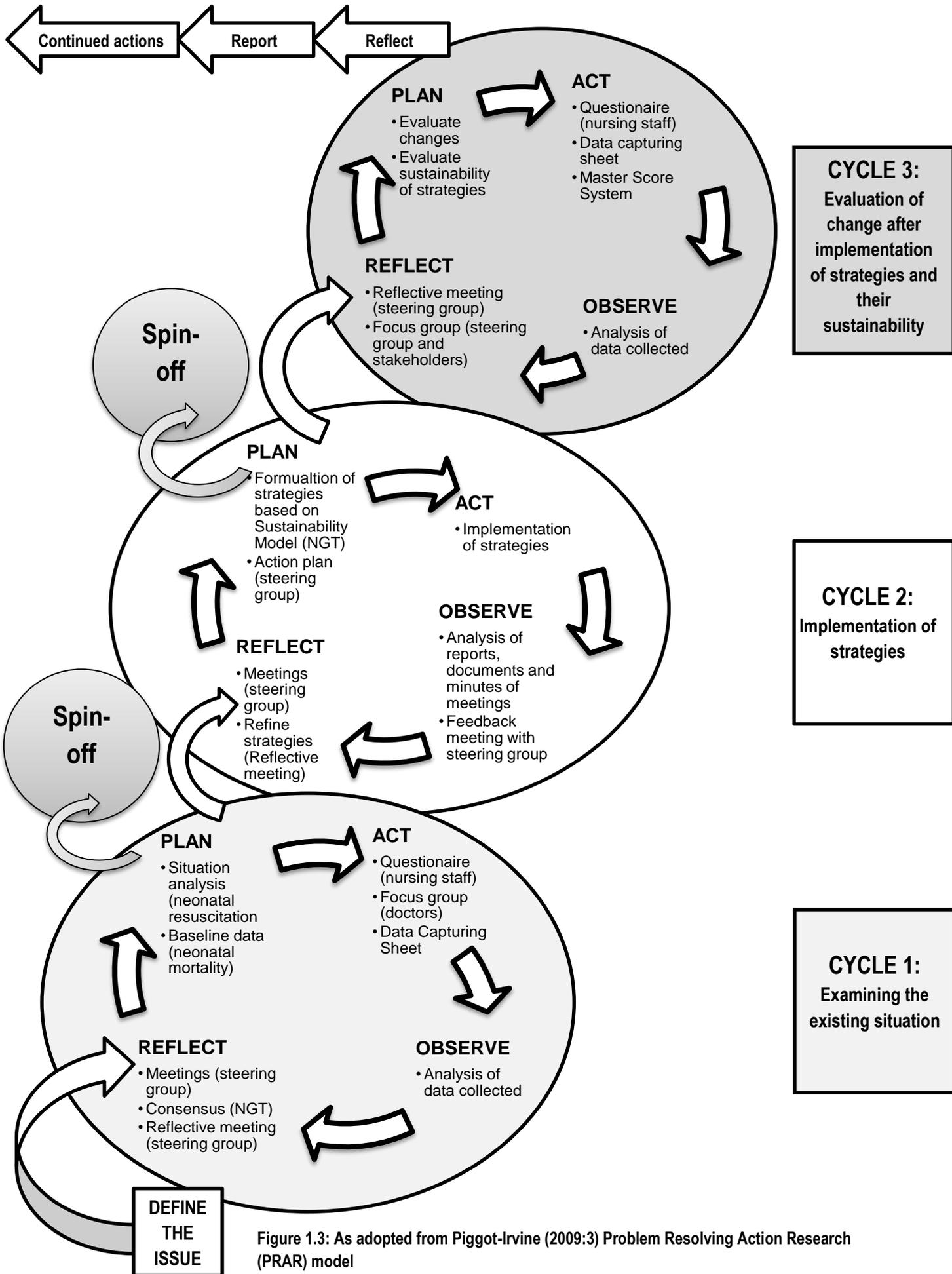


Figure 1.3: As adopted from Piggot-Irvine (2009:3) Problem Resolving Action Research (PRAR) model

1.10.4.1 CYCLE 1 – Examination of the existing situation

The main focus of CYCLE 1 was to answer the sub question: “*What is the existing situation regarding factors influencing neonatal resuscitation and neonatal mortality in a district hospital in Gauteng?*”

The first step (PLAN) for CYCLE 1 (view Figure 1.3) included a situational analysis and the gathering of baseline data. The situational analysis focused on the practice of neonatal resuscitation and other influencing factors related to the process, staff and organisation, and neonatal mortality as the indicator of quality of care. The second step (ACT) dealt with data gathering. The data gathering tools included a questionnaire, focus group interview and data capturing sheets. The sample for the questionnaire was all categories of nurses working in the maternity section of the particular district hospital. The sample for the focus group interview included the doctors working in the maternity section of the district hospital. The unit of analysis for the data capturing sheets was documents and records pertaining to statistics related to neonatal mortality, for example, the number of births. The data capturing sheets provided baseline data for neonatal mortality. During the third step (OBSERVE) data from previous steps were analysed (view Figure 1.3). The quantitative data were analysed by making use of descriptive statistics and the qualitative data were analysed by open-coding. Lastly, step four followed, (REFLECTION). During this step (view Figure 1.3) consensus was reached by means of a nominal group technique (NGT) discussion based on the findings of CYCLE 1. The sample for the NGT included the steering group as well as doctors and nursing staff from the maternity section. Reflective meetings were also held with the steering group.

1.10.4.2 CYCLE 2 – Implementation of strategies

The focus of CYCLE 2 was to answer the following research question: “*What strategies can be implemented to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng?*”

The first step (PLAN) was to develop and formulate strategies based on the findings from CYCLE 1, consensus reached during the nominal group technique discussion and a literature control to sustain a quality improvement initiative in neonatal resuscitation in the maternity section of the district hospital (view Figure 1.3.). In the second step (ACT) strategies were implemented by the operational managers of the maternity section in each of the three units. During the third step (OBSERVE) the minutes of meetings held by the

steering group and a feedback meeting held with the steering group regarding the implementation of strategies were analysed. The fourth step, (REFLECT) included a reflective meeting held with the steering group members regarding the implementation and refinement of strategies.

1.10.4.3 CYCLE 3 – Evaluation of implementation of strategies and determining sustainability of the strategies

The focus of CYCLE 3 was to answer the following research questions: “*What were the changes that occurred as a result of the strategies for a quality improvement initiative in neonatal resuscitation that was implemented? How sustainable was the strategies to sustain a quality improvement initiative?*”

During the first step, (PLAN) the changes and sustainability of the strategies implemented were evaluated. During the second step (ACT) various data gathering tools were used to collect data. These included a questionnaire and data capturing sheets to provide data on changes regarding neonatal mortality (view Figure 1.3). The sample for the questionnaire was the same as in CYCLE 1 and included all the categories of nurses working in the maternity section of the district hospital. The Master Score System served as a tool to evaluate the sustainability of the strategies that were implemented. The sample for the completion of the Master Score System included the matron, operational managers of the maternity section and the researcher. The doctors were included in the sample for the focus group interview that was held in step four (REFLECTION). During the third step (OBSERVE) data from previous steps were analysed (view Figure 1.3). The quantitative data were analysed by making use of descriptive statistics and the qualitative data were analysed through open-coding. Lastly, step four, (REFLECTION) followed. During this step (view Figure 1.3) a focus group interview was held with the steering group and stakeholders. The sample for this focus group therefore included the steering group, doctors as well as professional nurses. This focus group interview served a dual purpose of reflecting on and evaluating the strategies. Reflective meetings were also held with the steering group.

Table 1.1 serves as a summary or overview of how the three cycles played out. The research methodology and process for each of the three cycles will be discussed in detail in Chapters 4, 5, 6 and 7.

Table 1.1: Summary/overview of the different cycles of the study design

OBJECTIVES	SAMPLING/UNIT OF ANALYSIS (PURPOSIVE SAMPLING)	DATA COLLECTION	DATA ANALYSIS
<p>CYCLE 1: EXAMINING THE EXISTING SITUATION:</p> <ul style="list-style-type: none"> • Explore and describe the existing practices of neonatal resuscitation • Explore and describe factors influencing neonatal resuscitation 	<p>CYCLE 1:</p> <ul style="list-style-type: none"> • Nurses: 42 respondents from all three the units completed questionnaires; 69 questionnaires were distributed (60.8% responded) • Doctors: 9 attended focus group interview • Steering group and staff from the maternity section: Management; doctors; senior and clinical leaders and professional nurses; 10 participants attended the nominal group technique (NGT) discussion. • Documents and statistical records: Data capturing sheets of statistics related to births and neonatal mortality 	<p>CYCLE 1:</p> <ul style="list-style-type: none"> • Questionnaires: Nurses • Focus group interview: Doctors • Nominal Group Technique discussion: Steering group and professional staff from the maternity section • Data capturing sheets 	<p>CYCLE 1:</p> <ul style="list-style-type: none"> • Quantitative data: descriptive and inferential statistics used for analysis • Qualitative data: Open-coding following the steps of Tesch (Creswell 2009:186) used for analysis

OBJECTIVES	SAMPLING/UNIT OF ANALYSIS (PURPOSIVE SAMPLING)	DATA COLLECTION	DATA ANALYSIS
<p>CYCLE 2: FORMULATION AND IMPLEMENTATION OF STRATEGIES</p> <ul style="list-style-type: none"> • Develop strategies to sustain a quality improvement initiative in neonatal resuscitation • Implement strategies to sustain a quality improvement initiative in neonatal resuscitation 	<p>CYCLE 2:</p> <p>Steering group and professional healthcare staff from the maternity section: Management, doctors, senior and clinical leaders and professional nurses</p>	<p>CYCLE 2:</p> <p>Strategies were based on the results of CYCLE 1, consensus of the NGT and a literature control.</p>	<p>CYCLE 2:</p> <p>Minutes of the meetings and a feedback meeting held with the steering group regarding the implementation of strategies were analysed</p>
<p>CYCLE 3: EVALUATION OF IMPLEMENTATION AND SUSTAINABILITY OF STRATEGIES</p> <ul style="list-style-type: none"> • Determine changes occurring in neonatal resuscitation as a result of these strategies • Determine the sustainability of these strategies on neonatal resuscitation 	<p>CYCLE 3:</p> <ul style="list-style-type: none"> • Nurses: 40 respondents from all three the units completed questionnaires; 71 questionnaires were distributed (56.3% responded) • Steering group and professional healthcare staff from the maternity section: Management, doctors, senior and clinical leaders and professional nurses (focus group interview); 10 participants. • Documents and statistical records: Data capturing sheets 	<p>CYCLE 3:</p> <ul style="list-style-type: none"> • Questionnaires: Nurses • Focus group interview: Management, doctors, senior and clinical leaders and professional nurses • Data capturing sheets 	<p>CYCLE 3</p> <ul style="list-style-type: none"> • Quantitative data: Descriptive and inferential statistics were used for analysis of quantitative data • Qualitative data: Open coding following the steps of Tesch as indicated by Creswell (2009:186) was used for analysis

1.11 RIGOUR

Rigour refers to the quality, validity, accuracy and credibility of action research and its findings (Mertler 2009:24). According to Coghlan and Brannic (2010:14), rigour in action research pertains to how data were generated, gathered, explored and evaluated to convince the audience about the value and truth thereof. In this study validity and reliability were used to establish the rigour of the quantitative data and the trustworthiness of the qualitative data.

In quantitative data validity is “quality criteria which refers to the degree to which inferences made in a study are accurate and well founded” (Polit & Beck 2008:768). Reliability refers to “the degree of consistency or dependability with which an instrument measures an attribute” (Polit & Beck 2008:764).

In qualitative data trustworthiness refers to ‘the degree of confidence researchers has in their data’ (Polit & Beck 2008:768). Trustworthiness is concerned with the quality of the data presented in qualitative research; the data obtained must accurately reflect the experiences of the participants. This confidence in data is obtained by assessing the data using various criteria: credibility, dependability, confirmability and transferability (Maree et al. 2010:133-134; Polit & Beck 2008:768). The rigour in this study will be discussed in detail in Chapter 4, section 4.10.

1.12 ETHICAL CONSIDERATIONS

Fundamental ethical principles underlie the protection of human beings when conducting nursing research involving humans. The three basic ethical principles guiding researchers are respect for persons, justice and beneficence (Burns & Grove 2009:188). In action research the researcher (facilitator) works in collaboration with the stakeholders and the study participants. It is the responsibility of the research team (the researcher, supervisors and the steering group in this study) to determine the risks and benefits of the study (Bastida et al. 2010:16-20). During the current action research study process this code of conduct was adhered to consistently.

1.12.1 Principle of respect for persons

The two most important aspects of the principle respect for persons are the right to self-determination and the right to full disclosure (Burns & Grove 2009:189-207; Polit & Beck 2008:170-185).

- ***Right to self-determination***

The right to self-determination implies that individuals have the right to participate or withdraw from a research study as they please and without any repercussions. Individuals have the right to ask questions and be free from coercion (Burns & Grove 2009:189-194; Polit & Beck 2008:171-172). The informed consent documents (see Annexures I, K, M, and N) included adequate information with regard to participation and it was stated clearly participants were free to choose and could participate voluntarily or decline participation. It was also important for the study participants not to be misinformed about the purposes of the study (Bastida et al. 2010:19). Therefore, the researcher disclosed to the participants that this study was part of the requirements for her doctorate at the University of Pretoria.

Due to the nature of action research and the cyclic process of planning, action, observation and reflection the researcher could not provide detailed information about what could be expected during the research process. It was also difficult to state exactly how long the process would take because of the possibility of unforeseen spin-off cycles that might have occurred. This issue was discussed with the participants and all agreed willingly to participate (Bastida et al. 2010:16-20; Smith 2008:16-21).

- ***Right to full disclosure***

The right to full disclosure is the right to make a fully informed decision. Therefore, the study participants had the right to voluntarily choose to participate or decline participation without prejudice (Burns & Grove 2009:189-207; Polit & Beck 2008:170-185). The researcher therefore requested the participants in the nominal group technique (NGT) discussion and focus group interviews to sign an informed consent form only after they had volunteered to participate in the study. The researcher answered all questions relevant to the study and provided additional information upon request. The researcher informed the participants about the purpose of the study. By completing the questionnaire the participants implied consent. Because action research is a cyclical process, the researcher made sure she

obtained informed consent from the participants on a continuous basis throughout the research process. An informed consent form for each of the data collection methods was signed by all the nominal group technique discussion and focus group interview participants (Smith 2008:16-21).

The researcher requested and obtained approval from the following committees and stakeholders to conduct this study.

- *The in-house committee of the Department of Nursing, School of Health Sciences Postgraduate and Research Committee as well as the Faculty of Health Science Ethics Committee (see Annexure B).*
- *Provincial consent from the Gauteng Department of Health (DoH) (See Annexure C).*
- *Tshwane Research Committee clearance certificate (see Annexure A).*
- *Consent from the management of the selected district hospital (see Annexure D).*

In addition, the researcher obtained informed consent from the management of each unit and the healthcare providers working in the unit. Hence, informed consent was obtained from all the stakeholders. The original signed documents are available on request.

1.12.2 Principle of justice

The principle of justice includes the right to fair treatment and the right to privacy (Polit & Beck 2008:173-174).

- ***The right to fair treatment***

Fair treatment implies the fair and non-discriminating selection of participants (Burns & Grove 2009:198; Polit & Beck 2008:171-174). In this study all the healthcare providers working in the maternity section of the district hospital were invited to participate.

Agreements regarding the fair treatment between the study participants (stakeholders and steering group) and the researcher (facilitator) were kept. This was discussed in an introductory meeting before data were collected. Fair treatment also implied that the researcher treated the study participants who withdrew from the study in a non-judgemental way. In action research fairness is important in building trust among the researcher, steering group and participants (Bastida et al. 2010:16-20). In this study trust was earned by keeping promises and adhering to meeting dates as far as possible (sometimes meetings had to be

cancelled due group members being unavailable) as well as by treating the steering group members and the healthcare providers with respect.

- ***The right to privacy***

The right to privacy principle can be honoured either by anonymity or through maintaining confidentiality. Anonymity implies keeping individuals nameless (Burns & Grove 2009:194-198; Polit & Beck 2008:174-185). Confidentiality implies the researcher takes the responsibility to protect all data gathered within the scope of the project from being made available to other persons unless the researcher has been given permission to make it known publicly (Burns & Grove 2009:196-198; Polit & Beck 2008:174-185).

With the questionnaire anonymity could be guaranteed because it was completed anonymously by the respondents. However, in the context of this study making use of the nominal group technique discussion and focus group interviews as data collection methods meant anonymity could not be guaranteed. Thus, by not mentioning the name of the institution neither the participants' names or surnames in the report or during the dissemination of the findings ensured confidentiality was maintained as optimally as possible. The participants were made aware of this fact and the researcher requested them to respect one another's privacy and not to disclose information given during the focus group interviews and nominal group technique discussion.

The researcher will keep all documents, transcripts and files of this study under lock and key with password protection on her personal computer. These will be kept for a period of 15 years after completion of the study. The researcher only disseminated the findings after permission was granted by the relevant parties (Burns & Grove 2009:194-198; Polit & Beck 2008:174-185).

The findings of the study will be disseminated through articles written for national and international publications as well as during conferences.

1.12.3 Principle of beneficence

The principle of beneficence is the most basic principle and implies the right to freedom from harm and discomfort and the right to protection from exploitation (Burns & Grove 2009:189-207; Polit & Beck 2008:170-185).

- ***The right to freedom from harm and discomfort***

The right to freedom from harm and discomfort means the researcher must be sensitive to the study participants with the aim to “do good” and, above all, to not harm or cause discomfort to the study participants (Burns & Grove 2009:198). The researcher should also be prepared to stop the study immediately if the disadvantages outweigh the advantages of the study. The researcher was aware that harm and discomfort comes in different forms, for example, emotional, physical, social and financial (Burns & Grove 2009:198-201; Polit & Beck 2008:170-173).

In the case of this study the researcher did not foresee any discomfort or harm to the study participants. The benefits of this study included that it might contribute towards decreased neonatal mortality rates in the specific hospital. In addition, the strategies that were implemented for sustaining a quality improvement initiative in neonatal resuscitation and the changes that might have occurred in this district hospital could serve as a benchmark for decreasing neonatal mortality in similar district hospitals in all nine provinces in South Africa. Another possible benefit was that the steering group learned about action research; also, the healthcare providers working in the maternity section had ownership of this study thus affording them the opportunity to be empowered. To be empowered means it gave the participants self-confidence, control and choices in life, and it has a lasting value (UNAIDS 2000:7).

- ***The right to protection from exploitation***

Participants in a research study need to be assured that information given during the course of the research study will not be used against them in any way. It is important for the researcher to make sure the benefits of the study outweigh the risks and that study participants will be free from exploitation (Polit & Beck 2008:171; Burns & Grove 2009:200-201). The benefits in the current study included that the participants would have ownership in the quality improvement initiative and, as a result, practice and outcomes of the neonates born at this hospital could be improved. Professional development was perceived as a benefit for the participants, for example, the steering group would learn about action research methodology. The selected district hospital could also serve as a benchmark for other district hospitals in Gauteng and in the rest of South Africa for sustaining an improvement initiative in neonatal resuscitation. According to Bastida et al. 2010:19, researchers should disclose their academic gain and meetings should be based on equality and full disclosure. The researcher disclosed her own academic interests and gain from the

study and the meetings were held based on equal voice and full disclosure. The steering group that took this study and led it forward were acknowledged for their contribution.

For the purposes of this study the researcher was convinced the benefits would outweigh the risks; there was no risk of exploitation of the study participants. The researcher took the culture and the contemporary healthcare politics of the context into consideration.

1.13 DISSEMINATION OF FINDINGS

It is envisaged for the study to be published in national and international publications. The researcher also plans to deliver presentations on the findings of the study at national conferences, for example, at the Neonatal Nurses Association of South Africa's annual conference as well as at perinatal conferences. In fact, should the opportunity arise it will also be presented at international conferences. Furthermore, the researcher intends to take the strategies to sustain a quality improvement initiative in neonatal resuscitation to the South African Department of Health which could potentially bring about change and inform policies.

1.14 LIMITATIONS OF THE STUDY

Action researchers must gain the trust of participants to facilitate the research process (Maree et al. 2010:135). The researcher was an outsider and unknown to most of the participants; this might have been a limitation. To address this issue the researcher made sure she took preventive measures by, for example, providing a comprehensive introduction and using open communication. With regard to the generalisation of results, the researcher had to rely on the validation of the participants. Therefore, it was important for the researcher to give comprehensive details regarding the context of the research setting as well as a thick description of the findings (Maree et al. 2010:135-136). Moreover, time can be a limitation in action research as it is a time-consuming process (Piggot-Irvine 2009:9). To overcome this limitation the researcher took the time aspect into consideration when she was planning the research process and dissemination of findings. Further limitations will be discussed in Chapter 8, section 8.4.

1.15 OUTLINE OF THE STUDY

The study comprises the following chapters:

Chapter 1: Research overview

Chapter 2: Literature review on neonatal mortality and neonatal resuscitation

Chapter 3: Literature review on quality improvement initiatives and sustainability

Chapter 4: Action research methodology

Chapter 5: CYCLE 1: Examination of the existing situation

Chapter 6: CYCLE 2: Formulation and implementation of strategies to sustain a quality improvement initiative in neonatal resuscitation

Chapter 7: CYCLE 3: Evaluation of implemented strategies and their sustainability

Chapter 8: Conclusions and recommendations

1.16 CONCLUSION

Neonatal mortality and morbidity remains a problem in South Africa; especially in the district hospitals. The practice of neonatal resuscitation can change the outcome of neonates in the country if done effectively. The problem factors surrounding neonatal resuscitation relate to the process, staff and organisation. In combination, these factors are seen as perpetuating neonatal resuscitation as a multifaceted problem in urgent need of a holistic problem-solving approach. By making use of action research in this study, the researcher could engage and collaborate with the stakeholders to achieve and take ownership of the developed and implemented quality improvement initiative. When such a quality improvement initiative is driven by the healthcare providers working in the district hospital, the chances are even higher to sustain it over time. In this study the healthcare providers in the district hospital played an important role in identifying and resolving the problems regarding neonatal resuscitation in their own hospital and they were able to reflect on the positive effects.

If strategies to sustain a quality improvement initiative are implemented and evaluated, it can aid in the prevention of knowledge and skill deterioration in neonatal resuscitation, provided that the focus is not on the neonatal resuscitation process only but also on the healthcare staff and the organisation. These strategies can assist the management of the district

hospital (and others in the country) in dealing with issues surrounding neonatal resuscitation and neonatal mortality from a holistic point of view. This in itself can lead to policy changes. Additionally, if the strategies formulated from the data obtained in this study lead to positive and sustained change, it can also initiate policy changes. These strategies can furthermore effectuate a decrease in the neonatal mortality rates in the study setting thereby helping to make a difference in the lives of many neonates and their parents. Successful neonatal resuscitation can decrease the NMR and this will help the government of South Africa to improve the critical healthcare outcome linked to the MDG 4 set by the WHO.

This chapter served as an overview of the study. The aim was to conduct a study with the purpose of developing strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng. The background and rationale were discussed as well as the research overview and research design. Attention was given to rigour and the ethical considerations related to human research studies. The dissemination of the findings and limitations of the study were briefly mentioned. The rest of the chapters in this report were also outlined.

Chapter 2 is a literature review on neonatal mortality and neonatal resuscitation.

CHAPTER 2: LITERATURE REVIEW ON NEONATAL MORTALITY AND NEONATAL RESUSCITATION

2.1 INTRODUCTION

Chapter 1 provided an overview of the study of which the main focus was to develop strategies to sustain a quality improvement initiative in neonatal resuscitation. Because the focal point was on a holistic approach, the study was based on the NHS Sustainability Model which is thoroughly discussed in Chapter 3. This chapter converges on the literature related to neonatal mortality and neonatal resuscitation.

The researcher involved the academic information specialist of the University of Pretoria to assist with the literature search. Different health databases were used such as PUPMED, OVID and CINHAL to name a few. The researcher also made use of e-journals. Keywords that were used were related to neonatal mortality, strategies, sustainability, quality improvement initiatives and district hospital for example. Potential articles were screened by title, then by abstract and lastly by full article. Various reports related to the MDG 4 were also used in the literature review.

The mortality rates are used as an indicator for quality healthcare in a country and to determine the world's health status. The under-5 mortality rates refer to the mortality of children under the age of 5/1 000 live births (Nannan et al. 2012:iii). Neonatal mortality is therefore part of the under-5 mortality rates.

Neonatal mortality is the mortality rate of neonates who die within the first 28 days/1 000 live births (Ersdal & Singhal 2013:373). Neonatal mortality can be divided into early and late neonatal mortality. The early neonatal mortality rate (ENMR) refers to mortality within 0-6 days/1 000 live births and the late neonatal mortality rate (LMNR) to mortality within 7-28 days/1 000 live births (Nannan et al. 2012:iii).

In 1990 the WHO made a call for action for a 2/3 reduction in the under-5 mortality by 2015. This was set in the MDG 4 (Bryce et al. 2008:1247-1257). Since then sub-Saharan Africa has shown the highest under-5 mortality rates in the world (Bryce et al. 2008:1247-1257). In the 2000-2010 WHO/UNICEF Countdown to 2015 Decade Report (WHO/UNICEF 2010:iii) the key message was that worldwide, but particularly in sub-Saharan Africa, the poor functioning of the healthcare infrastructures, the lack of staff resources, slow implementation

of evidence-based practice, and insufficient focus on quality care were having a negative impact on the global progress towards achieving the 2015 MDGs. South Africa committed and signed on to the MDGs in 2000 (Bradshaw et al. 2008a:1294-1304; Bryce et al. 2008:1247-1257). South Africa was one of 12 countries (others were, for example, Cameroon, Lesotho, Botswana, Swaziland and Zimbabwe) in which the mortality of children under 5 years old had increased since the baseline was set in 1990 (Bryce et al. 2008:1247-1257; Chopra et al. 2009:1). A country like Botswana along with South Africa was identified as countries that made the least progress towards MDG 4 in 2006, but in the Countdown to 2015 Decade report Botswana is identified as a country on track towards attainment of the MDG 4 whereas South Africa is still making no progress (Bryce et al. 2008:1247-1257; WHO/UNICEF 2010:8-9).

In current day South Africa certain avoidable factors in the health system unfortunately still result in neonatal deaths (Lloyd & de Witt 2013:1-4). Although specific strategies to improve the quality of existing programmes were set by the Perinatal Problem Identification Program (PPIP) – which falls under the Medical Research Council (MRC) – avoidable and preventable neonatal deaths still occur, especially in the district hospitals in South Africa. These avoidable and preventable deaths are associated with the patient (for example, delay in seeking medical attention during labour by the mother or delay in seeking help for a ill neonate); administrative problems (such as inadequate facilities or equipment for resuscitation or lack of staff or transport) or it is linked to the healthcare provider who may not be knowledgeable about caring for a neonate or have no knowledge of neonatal resuscitation (Pattinson 2009:38; 2011:39-41; 2013:12). By improving coverage and the quality of care, adequately staffed and equipped facilities with healthcare providers who have appropriate skills and a positive attitude towards quality improvement are needed (Pattinson 2013:12).

In this chapter the prevalence of neonatal mortality globally and in South Africa are discussed followed by interventions to reduce neonatal mortality. Neonatal resuscitation is explained with regard to basic and advanced neonatal resuscitation and neonatal resuscitation training. Lastly, additional factors influencing the success/effectiveness of neonatal resuscitation are addressed.

2.2 PREVALENCE OF NEONATAL MORTALITY

According to Lloyd and de Witt (2013:1), 130 million babies are born globally every year of which “4 million will die within the first 28 days of life”. The highest risk for death is on the

first day of life in the period before, during and after birth (Lloyd & de Witt 2013:1). Every Newborn: An Action Plan to End Preventable Deaths (WHO/UNICEF 2014:5, 9) reflected by the end of 2012 the global number of child deaths had been reduced by 50% while the neonatal mortality and stillbirth rate for the same period had reduced at a slower rate despite the availability of feasible evidence-based solutions. In addition, globally more than 40% of child deaths occur in the neonatal period. In fact, Lawn et al (2014:195) emphasise 40% of stillbirths and neonatal deaths occur during labour and in the first 48 hours after birth. Worldwide a decrease in neonatal mortality lagged behind when compared to the under-5 mortality rates in 2012, thus indicating the global newborn mortality rate decreased only by 37% from 33/1 000 live births to 21/1 000 live births, representing 44% of the total under-5 mortality rate (WHO/UNICEF 2014:9).

According to the WHO/UNICEF (2014:12), the current reality is that 2.9 million neonatal deaths still occur worldwide. The percentage of deaths occurring in the neonatal period (within the first 28 days of life) increased to 44% as reflected in the latest available statistics (WHO/UNICEF 2014:12; Darmstadt et al. 2014:174). However, as stated by Berkly et al. (2014:e22) and Mason et al. (2014:455), this percentage does not include the 2.6 million stillbirths of which 1.2 million (45%) occurs during labour. Furthermore, of the 44% deaths (in the neonatal period) 99% occurs in low- and middle-income countries (Berkly et al. 2014:e22; Conroy et al. 2014:1). Mason et al. (2014:455) observe globally more than 15 000 babies die every day; this translates to approximately ten babies dying every minute.

In the Countdown to 2015 Decade Report (2000-2010) South Africa was identified as a country where no progress has been made towards obtaining the MDG 4 as the under-5 mortality rate raised from 56/1 000 live births in 1990 to 73/1000 live births in 2000 which then decreased to 67/1 000 live births in 2008 (WHO/UNICEF 2010:9). The most recent statistics estimated by the UN Inter-agency Group for Child Mortality Estimation (UN Inter-agency Group, South Africa mortality rate, [s.a]) estimate the under-five mortality rate for South Africa was 46.7/1 000 live births in 2011. As previously mentioned, reducing neonatal mortality will contribute to the reduction of the under-5 mortality rate in South Africa.

Lloyd and de Witt (2013:1) state the neonatal deaths in South Africa account for 40% of the under-5 mortality rate in the country. South Africa's target was to reduce the neonatal mortality rate (NMR) from 21/1 000 live births in 1998 to 7/1 000 by 2015. According to Statistics South Africa (StatsSA), the NMR rate for South Africa was 14/1 000 live births in 2008. The data from StatsSA indicated there was no change in the NMR from 2000 to 2008 (Lloyd & de Witt 2013:1; Velaphi & Rhoda 2012:67). According to UN estimates the neonatal

mortality rate for South Africa was 19.2/1 000 live births in 2011 (UN Inter-agency Group, South Africa mortality rate, [s.a]). In the Saving Babies Report of 2010-2011 the NMR rate is indicated as 21/1 000 live births with most of these deaths occurring in the birth weight category of 1000 g – 1499 g (Lloyd & de Witt 2013:1). In South Africa 46% of neonatal deaths occur in district hospitals. Velaphi and Rhoda (2012:67) argue that although it is understandable that low birth weight infants are at a high at risk of not surviving, it is a major concern that for babies weighing more than 1 000 g the early neonatal mortality rates (ENMR) is the highest in district hospitals.

Considering that early neonatal deaths account for 75% of all neonatal deaths worldwide (Lloyd & de Witt 2013:1), it is troublesome that WHO/UNICEF (2014:6) reports 80% of all newborn deaths globally are caused by preventable and treatable conditions. The highest risk for neonatal deaths is the period before, during and shortly after birth (Lawn et al. 2014:195). Ersdal and Singhal (2013:373) assert over the past decade the consistent three main causes of neonatal mortality worldwide were complications related to a low birth weight (including prematurity and small for gestational age babies), intrapartum conditions (asphyxia), and infections. Low birth weight babies (including premature babies) account for 60-80% of neonatal deaths (usually due to hypothermia) making a low birth weight the leading cause of neonatal deaths in the world (Conroy, Morrissey & Wolman 2014:2; Lloyd & de Witt 2013:1). Similarly, a low birth weight, intrapartum conditions and infections are the main causes of neonatal deaths in South Africa (Mabaso, Ndaba & Mkhize-Kwitshana 2014:184; Pattinson 2009:15; 2011:39-40; Velaphi & Rhoda 2012:67). Mortality reviews in South Africa indicate many neonatal deaths that have been linked to prematurity and asphyxia may have been prevented if there were adequate facilities and equipment to do neonatal resuscitation, and if there were enough staff sufficiently trained to resuscitate and monitor the patients. These are just a few examples related to administrative and healthcare worker avoidable factors (Velaphi & Rhoda 2012:67).

According to Mabaso et al. (2014:184), it is estimated that 32-54% of maternal, neonatal and child deaths are due to preventable causes that could have been avoided within in the healthcare system. Such preventable causes are either administrator-related or related to healthcare workers. The identified administrator related factors include, amongst others, inadequate facilities or equipment; no intensive care unit bed with ventilator; a lack of transport; personnel who are not sufficiently trained; not enough trained nurses and anaesthetic delays. The healthcare worker related factors are identified as inadequate management; delays in the referral of patients; no antenatal steroids; inadequate monitoring and inadequate resuscitation; foetal distress not detected; prolonged second stage without

intervention; poor progress and partogram not used properly (Pattinson 2011:21-41; Velaphi & Rhoda 2012:68).

Whereas prematurity, asphyxia and infections seem to be the three main causes of neonatal mortality, the two conditions that account for the biggest portion of the NMR in South Africa are preterm birth and intrapartum asphyxia (Velaphi & Rhoda 2012:68). Interventions should therefore be aimed at the prevention of these two conditions to reduce neonatal mortality in South Africa. Such interventions should include improvements in the obstetric care and immediate care of the newborn. As evidenced, most births in South Africa occur in district hospitals and therefore these interventions should be aimed at district hospitals (Velaphi & Rhoda 2012:68, 69).

2.3 INTERVENTIONS TO REDUCE NEONATAL MORTALITY

Coverage of interventions surrounding care during labour and birth has the greatest potential to prevent deaths and can save the lives of mothers and newborns. It can further prevent stillbirths and disability (Mason et al. 2014:456). These interventions should include care of the small and sick newborn (Mason et al. 2014:456). According to Conroy et al. (2014:1), it is estimated that if interventions were implemented effectively and with high coverage, it could prevent up to 70% of neonatal deaths. Interventions can also have a positive impact on neonatal morbidity thus it can be instrumental in reducing the NMR rate in South Africa. Such interventions should be aimed at assisting district hospitals where the quality of care is the poorest (Pattinson 2009:1; 2013:23-24; Velaphi & Rhoda 2012:68, 69). Efforts should therefore be concentrated on interventions for district hospitals (Pattinson 2009:1; Velaphi & Rhoda 2012:68).

Recommended interventions will be discussed in the following section according to the leading reports, namely, the Saving Babies Reports (2006-2007; 2008-2009; 2010-2011); the Every Death Counts Report (2008); the Every Newborn: An Action Plan to End Preventable Deaths (2014); the National Perinatal Morbidity and Morbidity Committee Triennial Report (NaPeMMCo) (2008-2010); the Countdown to 2015 Decade Report (2000-2010), and South Africa's Strategic Plan for a Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA) (2009) as well as other additional recommendations.

2.3.1 Saving Babies Report (2006-2007; 2008-2009; 2010-2011)

The Perinatal Problem Identification Programme (PIPP) data base is administered by the Maternal and Infant Healthcare Strategies Research Unit (MRC) and was set up in 1999. The aim of the PIPP is to estimate a national perinatal mortality rate (PNMR) and to identify the major causes of perinatal mortality and any related avoidable factors, missed opportunities, and substandard care in South Africa. The data are reported on in the Saving Babies Reports (Pattinson 2009:v-1). For the purpose of this study the focus will be on the three latest Saving Babies Reports, namely, that of 2006-2007; 2008-2009 and 2010-2011.

The neonatal care recommendations made in the sixth report on perinatal care in South Africa, the 2006-2007 Saving Babies Report, (Pattinson 2009:59-62), are aimed at *reducing neonatal morbidity and mortality* due to perinatal hypoxia, low birth weight and infection. One of the specific preventable factors mentioned in the report is the dire quality of neonatal resuscitation. Recommendations are made to develop national guidelines for newborn care and neonatal resuscitation to be used by all the healthcare workers involved in the delivery of newborns. Institutions have to provide the required infrastructure, equipment and staff to implement these guidelines. Most importantly, it is recommended that all doctors and nurses caring for newborns should be competent in neonatal resuscitation. Drills for practising neonatal resuscitation on mannequins should be conducted in 3-monthly intervals. The training of undergraduate students should also include the national neonatal guidelines. Another recommendation pertaining to the quality of postnatal care for neonates is that it has to be improved to reduce the mortality in the post-discharge period. These recommendations include improving aspects of administration, for example, health facilities should have the necessary infrastructure, equipment and staffing to implement the national guidelines; clinical practice, for example, healthcare providers caring for babies need to use the national guidelines for neonatal care and should be competent in neonatal resuscitation and, importantly, attention should be paid to the education of undergraduate students (Pattinson 2009:59-65).

The seventh Saving Babies Report of 2008-2009 addresses *interventions for perinatal care* in South Africa. The major interventions to improve the quality of care and thus the outcomes for newborns are identified as the recognition and management of preterm labour, hypertension and intrapartum hypoxia as well as the management and care of the small and sick newborn which include neonatal resuscitation (Pattinson 2011:58). Further recommendations were similar to those made in the previous Saving Babies Report (2006-2007). But, in the Saving Babies Report of 2008-2009 it is highlighted that recommendations alone cannot lead to change; the recommendations need to be implemented to lead to

change. Recommendations thus focus on the clinical skill improvement of midwives and nurses regarding neonatal resuscitation and the management and care of the sick and low birth weight newborn. In-service training for doctors, midwives and nurses with regard to neonatal resuscitation are recommended as are the implementation of national neonatal guidelines and the improvement of postnatal care. Recommendations pertaining to the staff, equipment and facilities include that the staff should be used in the most efficient ways, staff norms should be implemented, and systems must be in place to attract and retain staff. Furthermore, equipment lists must be adhered to and the procurement of equipment has to be efficient. Equipment must also be used correctly and appropriately. Regarding the transport to healthcare facilities it is recommended that transport should be available and equipped for dealing with obstetrics and neonatal emergencies. Recommendations are also made regarding training and education while basic neonatal resuscitation is highlighted as a priority (Pattinson 2011:71-88).

The Saving Babies Report of 2010-2011, the eighth report on perinatal care in South Africa, signifies that in order to save the lives of South Africa's neonates, *effective interventions must be available*. The coverage of these interventions should not only be adequate but also need to be applied with the appropriate knowledge, skills and resources to contribute towards improving the quality of care rendered to neonates. Priorities for interventions are set in the Saving Babies Report (2010-2011) with the two most important priorities being preventing intrapartum asphyxia and birth trauma. In district hospitals specifically, the priority is to prevent spontaneous preterm birth. The quality of care depends on adequate staff resources, adequate material resources (stock and equipment) and competent healthcare providers displaying the necessary knowledge and skills with a caring attitude. Other recommendations remain the same as for the previous two reports (2006-2007) and (2008-2009) (Pattinson 2013:12, 22). Unfortunately, it seems as if the sustainability related to the suggested quality improvements and recommendations is still lacking. The focus of this study was therefore to develop strategies to sustain a quality improvement initiative in neonatal resuscitation.

Data and findings from the PPIP and Saving Babies Reports were used as a health profile giving insight into the quality of care received in South African district hospitals. This data contributed towards the Every Death Counts Report discussed next.

2.3.2 Every Death Counts (EDC) Report: Saving the lives of mothers, babies and children in South Africa

The Every Death Counts (EDC) Report is based on the three South African mortality audit reports, namely, Saving Mothers, Saving Babies and Saving Children. These reports offer a review of the healthcare provided to mothers, babies and children. The strength of the EDC Report lies in its information which can potentially contribute towards quality improvement and recommendation for action (Bradshaw et al. 2008b:2).

According to Bradshaw et al. (2008b:3-7), the 2008 EDC Report identifies five health challenges. To meet the MDGs for maternal, newborn and child survival (MDG 5 and 4) these challenges should be addressed and improvement in coverage of interventions and quality of care need to be achieved. Healthcare packages were developed to provide vital interventions at various levels of care to save the lives of mothers, newborns and children under 5 years old. The ideal to strive for is to provide the right care in the right place at the right time. Priority high impact interventions include emergency obstetric care with the correct management of complications and neonatal resuscitation. Care and management of the newborn are also identified as an intervention and include the care of premature babies and the management of birth asphyxia including neonatal resuscitation (Bradshaw et al. 2008b:3-7).

In the same EDC Report it is further indicated that coverage and quality of care are determined by the right actions by the right people. Avoidable deaths occur when healthcare managers and healthcare providers delay or give insufficient coverage of essential interventions and quality care. The achievement of the goals of providing the best care and saving lives depends on the coverage of care (ensuring services are received); accordingly, the quality of care is essential. In order to improve the quality of the existing programmes such as the PPIP, specific strategies for interventions are identified that focus on the family, community, policymakers and healthcare managers as well as healthcare providers. For example, the family should know about newborn danger signs; healthcare managers should make sure there are functional referral routes and criteria for newborns including emergency transport for newborns; facilities should have appropriate staff (with the proper knowledge and skills), relevant equipment in working condition available, and provide and have at hand guidelines for managing sick newborns. Finally, healthcare providers must be able to resuscitate newborns and provide emergency care to them. They must also be able to care for and manage sick and low birth weight newborns (Bradshaw et al. 2008b:8-9).

To make every death count policymakers should ensure and support the implementation of interventions to save lives by increasing the coverage of interventions and providing quality care. Actions must be implemented by health policymakers and managers as well as the healthcare providers and training institutions. Health managers should make sure facilities are well equipped and adequately staffed and also ensure that interventions are implemented. Healthcare providers must be accountable for the quality of care they provide and ensure that they are competent in life-saving skills like neonatal resuscitation and basic newborn care. Training facilities should assure that healthcare providers are adequately trained to provide high quality care. In the final instance, families and communities should know their rights and demand quality care. They should also be able to seek care at the right time and the right place (Bradshaw et al. 2008b:10-15)

Quality of care therefore depends on various role players and factors; the one influences the other and directly affects quality of care. Although training in neonatal resuscitation is a critical skill, training alone cannot ensure quality care. The correct equipment and resources are necessary and, importantly, the coverage of interventions should be primary while the interventions should be sustainable. Without sustainability, long-term quality care is impossible.

2.3.3 The Every Newborn Action Plan to End Preventable Deaths

The Every Newborn: An Action Plan to End Preventable Deaths is based on epidemiology, evidence and global and country learning; it sets a framework to end preventable newborn deaths by 2035. This plan provides a clear vision on how to improve newborn health and prevent stillbirths (WHO/UNICEF 2014:5-6).

This action plan proposes supportive and preventative care to improve the quality of care in appropriately staffed and equipped facilities. The focus of this action plan is to end preventable newborn deaths through the use of an evidence-based roadmap. The incorporated goals for 2035 is linked to the post 2015 development framework where all countries should have a neonatal mortality rate of 10 or fewer deaths/1 000 live births (Mason et al. 2014:457; WHO/UNICEF 2014:9).

The focus of the Every Newborn: An Action Plan to End Preventable Deaths is on care during labour and birth and in the first week of life. For level 1 and 2 facilities the focus is on skilled care at birth and delivering basic emergency obstetric and essential newborn care (it includes sick and small newborns) as well as postnatal visits (WHO/UNICEF 2014:15).

The intervention in the package of care during labour and around birth and the first week of life include skilled care at birth, basic and comprehensive obstetric care, the management of preterm births, and essential newborn care. Essential newborn care includes hygienic care, thermal control, and support of breastfeeding. Most notably for the context of this study the intervention includes neonatal resuscitation if required. The package of care for small and sick newborns includes interventions regarding appropriate management which involves additional thermal care and support for feeding; Kangaroo Mother Care (KMC); antibiotic treatment for infections; full supportive facility care; infection prevention and management; safe oxygen therapy; management of jaundice and, if needed, surfactant and respiratory support (WHO/UNICEF 2014:16).

The vision of Every Newborn: An Action Plan to End Preventable Deaths (WHO/UNICEF 2014) is: “A world in which there are no preventable deaths of newborns or stillbirths, where every pregnancy is wanted, every birth is celebrated, and women, babies and children survive, thrive and reach their full potential” (WHO/UNICEF 2014:7). The first goal is to end preventable newborn deaths, and the second is to end preventable stillbirths. To achieve its vision and goals five strategic objectives have been set. Firstly, strengthening and investment in care during labour, birth, the first day and the first week of life. Secondly, a significant improvement in the quality of maternal and newborn care and in the third instance the reduction of inequities by ensuring that every woman and newborn are reached and have access to quality healthcare. The fourth goal pertains to harnessing the power of parents, families and communities and, finally, counting every newborn through measurement, programme tracking and accountability. These five strategic objectives are based on six principles which include country leadership, human rights, integration, equity, accountability and innovation (WHO/UNICEF 2014:7).

2.3.4 The National Perinatal Mortality and Morbidity Committee Triennial Report 2008-2010 (NaPeMMCo)

The National Perinatal Mortality and Morbidity Committee (NaPeMMCo) was established in 2008 by the then South Africa’s Minister of Health, Dr Tshabalala-Msimang. The task of this committee was to audit all perinatal and neonatal deaths occurring in South Africa and to produce a final triennial report in 2011 in which they made recommendations on how to reduce perinatal and neonatal deaths (NaPeMMCo 2011:5). The NaPeMMCo Triennial Report (2008-2010) indicates that avoidable mortality rates can be used as an indicator of quality care. The primary indicators used to determine avoidable mortality is probable

avoidable deaths related to healthcare providers and probable avoidable deaths related to administrators (NaPeMMCo 2011:62).

The committee made recommendations to improve the quality of care in order to have a direct impact on neonatal mortality and morbidity. The aim of the recommendations is to improve access to appropriate healthcare (running outreach programmes; improvement of transport systems and better communication between communities and the patient and healthcare providers); improve the quality of care (improvement in training; setting up clear maternal and neonatal guidelines; achieve improvement in postnatal care and the normalisation of HIV); ensure that adequate resources are available (provision of adequate staff resources and equipment also for emergency care; providing enough hospital beds) and the auditing and monitoring of data (improving data collection and review). These recommendations therefore focus on current areas contributing towards neonatal deaths in South Africa (NaPeMMCo 2011:98-104).

The two areas that require neonatal interventions identified in the NaPeMMCo report are term deaths due to asphyxia and deaths of low birth weight babies above 1000g. Recommendations to reduce deaths due to asphyxia include the recognition of neonates in need of resuscitation without delay; initiating neonatal resuscitation immediately and close monitoring after resuscitation, and post-resuscitation care of neonates. Recommendations are also made for the reduction of low birth weight infants. These include correct management of neonates with respiratory distress and also basic neonatal nursing care. Basic neonatal nursing care includes temperature and blood glucose control; fluid balance; oxygen therapy; infection control; treatment of jaundice and infections; promoting breastfeeding and correct feeding practices as well as Kangaroo Mother Care (KMC) and follow-up care of low birth weight infants. The final recommendation includes monitoring the growth and development of high-risk neonates as well as providing education to their mothers (NaPeMMCo 2011:106-107).

2.3.5 Countdown to 2015 Decade Report (2000-2010)

The Countdown to 2015 Decade Report is a global movement of academics, governments, international agencies, healthcare professional associations, donors and non-governmental organisations (NGOs) with The Lancet as key partner. This report tracks the progress in maternal, newborn and child survival by using country-specific data to stimulate and support country progress towards achieving their MDGs. Furthermore, it focuses on the coverage of

effective interventions for maternal, newborn and child health and addresses aspects related to coverage, equity, health systems and policies, and funding (WHO/UNICEF 2010:5).

In the Countdown to 2015 Decade Report (2000-2010) specific actions for governments and leaders are identified. Every woman, newborn and child must have access to the healthcare service needed and they have to be counted. In this way equity will be improved. Every district should have adequate numbers of skilled healthcare workers. Therefore, the training distribution and retention of staff need to be prioritised. All countries should identify inequities and gaps in coverage and quality of care along the continuum of care. Essential interventions should be implemented. Resources should be increased and allocated for reproductive, maternal, newborn and child health services. Interventions and programmes should therefore be sufficiently funded (WHO/UNICEF 2010:38).

2.3.6 South Africa's strategic plan for a Campaign on Accelerated Reduction of Maternal & Child Mortality in Africa (CARMMA)

The Campaign on Accelerated Reduction of Maternal and Child mortality in Africa was launched in 2009 at the African Union Conference of the Ministers of Health. This campaign focused on four key areas: best practises, generating and providing data related to maternal and newborn deaths, mobilising political commitment towards improving maternal and child health, and the reduction of maternal mortality. Accelerating actions aimed at achieving these goals in the individual African countries are highlighted. The goal of CARMMA is therefore to accelerate the reduction of maternal and child mortality in South Africa through the accelerated implementation of evidence-based interventions essential to survival. Quality healthcare, the strengthening of the health system, community empowerment and involvement and collaboration of relevant stakeholders are thus advocated for (Department of Health, South Africa's National Strategic Plan, [s.a.]).

Some of the key components of CARMMA in South Africa address factors related to neonatal resuscitation. These are improved access to skilled birth attendants by allocating dedicated obstetric ambulances to every sub-district to ensure timeous transfer of women in labour as well as for obstetric and neonatal emergencies; the training of doctors and midwives in Essential Steps in Management of Obstetric Emergencies (ESMOE), and intensifying midwifery education and training.

In a briefing held in March 2013 by the Minister of Health, Dr Aaron Motsoaledi concerning child mortality in South Africa, neonatal resuscitation was identified as one of the key

priorities to be addressed by the DoH-CARMMA. Hence, neonatal resuscitation is still an area which needs improvement to decrease the static neonatal mortality rate (Parliamentary Monitoring Group, Child mortality in South Africa: Minister of Health briefing, 2013).

2.3.7 Conclusive remarks on interventions to reduce neonatal mortality

Mayosi et al. (2012:2029) state in South African district hospitals 25-50% of maternal and child deaths are influenced by avoidable health system factors. Mason et al. (2014:457, 459) refer to the global call made by the authors for an international scale-up of quality maternal and newborn care, particularly in district facility settings. Bhutta et al. (2014:347) also mention that the accelerated scale up of quality care is necessary in order to target the major causes of neonatal deaths.

Mabaso et al. (2014:185) assert low income families have an increased risk of illness because they face many challenges to acquire high quality care timeously. These authors claim the lack of transport, making poor use of healthcare facilities, and the lack of quality care by healthcare providers are obstacles for poor families to receive timely, appropriate and quality healthcare. Marmot (2005:1100) notes that within a country the child mortality rate is higher in the poorest households; moreover, social economic statuses also play a role and therefore the higher the level of socioeconomic status the lower the mortality. It is thus crucial that coverage of interventions should also reach poor areas and underprivileged people in the whole of South Africa. Also, to achieve the 2035 MDG, such inequities need to be urgently addressed to ensure high coverage of interventions (Mabaso et al. 2014:185).

It is very clear that the neonatal mortality in South Africa remains a challenge for the health sector. In order for the country to reach the MDGs for 2015 and for the future 2035 MDGs set by the WHO, various role players (healthcare management, healthcare providers and patients) are involved and many professionals are working together to come up with solutions to address the multifaceted and multi-layered challenges surrounding neonatal mortality. Healthcare providers, healthcare facilities, healthcare managements and communities are all involved.

As discussed, many and varied reports endeavour to explain the situation regarding neonatal care, neonatal mortality and the possible interventions that can address the challenges currently experienced. These reports address the lack of quality care, especially in district hospitals in South Africa. Quality care depends on having enough resources such as staff, facilities and equipment and also having competent, knowledgeable and skilled

staff. Neonatal resuscitation was identified as an area of concern in many reports. The lack of knowledge regarding neonatal resuscitation has a direct influence on quality care and neonatal mortality. Although the lack of training in neonatal resuscitation is foregrounded, training in neonatal resuscitation alone cannot make a significant contribution towards change and therefore the other prominent influencing factors also need to be addressed.

The interventions specific to neonatal resuscitation are presented next followed by a discussion of neonatal resuscitation.

2.4 NEONATAL RESUSCITATION INTERVENTIONS

According to Ersdal and Singhal (2013:374), the strategies to prevent perinatal outcomes can be divided into three phases. The first phase is primary prevention by adequately monitoring the foetus during labour. The second phase is secondary prevention after an insult (for example, a hypoxic incident) by delivering immediate basic stabilisation and neonatal resuscitation for the non-breathing newborn. The third phase is tertiary prevention of complications through rendering adequate postnatal care.

The need for neonatal resuscitation cannot always be predicted; therefore, all healthcare providers caring for newborns should be trained to follow simple guidelines like protection from hypothermia, appropriate head positioning, and maintaining an open airway. Most importantly, these healthcare providers have to identify newborns that are in need of basic neonatal resuscitation and perform the resuscitation effectively. These interventions can contribute significantly towards changing neonatal mortality and morbidity rates (Duran et al. 2008:43).

The first minute after a baby is born is known as the 'Golden Minute'; it is a crucial window for neonatal resuscitation of non-breathing babies (Lawn et al. 2014:195). Globally 10 million babies do not breathe at birth of which 6 million are in need of basic neonatal resuscitation (WHO/UNICEF 2014:13).

To make the physiological transition from intrauterine to extrauterine life, it is critical that a newborn starts to breathe (Lee et al. 2011:2). More than 90% of newborns accomplish this transition on their own. Failure to initiate spontaneous breathing at birth might be due to hypoxia, also known as 'primary apnoea'. In this case, the heart rate of the newborn will be above 60 beats per minute with compensating blood pressure. These infants respond well to early interventions such as drying, stimulation, clearing of the airway if indicated as well as bag mask ventilation if applied during the first minute after birth. If intervention during the first

minute of life is delayed, the newborn will progress to secondary apnoea with a heart rate most probably below 60 beats per minute concomitant with hypotension and gasping; with no intervention the newborn will die (Ersdal & Singhal 2013:374). When emergency care is needed in such a life-threatening situation, a rapid response is critical because a newborn that is not breathing at the time of birth will die within minutes if left unattended (Kattwinkel et al. 2011:e1402; WHO/UNICEF 2010:20).

In the Golden Minute most infants only need immediate assessment and basic newborn care. Approximately 5-10% of newborns need some assistance with breathing like drying to stimulate breathing, tactile stimulation and warmth. Bag and mask ventilation (basic neonatal resuscitation) is required in 3-6% of newborns and only 1% require extensive resuscitation such as chest compressions, intubation and drugs. These infants will require ongoing neonatal care (Ersdal & Singhal 2013:373; Lee et al. 2011:2; Perlman et al. 2010:s516; Velaphi & Rhoda 2012:69; Wall et al. 2009:s47-s48; Wyllie et al. 2010:e260).

2.4.1 Defining basic and advanced neonatal resuscitation

Neonatal resuscitation is defined as a sequence of interventions in order to establish breathing and circulation in a neonate (Lee et al. 2011:2). If a neonate is not breathing after birth she or he is in need of basic neonatal resuscitation which includes maintaining an open airway and providing ventilation with a bag and mask. Advanced neonatal resuscitation is basic neonatal resuscitation with the addition of supplemental oxygen, chest compressions, endotracheal intubation, and the administration of certain medication, for example, adrenalin, as well as the administration of fluids (Lee et al. 2011:2; Velaphi & Rhoda 2012:69; Wall et al. 2009:s47-s48).

The practice of neonatal resuscitation includes the following:

- **Pre-resuscitation:** Prevention of risk factors or deterioration including drying and covering of the newborn and maintaining a normal temperature; anticipation of resuscitation needs (preparing for resuscitation) which includes the early recognition of risk factors (Gardner et al. 2011:55-71; Verklan & Walden 2004:105-120).
- **Resuscitation (intervention):** Basic or advanced neonatal resuscitation.
- **Post-resuscitation care:** This is crucial because there is a risk of deterioration after initial successful resuscitation (Kattwinkel et al. 2010:1400). Close monitoring is important to evaluate the infant's condition when diagnosing and treating an underlying disease and during the transfer to a tertiary institution for specialised

treatment should it be necessary (Gardner et al. 2011:55-71; Verklan & Walden 2004:105-120). Post-resuscitation care should include temperature control and general supportive care such as the monitoring of blood glucose (Wyllie et al. 2010:e268).

Basic neonatal resuscitation (bag and mask ventilation) is possible in low resource settings if the healthcare provider is skilled and only basic equipment such as a bag, mask and suction are available. If applied correctly it can save many newborn lives therefore contributing towards a lower NMR thus achieving the MDG 4. According to the WHO, a simple yet feasible indication of which newborns should be resuscitated is the clinical criteria based on assessment of breathing alone. Therefore, babies who do not cry or breathe at birth or who are gasping 30 seconds after birth should be resuscitated with a bag and mask (Wall et al. 2009:s48-49).

In the context of this study the focus was on basic neonatal resuscitation. Different algorithms exist for neonatal resuscitation, yet the steps to follow are very similar and have one singular goal: saving the life of a neonate. The Neonatal Resuscitation Program and Helping Babies Breathe algorithms are discussed next.

2.4.1.1 Neonatal Resuscitation Program (NRP)

The Neonatal Resuscitation Program (NRP) was developed by the American Academy of Pediatrics (AAP) and American Heart Association (AHA) to teach principles and skills in neonatal resuscitation (Fernandes, Weisman & Kim 2014:1). Changes recommended by the International Liaison Committee on Resuscitation (ILCOR) were also incorporated into the NRP (see Figure 2.1). The focus of the NRP is to ensure that ventilation is provided to newborns in need thereof without causing lung injury, hypoxaemia or hyperoxemia (Kattwinkel et al. 2010:e1403-e1404).

Zaichkin and Weiner (2011:43-49) assert the NRP recommends that resuscitation for term newborn infants to be started on 21% oxygen. Pulse oximetry should be used whenever saturation needs to be monitored and positive pressure ventilation or continuous positive airway pressure (CPAP) is used. It is also recommended that every delivery room should have blended oxygen and a pulse oximeter for use during resuscitation. The oxygen concentration should then be adjusted according to the targets for infant age in minutes. A further recommendation is that the oxygen concentration should be increased to 100% when cardiac compressions commence during neonatal resuscitation. The reminder, **MR SOPA**, was introduced in the NRP to ensure adequate ventilation before commencing with cardiac

compressions. Zaichkin and Weiner (2011:43-49) explains the acronym **MR SOPA** stands for:

- **M** – reapply the **mask** to ensure a good face mask seal
- **R** – **reposition** the head to ensure an open airway
- **S** – **suction** the mouth and nose with a bulb syringe to clear the airway
- **O** – **open** the infant’s mouth with a finger to improve ventilation,
- **P** – increase **pressure** every few breaths until bilateral breath sounds and chest rise are evident
- **A** – if still unsuccessful use an **alternative** airway, for example, endotracheal intubation or laryngeal mask airway.

According to the Neonatal Resuscitation 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Special Report, the following are the recommended guidelines for neonatal resuscitation (Kattwinkel et al. 2010:1400-e1413). Firstly, healthcare workers should anticipate the need for resuscitation. It is therefore important for them to be aware of certain precipitating risk factors including a difficult or premature delivery. It is thus critical to have the necessary equipment available and at hand and for one healthcare worker competent in neonatal resuscitation to be present at the birth (Fernandes et al. 2014:1; Kattwinkel et al. 2010:1400-e1413).

Next, at birth a rapid assessment of the newborn based on three characteristics, namely, term gestation, crying or breathing, and good muscle tone must be done. If these are compromised then neonatal resuscitation should be initiated by following the initial steps for stabilisation such as providing warmth, clearing the airway, and drying and stimulating the newborn. As regards clearing the airway suctioning is not needed for clear amniotic fluid except if there is a clear obstruction of secretions in the airway. In the case of meconium stained fluid and a non-vigorous neonate the airway may be suctioned. It is further recommended in the NRP that pulse oximetry be used during resuscitation to manage the administration of oxygen. Blended oxygen should be administered; if this is not available room air should be used. The probe has to be attached to the right hand. Oxygen should be adjusted according to the saturation target range with age in minutes. When bag and mask ventilation is started, chest wall movement and improvement in heart rate need to be looked out for (Kattwinkel et al. 2010:1400-e1413).

Chest compressions are indicated for a heart rate <60 beats per minute. It is important to make sure that ventilation is adequate before commencing chest compressions. These

compressions should be delivered to the lower third of the sternum to the depth of approximately one-third of the anterior posterior diameter of the chest. Chest compressions and ventilations should be coordinated to a ratio of 3:1. The infant's breathing and heart rate must be evaluated at regular intervals (approximately every 30 – 60 seconds) until the heart rate is more than 60 beats per minute. Resuscitation efforts should be discontinued if no heart rate has been detected for 10 minutes. Resuscitation can also be withheld if it is possible to identify conditions associated with high mortality, for example, extreme prematurity <23-25 weeks, anencephaly, and some other major chromosomal abnormalities (Kattwinkel et al. 2010:1400-e1413).

Although recommendations on intubation and administration of medication are also made by the NRP, the focus of this study was limited to basic neonatal resuscitation and the addition of cardiac compressions and therefore the former is not included in the discussion. According to the WHO guide, cardiac compressions form part of advanced neonatal resuscitation, but may be included in basic neonatal resuscitation if there is persistent bradycardia despite adequate ventilation and as long as two trained providers are present and the infants' heart rate is assessed correctly (Wall et al. 2009:s51-s53).

Figure 2.1 illustrates the NRP Newborn Resuscitation Algorithm developed by the AAP and ASA.

Newborn Resuscitation

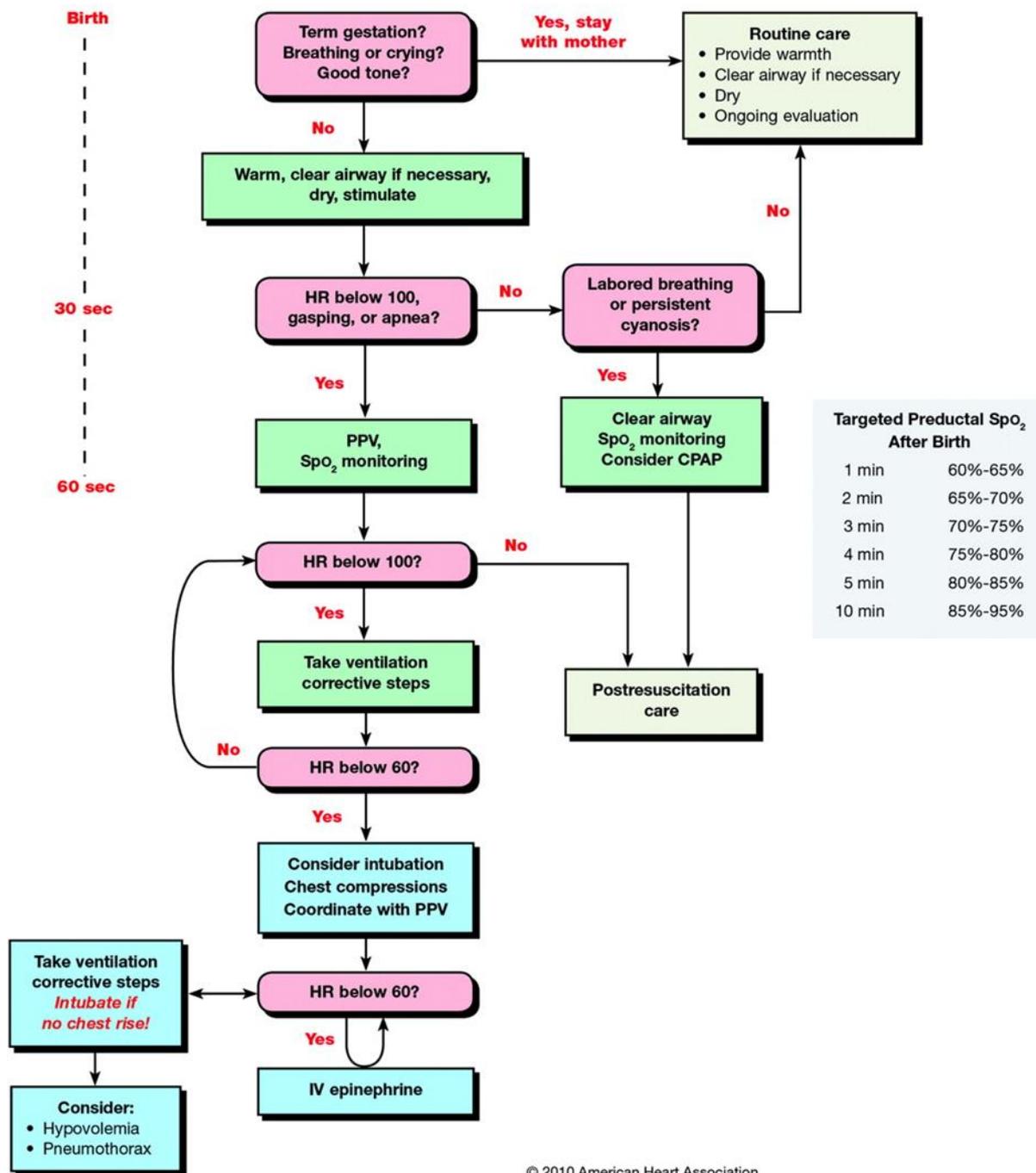


Figure 2.1: Newborn Resuscitation (NRP) Algorithm (Source: Kattwinkel et al. 2010:e1401).

2.4.1.2 Helping Babies Breathe (HBB)

The Helping Babies Breathe (HBB) curriculum was designed for resource limited settings by the AAP and is based on the neonatal evidence evaluation of the International Liaison Committee on Resuscitation (ILCOR) guidelines. The HBB curriculum centres on achieving spontaneous respiration within the first minute after birth which is referred to as the 'Golden Minute'. This HBB programme was developed to reach all infants who do not cry or breathe at birth on their own (Ersdal & Singhal 2013:376; Goudar et al. 2013:e345; Singhal et al. 2012:90).

The HBB flowchart (see Figure 2.2 on the next page) consists of steps easy to follow. It starts with basic newborn care and then moves on to assisted ventilation in room air with a bag and mask. The HBB action plan starts at birth and illustrates how to dry the baby thoroughly. If the baby is crying, keep the baby warm via skin-to-skin contact on the mother's chest and putting a cap on the baby's head; check breathing and cut the cord. If the baby is not crying at birth, clear the airway and stimulate; if the baby starts to breathe give routine care as explained above. If the baby is not breathing after stimulation and clearing of the airway, cut the cord and ventilate with a bag and mask with the head in the sniffing position. If the baby is still not breathing, call for help and improve the ventilation by checking the airway and the seal of the bag and mask, and that the head is in sniffing position. Improve ventilation and continue bag mask ventilation. Determine if the heart rate is slow and continue ventilation and advanced care (Ersdal & Singhal 2013:376; Goudar et al. 2013:e345; Singhal et al. 2012:90; Wall et al. 2009:s52).

Post-resuscitation management is essential because of the risk of deterioration after resuscitation (Kattwinkel et al. 2010:e1406). The advantage of successful neonatal resuscitation may be lost if there is poor aftercare. Appropriate and proper post-resuscitation care can improve the survival and long-term outcomes of newborns. These interventions include supporting breathing and oxygenation, as well as the management of serum glucose and fluid. Additionally, thermal management and preventing hypothermia by minimising heat loss and cold stress as well as the management of neurological abnormalities such as hypoxic ischaemic encephalopathy (HIE) (Fernandes et al. 2014:1; Kattwinkel et al. 2010:e1406; Wall et al. 2009:s55).

2.4.2 Debriefing after neonatal resuscitation

Debriefing in the clinical setting was developed as a technique to reduce psychological stress in healthcare workers after an emotional or stressful event (Couper & Perkins 2013:188). According to Ranse and Arbon (2008:39), participation in a resuscitation event can be emotionally and physically challenging. Furthermore, both internal and external stressors can be associated with the resuscitation experience. Internal stressors refer to feelings of doubt, a lack of calmness as well as moral conflicts while external stressors relate to healthcare workers being overworked or experiencing burnout, poor patient outcomes and the lack of knowledge and skills. In a study conducted in the United Kingdom by Ireland, Gilchrist and Maconochie (2008:329) on debriefing the staff in the case of unsuccessful paediatric resuscitation, the authors make significant recommendations. Debriefing should occur within a few days of the incident; all the staff who was involved should be invited; medical issues should be addressed by a senior clinician, and the psychological issues should be addressed by a trained individual. Ireland et al. (2008:329) emphasise both the medical and psychological issues must be addressed.

Team debriefing after resuscitation efforts during which complications or death occurred may assist team members to recognise and learn from problems that arose; consequently, continuous improvement in quality care is promoted (Leone & Finer 2005:e181). Structured debriefing can be used as an educational strategy to improve knowledge and skills thereby enhancing the implementation of these skills in practice (Couper et al. 2013:1521).

Couper and Perkins (2013:188-189) describe two different types of debriefing: hot debriefing and cold debriefing. The authors base the type on the time it is delivered. Hot (immediate) debriefing is where teams are debriefed immediately after resuscitation. It can be used to identify and rectify hidden resuscitation errors such as challenges experienced with

treatment, leadership and equipment. Cold (delayed) debriefing is feedback provided some time after the resuscitation took place and is associated with improvement during the resuscitation process and improved patient outcomes. All members of the clinical team can attend and therefore it creates a learning opportunity from others' experiences. According to these authors evidence suggests that debriefing is associated with improvement in healthcare providers' performances.

Debriefing can therefore play an important role in creating learning opportunities to identify what can be done differently and what was done correctly during a neonatal resuscitation. However, the importance of addressing psychological issues after a failed resuscitation is also pointed out by Ireland et al. (2008:329). Identifying psychological issues in an individual would facilitate the discussion of problems. An individual who experiences psychological issues could be referred for counselling or be considered for time off work (Ireland et al. 2008:329).

2.4.3 Mortality and morbidity meetings

Mortality and morbidity (M&M) meetings can be used as a tool to improve quality of care through the discussion of adverse effects, complications that occurred or medical errors that were made during the treatment of patients. Most importantly, it can indicate which alternative approaches towards medical decision-making could have been taken. A mortality and morbidity meeting is therefore a tool to be used to evaluate and improve quality of care and patient safety (Ksouri et al. 2010:135-136).

According to Higginson, Walters and Fulop (2012:1-10), mortality and morbidity meetings are used to review deaths as a part of professional learning. These meetings create a learning opportunity where those reviewing the data can recognise areas where improvement is needed. They have the potential to provide accountability. However, mortality and morbidity meetings should be structured and the discussions should be directed towards improving the system and focusing less on medical error. Therefore, the focal point of such a meeting must be quality improvement.

Mortality and morbidity meetings can thus serve as a source to identify challenges and issues and the discussions should be directed at problem solution and not focus on what individuals did wrong. Such meetings can serve as a starting point to identify areas where training is needed such as for example, in the neonatal resuscitation training area.

2.4.4 Training in neonatal resuscitation

Training in neonatal resuscitation was identified as one of the specific strategies to reduce neonatal mortality (Pattinson 2009:59-73; 2011:68-90). Neonatal resuscitation training programmes are low-cost interventions. It has been reported that training in neonatal resuscitation can reduce neonatal deaths due to asphyxia by 30% and early neonatal deaths by 38% (Bhutta et al. 2014:354; Conroy et al. 2014:2; Goudar et al. 2013:e345; Wall et al. 2009:s48). Wall et al. (2009:s48) note it can reduce deaths due to prematurity by 5-10%.

Delays to establish ventilation in neonates that do not breathe may contribute to an increased risk for assisted ventilation and may contribute towards morbidity and mortality (Wall et al. 2009:s47). Many newborn lives can be saved by immediate assessment (warming, drying) and tactile stimulation as well as basic neonatal resuscitation which includes airway clearing (including suctioning if required), positioning of the head to open the airway as well as bag and mask ventilation. This is also feasible when done by less skilled health workers in settings where equipment resources are limited (Lee et al. 2011:3). Enrolled nursing auxiliaries and auxiliary nurses in resource limited settings can also be trained to do basic neonatal resuscitation. Meany et al. (2010:1462) assert inadequate initial assessment and inappropriate treatment and monitoring of newborns contribute to poor outcomes of neonates which the authors ascribe partly to healthcare providers who are not sufficiently trained in initial assessment of the neonate and neonatal resuscitation techniques.

One cannot always predict the need for neonatal resuscitation at birth; therefore, all nurses and doctors involved in caring for neonates should be trained in immediate care of a neonate and basic neonatal resuscitation (Velaphi & Rhoda 2012:69). According to the Every Newborn: An Action Plan to End Preventable Deaths (WHO/UNICEF 2014:29), mid-level healthcare workers, can be delegated to do lifesaving interventions with the appropriate and proper training. To save the lives of neonates that do not breathe at birth, all birth attendants should be competent in neonatal resuscitation at a level appropriate for their setting (Wall et al. 2009:s59).

According to Conroy et al. (2014:1), there is evidence that healthcare workers in low resource settings face various challenges with regard to managing the care of neonates in need of resuscitation at birth. Wall et al. (2009:s47) agree and observe that, because of poor access to intrapartum care and increased mortality and morbidity due to intrapartum related complications such as birth asphyxia, low resource settings have an increased need for staff

to be trained in neonatal resuscitation. Couper et al. (2005:2) and Meany et al. (2010:1462) confirm it has been reported when resuscitation training is adapted to the local setting, mortality can be reduced significantly. Training is possible if training programmes are simplified and low-cost equipment is available. Therefore, in settings where resource challenges such as untrained staff and a lack of emergency equipment are experienced, priority should be given to scale up the staffs' skills and knowledge as it will help them to cope and manage better even if the material resources are limited. In the case of neonates being born in a setting where there are limited material resources, high coverage must be given to training of all the maternity staff in basic neonatal resuscitation because, as Lee et al. (2011:17) argue, "every baby that is born alive has the right to breathe at birth and to solutions helping those who do not breathe."

According to the recommendations made in the NaPeMMCo Report (2008-2010), the training of healthcare providers must include neonatal emergency care and should be part of undergraduate curriculums. Furthermore, in-service training should include both theoretical knowledge as well as practical skills. The training must be structured and accessible to healthcare workers and therefore they must be provided with equipment such as mannequins in order for them to practise neonatal resuscitation (NaPeMMCo 2011:100). Anderson and Warren (2011:59) state simulation-based training can be used as a strategy to improve knowledge and skill retention especially in high pressure and high consequence environments such as when neonatal resuscitation needs to be performed. Simulation-based training is when the trainees are exposed to a realistic situation created with a mannequin that replicates a real situation in a specific setting (Murphy & Halamek 2005:e489).

Simulation-based training results in deeper learning and improved retention of knowledge and skills. Recommendations made by the AHA and the AAP regarding neonatal resuscitation training were that simulation should be used as a methodology in resuscitation education and briefings, and debriefings be used during learning activities where students take care of simulated patients (Kattwinkel et al. 2010:e1407-e1408). Neonatal outcomes are improved when simulation is used as an educational strategy because it teaches healthcare providers how to manage neonatal emergencies (Anderson & Warren 2011:59).

In a study done by Bookman et al. (2010:1180-1182) it was found the educational impact of a hospital-based neonatal resuscitation programme in Ghana was effective and that knowledge and skill were sustained over a period of nine months. More importantly, the findings showed the healthcare workers who received this training used their skills frequently as they were working in a high risk referral hospital. These findings evidence the training of

healthcare staff in neonatal resuscitation is much needed because many (*used their skills frequently*) neonates often (*over a period of nine months*) need resuscitation.

The HBB programme is a graphically illustrated simulation-based educational programme developed to train large numbers of birth attendants in low income countries basic neonatal stabilisation and neonatal resuscitation. The HBB programme focuses on immediate assessment of the newborn, temperature support, simple stimulation to breathe (drying) and bag mask ventilation techniques all within the Golden Minute. It was designed for resource limited countries where most often there is only one birth attendant who has to provide care for both the mother and the baby in a timely manner (Ersdal & Singhal 2013:376; Little et al. 2011:82-83; Singhal et al. 2012:90).

In resource limited settings a skilled birth attendant can make the difference between life and death. The HBB programme was made simple and easy to follow; it is also flexible (with a certain variability between the knowledge and skills and the existing level of competency of the healthcare provider/s) so that it can be adapted to a specific setting (Ersdal & Singhal 2013:377). The HBB programme can thus be adjusted according to the needs of the trainees. The findings of a study done in Tanzania in which the HBB training programme was used proved that the introduction of simple devices and on-the-spot teaching can reduce neonatal mortality by as much as 47% during the first 24 hours. The HBB training programme follows the train-the-trainer model with paired teaching, skills and practising thus creating a snowball effect. The results of the abovementioned study done in Tanzania were sustained for a period of two years (Berkly et. al 2014:e22; Conroy et al. 2014:1; Goudar et al. 2013:e344; Singhal et al 2012:91).

In the context of the current study competency regarding neonatal resuscitation implied that the healthcare provider would have the necessary knowledge and skill to practise neonatal resuscitation according to specific neonatal resuscitation guidelines. Training in neonatal resuscitation can improve the competency of healthcare workers. Competence can be defined as “having sufficient knowledge and skills to comply with predefined clinical standards” (Ariff et al. 2010:5). Khomeiran et al. (2006:68-69) state nurses in their study identified six categories that influence competence development. The most import factor influencing competence is experience. Experience is essential in developing certain skills and therefore repeated practise is important to acquire these skills. Learning opportunities which create opportunities for examination of performances, strengths and limitations also enhance competence. The environment nurses practise in plays an important role in the development of competencies. For example, an environment is viewed as positive to learning when nurses, who are expected to have certain skills in a certain situation, are

placed in an environment that allows for and ensures they develop competence in these skills. Personal characteristics also influence competence because nurses need to be curious and willing to learn new skills. Motivation is pivotal in competence development and for the improvement of skills. Lastly, theoretical knowledge is necessary for competence development. The benefit of theoretical knowledge is enhanced when it can be applied in the practical environment. Therefore, the development of competence is determined by the context and the individual.

Various research studies suggest the deterioration of knowledge and skills may be prevented by regular refresher courses. Wall et al. (2009:s59) assert to maintain competence in neonatal resuscitation knowledge and also retain the skill, refresher training courses should be provided. But, according to authors such as Mosley and Shaw (2013:1), refresher training courses do not necessarily contribute towards the sustainability of knowledge and skills acquisition. These authors found as early as three months after having completed a Newborn Life Support course, there was a marked deterioration in both the knowledge and the skill of the healthcare workers who did the course (Mosley & Shaw 2013:1). This deterioration occurred in spite of the fact that the Newborn Life Support course, according to the authors, was practical and educationally designed to enhance practical simulation experiences to facilitate learning; yet, as the authors observe, the retention of knowledge and the acquired skill was not achieved (Mosley & Shaw 2013:3-5). Goudar et al. (2013:e349) also acknowledge refresher training is needed to improve skills and ensure long-term knowledge retention. Trainees who attended the initial HBB training did show improved knowledge and skills at the beginning of the refresher courses indicating retention of knowledge is possible (Goudar et al. 2013:e349). The advice given by Singhal et al. (2012:95) regarding knowledge and skills retention is that learners must simply continue to practise to prevent deterioration. It is obvious that competence in sustaining acquired knowledge and skills in neonatal resuscitation through training depends on the applicability of the training material and programmes. Training must be done in an appropriate learning environment and on a continuous basis; the training initiatives and programmes must be equally supported by education curriculums and healthcare institutions and, finally, those who train and those who are trained must be committed to saving the lives of neonates.

In the context of this study it was important for the healthcare providers to acquire the necessary knowledge and skill to practise neonatal resuscitation; more importantly, it needed to be sustained over a period of time. To improve quality care regarding neonatal resuscitation the quality improvement initiative should be sustained and for this reason the study was based on the NHS Sustainability Model and Guide (see Chapter 3). However, before embarking on a thorough explanation and discussion of the NHS Sustainability Model

and Guide (Chapter 3) other factors that influence neonatal resuscitation have to be considered and addressed.

2.5 ADDITIONAL FACTORS INFLUENCING THE SUCCESS OR EFFECTIVENESS OF NEONATAL RESUSCITATION

Certain conditions are prerequisite for saving the lives of newborns. In the health system accountability for actions taken and decisions made is a shared responsibility. Firstly, communities and individuals are responsible for their own health knowledge and use of health facilities. Secondly, health managers (enablers) have to make sure there are accessible health facilities, transport between facilities as well as adequately equipped and staffed facilities for coverage and quality care. Lastly, healthcare providers need to be appropriately skilled with a caring attitude in order to deliver quality care to patients. Shared accountability influences the coverage and quality of care which, in turn, plays a role in lives being saved (Pattinson 2013:12-13).

As mentioned in section 2.2, in consecutive Saving Babies Reports (2006-2007; 2008-2009; 2010-2011) it is indicated that probable avoidable factors associated with patients, administrative management and healthcare providers influence mortality. These known factors have remained the same over years and are associated with staff, equipment, training in neonatal resuscitation, the management of patients and challenges regarding transport (Pattinson 2009:27-28; 2011:24-28; 2013:17-21).

The global lack of healthcare providers who are adequately trained and equipped for immediate newborn stabilisation and neonatal resuscitation is a major contributing factor towards the high under-5 (which includes neonates) mortality rates, but particularly so in resource limited settings (Ersdal & Singhal 2013:375). Amongst other factors, quality care depends on the availability of skilled healthcare providers who are motivated and adequately equipped (WHO/UNICEF 2014:28). In this regard Velaphi and Rhoda (2012:69) aptly state: “Emphasis must be placed on providing adequate medical and nursing staff, with appropriate training and equipment, before considering wide use of labour intensive and expensive specialist options.”

In all contexts a major challenge exists with regard to the establishment and maintenance of staff resources with the necessary knowledge and skills to provide quality care during birth and care for the ill or premature/small newborn. Training of the health workforce should include specific skills in neonatal care to make sure the healthcare workers are confident

and competent in neonatal care (Mason et al. 2014:463). Therefore, having sufficient staff resources to render quality care is not enough; healthcare workers with proper training and appropriate knowledge and skills to render quality care to neonates are needed. To overcome the shortages of staff necessitates that the training, development and retention of staff receive high priority in all healthcare facilities and on all levels (WHO/UNICEF 2010:2).

The Every Newborn: An Action Plan to End Preventable Deaths (WHO/UNICEF 2014:26) proposes that facilities providing maternal and newborn care should ensure their staff resources are planned to the extent that services can be provided to patients 24 hours a day, 7 days a week. Team work among members of the multidisciplinary team is essential in level 1 and 2 hospitals if neonatal complications are to be managed effectively.

Equally important is to optimise the performance of the available staff. The motivation of staff is essential for quality care. The staff can be motivated through coaching, mentoring, accreditation, and continuous training to improve knowledge and skills (WHO/UNICEF 2014: 29). During his 2013 briefing to The Select Committee on Social Services on child mortality in South Africa, Dr Aaron Motsoaledi, the Minister of Health, paid special attention to the problematic attitudes of staff in clinics and hospitals. This statement was quoted from the briefing: "Staff members demonstrating proper attitudes in clinics and hospitals was an area in need of improvement in the healthcare system." (Parliamentary Monitoring Group, Child mortality in South Africa: Minister of Health briefing, 2013).

According to the Every Newborn: An Action Plan to End Preventable Deaths, different contexts, require different approaches to reach all newborns and midwives. These proposed actions should include leadership and governance; a staff resources infrastructure; commodities and supplies as well as service delivery and information systems and financing. It would therefore be crucial to conduct a systemic analysis to identify barriers that prevent good quality care. Countries therefore need to assess what services are needed and also assess the motivation of healthcare providers to improve quality care (WHO/UNICEF 2014:25).

The Every Newborn: An Action Plan to End Preventable Deaths further suggests for every country to have a development plan for its healthcare professionals that covers education and training, the distribution of motivated staff, and to ensure the retention of skilled healthcare professionals. To augment quality care, healthcare providers must demonstrate respect and have positive attitudes. There is evidence that in many countries the standard of the education for healthcare professionals is low and there is limited legal protection to represent the interest of the healthcare professional. These factors combined with a

shortage of staff resources, facilities lacking equipment and material resources, and low remuneration lead to poor motivation and low quality of care (WHO/UNICEF 2014:25).

Training on its own and having the knowledge and skills to perform basic neonatal resuscitation is fruitless if adequate and functioning equipment for neonatal resuscitation is not available (Velaphi & Rhoda 2012:69). Facilities that render maternal and newborn care should have an appropriate infrastructure and the equipment to provide the necessary care to neonates (WHO/UNICEF 2014:26). Successful neonatal resuscitation depends on the availability, accessibility and correct functioning of basic neonatal resuscitation equipment (Opiyo et al. 2008:6).

2.6 CONCLUSION

The global NMR is high and the mortality rates of neonates have been left behind in comparison to child mortality rates. It is most unlikely that South Africa will be able to reach the 2015 targets set by the MDG 4 as there has been no change in the country's NMR over the past decade. The causes of neonatal deaths are the same all around the world. The most prevalent causes of neonatal mortality are prematurity, intrapartum-related causes (such as asphyxia) and infections. In South Africa there are various modifiable and avoidable causes that contribute towards the high NMR, especially in low resource settings like district hospitals.

Training in neonatal resuscitation can reduce neonatal deaths and improve outcomes for newborns. Training has to be done in such a way that knowledge and skills can be retained and sustained over a period of time. To enhance knowledge and skills retention, neonatal resuscitation training should be simulation-based. Furthermore, it is pivotal that regular refresher courses and drill sessions to practise neonatal resuscitation should be performed to enhance knowledge and skills retention. If knowledge and skills regarding neonatal resuscitation can be retained staff, will also be competent and feel confident to perform neonatal resuscitation.

Unfortunately, training alone cannot reduce neonatal mortality since other factors influence the successfulness of neonatal resuscitation. These include the lack of resources, challenges experienced with the training of staff, the lack of equipment and problems with transport to name a few. Therefore, it is imperative that all of these are addressed. A quality improvement initiative aimed at improving the knowledge and skill to do neonatal resuscitation may make a difference in the NMR of the specific district hospital in Gauteng.

In the next chapter the sustainability of quality improvement initiatives and the NHS Sustainability Model on which this study was based, will be discussed.

CHAPTER 3: LITERATURE REVIEW ON QUALITY IMPROVEMENT INITIATIVES AND SUSTAINABILITY

3.1 INTRODUCTION

Chapter 2 focused on the literature related to neonatal mortality and neonatal resuscitation. In the attempt to decrease neonatal mortality, neonatal resuscitation was identified for a quality improvement initiative to improve quality care. Importantly, such a quality improvement initiative should be sustainable over a period of time. This chapter focuses on literature related to key concepts such as quality improvement, sustainability and its influencing and supportive factors. The chapter further aims to explain the NHS Sustainability Model which formed the basis of this study. Lastly, the Master Score System (which is part of the NHS Sustainability Model) and its use to determine the sustainability of a quality improvement initiative with the focus on factors that need to be improved, are discussed.

To improve practice in neonatal resuscitation quality improvement initiatives need to be implemented. Unfortunately, evidence shows there is a 70% failure rate for organisational change (Maher et al. 2007:n.p.). Therefore, the NHS Institute for Innovation and Improvement developed the NHS Sustainability Model and Guide in an attempt to increase the probability of the sustainability of quality improvements in the healthcare services (Maher et al. 2007:n.p.).

The NHS Sustainability Model and Guide (see Chapter 1, Figure 1.1, section 1.6.2) was chosen as the theoretical framework for this study because it is a holistic approach used to increase the probability of the sustainability of quality improvement. It does not focus on the quality improvement initiative only, but also on associated factors such as the process, staff and the organisation itself.

3.2 QUALITY IMPROVEMENT INITIATIVE

Quality improvement regarding neonatal resuscitation was identified as the focus of this study. It is therefore important to understand what is meant by 'quality improvement'. Quality improvement is defined and its characteristics are discussed next.

3.2.1 Definition of quality improvement

According to Atkinson et al. (2010:537-538), “*quality* is a concept that describe those features of a product or service to which value is ascribed”. According to these authors, the Royal College of Physicians (RCP) in the UK made use of certain domains to define *quality*. These domains include: *patient experience and effectiveness* (the patient should be the focus of healthcare delivery and should receive the benefits of care within the right time); *efficiency and timeliness* (healthcare services should make the best of the limited resources and prevent unnecessary delays in delivering healthcare); *safety, equity and sustainability* (healthcare should be safe, available and sustainable). Quality is not a static concept and therefore a need exists for ongoing improvement. Quality improvement in healthcare thus needs to ensure safe and effective healthcare that is patient-centred, delivered timely and efficiently, and is equitable and sustainable.

Fan et al. (2010:2279) state quality improvement initiatives aim to change the behaviour of clinicians and these changes lead to more consistent, appropriate and efficient practice of clinical interventions. These changes result in improved healthcare delivery to patients leading to improved patient outcomes. In the context of this study the expected patient outcomes would be decreased neonatal mortality and morbidity.

Quality improvement in public health is defined by Bialek et al. (2009) (cited in Riley et al. 2010:6) as follows:

Quality improvement in public health is the use of a deliberate and defined improvement process, such as Plan-Do-Check-Act, which is focused on activities that are responsive to community needs and improving population health. It refers to continuous and ongoing effort to achieve measurable improvements in the efficiency, effectiveness, performance and accountability, outcomes, and other indicators of quality in services or processes which achieve equity and improve the health of the community.

3.2.2 Characteristics of quality improvement initiatives

Quality improvement comprises three domains. Firstly, the goal is to set standards. Specific outcomes are therefore identified and defined. Secondly, the quality should be measurable, therefore, evaluating practice. Thirdly, it is an ongoing process whereby action is taken to

bring about change or improvement aimed at achieving specific goals (Atkinson et al. 2010:538). The two key elements of quality improvement are therefore change or improvement and, secondly, the specific method or strategy that is used to make the improvement in a specific context. Quality improvement, spread across clinical teams and healthcare systems, need to be sustained over time. This is important when one wants to prevent knowledge to become isolated (Atkinson et al. 2010:538). In this study the healthcare workers' (staff's) knowledge and skills of neonatal resuscitation in the specific district hospital needed to be sustained over time to decrease mortality.

'Quality improvement' in the context of this study referred to the quality improvement in neonatal resuscitation by following a holistic approach addressing factors related to the process, staff and organisation to improve the sustainability of the initiative.

3.3 SUSTAINABILITY

Quality improvement initiatives can improve healthcare initially, but these changes should also be sustained over time (Chin et al. 2008:319). The sustainability of quality improvements is important when one wants to create change and an improved way of thinking. The implementation of change or a quality improvement initiative does not assure that it will continue and be sustained over time. It is therefore important to understand what sustainability means and also what factors influence and support sustainability (Allen et al. 2007:6-8).

Sustainability is dependent on various factors which include management, financial resources, leadership, the culture and politics of an organisation as well as the specific context (Buchanan et al. 2005:189). In the context of this study sustainability was influenced by factors related to resources such as the staff, equipment, facilities, and aspects of leadership and management.

3.3.1 Definition of sustainability

According to Maher et al. (2007:n.p.), the NHS shortly defines sustainability as when "new ways of working and improved outcomes become the norm". A more detailed definition of what sustainability mean to the NHS is given by Maher (2007:n.p.) as follows:

Not only have the process and the outcomes changed, but the thinking and attitudes behind them are fundamentally altered and the systems surrounding them are transformed as well. In other words the change has become an integrated or mainstream way of working rather than something 'added on'. As a result, when you look at the process or outcome one year from now or longer; you can see that at a minimum it has not reverted to the old way or old level of performance. Further, it has been able to withstand challenge and variation; it has evolved alongside other changes and perhaps improved over time. Sustainability means holding the gains and evolving as required – definitely not going back.

Allen et al. (2007:9) write sustainability of change can be defined as follows:

Sustainability of change for improvement exists when a newly implemented process continuous to improve over time, becomes the 'way things are done around here', and certainly does not return to the 'old' processes that existed before the improvement project begins.

Both definitions focus on the continuation of something that is of positive benefit leading to improvement, but it may not always be viewed as positive. For example, sustaining a quality improvement initiative may be viewed by staff as an increase in the workload and lead to them resisting it. Therefore, it must be emphasised that change is not always more work but just a “different way of doing the same things” (Allen et al. 2007:10).

3.3.2 Key factors influencing sustainability

Sustaining change in a system as complex as the healthcare system can be a challenge; it is therefore important to consider the whole healthcare system when change is to be implemented. However, there are two obstructions towards sustainability, namely, *the improvement evaporation effect* (or *initiative decay*) and *isolated improvement* (or *improvement islands*). The improvement evaporation effect pertains to when a quality improvement initiative has been successful but over a period of time things go back to the way they were before. Isolated improvement means the quality improvement initiative was sustained in a specific area in the organisation but failed to spread through the organisation implying no improvement elsewhere in the organisation occurred. To sustain an

improvement initiative, a team should take collective responsibility and every team member needs to be clear on what his or her personal contribution towards the initiative will be. Sustainability implies that the changes leading to positive benefits continue and become the normal practice (Allen et al. 2007:6-10; Buchanan et al. 2005: 189-205).

According to Allen et al. (2007:14-17), quality improvement initiatives are influenced not only by sustainability, but also spread within a specific context. Factors influencing sustainability are the following as described by Allen et al (2007:14-17):

- ***Integration into practice***

New practices, for example, quality improvement initiatives should be incorporated into the organisation's existing practices and be consistent with other programmes. Importantly, time and resources should be available for integration of quality improvement initiatives within the existing practices. In the context of this study the new practice was the quality improvement initiative regarding neonatal resuscitation.

- ***Evidence improvements***

Evidence for the quality improvement initiatives should be collected and shared to prove its effectiveness. It is also important to monitor the process and outcomes to determine whether the quality improvement initiative was effective.

- ***Readiness for improvements***

The staff should be able to recognise and identify that there is a need for improvement in a certain area or aspect of the organisation. They should therefore be aware of the challenges they experience in order to identify their needs.

- ***Nature of initiatives***

Quality improvement initiatives should be compatible with the organisational needs, priorities and culture within a specific context. The less complex the changes the more likely the chance that it will probably be more effective and the probability of spread and sustainability will also be increased.

- ***Local context***

To sustain a quality improvement initiative and increase the spread, positive organisational characteristics are essential and commitment and involvement of all staff is needed. Furthermore, staff should feel that their efforts are recognised and rewarded.

- ***Staff engagement***

If a quality improvement initiative is implemented then all staff that will be affected by the change should be engaged from as early as possible. It is also important to positively manage resistance to change.

- ***Support at senior level***

Validation, involvement and support for the quality improvement initiative from senior level staff are essential in sustaining and spread of change.

- ***Incentives***

Key factors influencing the sustainability of a quality improvement initiative are incentives. Staff should feel there is personal gain, an improved work environment due to the additional resources, and also potential benefits to patients, quality and safety issues.

- ***Process of implementation***

The implementation of quality improvement initiatives are influenced by the pace of implementation, for example, a fast pace of implementation may increase the spread of the quality improvement initiative but it may limit the sustainability. Phased implementation of large scale quality improvement may improve spread but can limit sustainability, especially if there are time constraints.

- ***Dedication to resources***

Infrastructure is essential in delivering and sustaining change after the implementation of a quality improvement initiative. Therefore, there should be enough resources, for example, staff and financial resources. Staff should be willing to dedicate their time to meet, plan,

develop and implement the quality improvement initiatives. Furthermore, sufficient and appropriate staff is needed to initiate, deliver and support the quality improvement initiatives.

- ***Leadership***

Leadership is needed to steer and drive a quality improvement initiative so that momentum is maintained. There should therefore be a clear vision and competent leadership.

- ***People who influence***

There should be people who influence the quality improvement initiatives at all levels and in all staff groups. The ideal is to effectively use combined expertise within a certain setting to implement the quality improvement initiative.

- ***Effective relationships***

The role of the multidisciplinary team cannot be underestimated. It not only creates certain boundaries but also assists in working towards a common goal. Effective teamwork consisting of trust, respect and support is essential. Roles should be clarified and everyone should know what their responsibilities are.

- ***Ownership of initiative***

To improve sustainability even after the quality improvement initiative has been implemented, ownership is pivotal. Ownership should be facilitated by a wide spread of staff involvement at all levels and in all stages of the quality improvement initiative. Quality improvement initiatives should therefore be adapted to fit the specific needs of the organisational context. Ownership from all stakeholders is important to benefit from the change after implementation of a quality improvement initiative.

The aforementioned key factors influencing the sustainability of a quality improvement initiative were addressed and acknowledged during this action research process in the specific context of this district hospital.

3.3.3 Supporting sustainability

According to Allen et al. (2007:18-23), the sustainability of a quality improvement initiative needs to be supported by the engagement of clinical leadership. To support sustainability key factors should be in place. These factors include that *quality care* should be treated as a high priority by healthcare leaders and managers. *Accountability systems* to track improvement should be in place. Senior leaders must be inspired and *supported by management*. Equally important is *effective communication* to measure the aims and outcomes of the quality improvement initiative. *Staff* should know the *reasons for change* and what *changes are expected from them*. The sustainability of a quality improvement initiative comes down to engaging staff in the process. Staff involvement is therefore essential and leads to *ownership* thus ensuring the changes will be sustainable (Allen et al. 2007:29).

It is important to realise that sustaining change can be seen as negative if people are not committed to the change or quality improvement initiative but cling to erstwhile procedures. Change may be viewed negatively, for example, because of the possibility of increase in workload. To sustain change in complex systems such as healthcare, one should give attention to the structures, processes, patterns and the ongoing interactions among them. By implication, the whole system has to change. It is also of note to realise that any particular change is only sustainable until a better or new idea comes along (Allen et al. 2007:10).

Through growing and evolving, a quality improvement initiative can be sustained; on the other hand, through lack of commitment staff may return to former practices and procedures. To achieve sustainability Allen et al (2007:16-24) and Brandrud et al. (2011: 251-259) confirm the key factors listed next need to be in place:

- *Management should support the initiatives.*
- *The quality improvement initiative should be formally recognised by means of planning, implementation, refinement and testing.*
- *A form of measurement or evaluation should be in place.*
- *Effective collaboration is essential, and all stakeholders involved should understand the processes and systems that need to be improved and share their vision, goals and strategies.*
- *The culture of improvement and collaboration, and the active engagement of trained staff are necessary.*

- *The training of staff should be a high priority, and capability-building programmes must be in place. An infrastructure based on the improvement of knowledge is necessary.*

Structures should be in place to embed quality improvement initiatives within the organisation. Changes should be made to policies and practices and there should be sufficient resources allocated to make the changes sustainable. Leadership and communication are therefore also essential to embed changes within an organisation. Feedback systems should be in place with easy access to knowledge, skills and resources. To support the sustainability of a quality improvement initiative even further, effective collaboration is essential. This is collaboration between all levels of staff as well as senior and clinical leaders. A shared vision and aim with specific strategies on how to implement the quality improvement initiative should be in place. Furthermore, the roles and responsibilities of everyone involved should be defined. The culture of improvement is also important. Quality improvement initiatives are supported when staff members view their quality of work as important, and by staff who wants to improve practice. Training of staff at all levels is a high priority in supporting sustainability of quality improvement initiatives (Allen et al. 2007:18-23).

To improve sustainability of a quality improvement initiative even further it is important to be clear about the benefits to the stakeholders. These benefits should be measurable. This is strengthened by identifying the staffs' needs and their perceptions of the challenges they experience. This gives stakeholders the opportunity to describe why they like the changes. The benefits of the quality improvement initiative should therefore be applicable to both the staff and the patients. Training and education needs should be acknowledged; ongoing training will ensure that knowledge and skills are maintained. Staff who can be trained as trainers should be identified to support the continuing training needs.

Furthermore, it is crucial to contribute towards incorporating the quality improvement initiative within the structure of the organisation to achieve ownership of the new standard. It is also important to establish a baseline before the implementation of a quality improvement initiative to enable measurement of the outcomes. The changes that occur due to the quality improvement initiative should be incorporated in the processes of the organisation. Lastly, it is important to acknowledge improvement, reflect on progress, and setting new goals and aims to improve even further (Allen et al. 2007:30-36).

In the context of this study sustainability referred to the sustainability of the quality improvement initiative in neonatal resuscitation (see Chapter 1, section 1.7.2). The new way

of practicing neonatal resuscitation should become the norm and the changes that occur because of the quality improvement initiative should be seen over a long period of time. It should therefore be a continuous process of quality improvement. In order to increase the probability of the sustainability of the quality improvement initiative, the NHS Sustainability Model and Guide were used as the theoretical basis of this study. This Model as described by Maher et al. (2007) and Allen et al. (2007) is discussed next.

3.3.4 NHS Sustainability Model and Guide

The NHS Sustainability Model and Guide formed the theoretical basis of this study. The NHS Sustainability Model is a diagnostic tool used to forecast the probability of the sustainability of a quality improvement initiative whereas the NHS Sustainability Guide provides practical advice on how to increase the probability of the sustainability of a quality improvement initiative (Allen et al. 2007:25; Maher et al. 2007:n.p.).

The NHS Sustainability Model can be used at any time during the quality improvement process – during the design of the quality improvement initiative to identify areas that need strengthening, in the implementation phase or even after the quality improvement initiative has been implemented. This can be done to ensure optimal probability for the sustainability of the quality improvement initiative (Allen et al. 2007:25).

The NHS Sustainability Model (see Figure 1.1, Chapter 1, section 1.6.2) focuses on ten essential factors related to the process, staff and organisational issues. These factors play a significant role in sustaining change in healthcare. These essential factors related to the process include the monitoring of progress; adaptability of the improved process; credibility of evidence, and benefits beyond helping patients. Staff-related factors are concerned with training and involvement; attitudes and senior and clinical leaders. Organisational issues focus on whether a quality improvement initiative and the changes that occur fit with the goals and culture of the organisation and ensure that infrastructure is in place.

Changes in healthcare brought about by a quality improvement initiative have an impact on patient outcomes. It also creates an opportunity for continual improvement after initiation of such a quality improvement initiative. The objective for creating the NHS Sustainability Model was to develop an easy-to-use tool that can assist in implementing quality improvement initiatives; it was based on the principle of improving healthcare services and patient experience. Most importantly, the effective achievement of change and continual

improvement was the goal and the NHS Sustainability Model serves as a platform for this (Allen et al. 2007:26; Maher et al. 2007:n.p.).

The Sustainability Model and Guide and each of its main components (the process, staff and organisation) are explained as detailed in Maher et al. (2007:n.p.).

3.3.4.1 Process

The factors related to process in the NHS Sustainability Model include monitoring progress, adaptability of improved process, credibility of evidence, and benefits beyond helping patients.

- ***Monitoring progress***

The system should be effective in monitoring progress. Questions to be answered include whether the change requires special monitoring systems to identify improvement? Are the data collected and easily accessible? Are there feedback systems in place to reinforce the benefits and progress as well as initiate action? Are the results of the changes that occurred communicated to the rest of the staff and patients?

Measuring continual improvement and providing feedback and communication is important to keep stakeholders and staff motivated and involved. With regard to the monitoring process the Sustainability Guide indicates communication and evaluation should be used to anticipate continual improvement. It is important to identify frameworks to help identify what will be the most effective measures to be used.

- ***Adaptability of the improved process***

The factor of adaptability of an improved process is described as “the ability of the quality improvement process to overcome internal pressures and to continually improve” (Maher et al. 2007:n.p.). The changes should continue to meet the needs effectively. Furthermore, the question should be asked whether the change can be sustained even if an individual or group or finances are withdrawn. Aspects that may disrupt the organisational change and progress of the quality improvement initiative should be identified.

- ***Credibility of evidence***

Credibility of evidence refers to the benefits to the patients, staff and the organisation. These benefits should be identified and visible. The staff members should understand and also believe in the benefits of the quality improvement initiative and the changes that occur. These changes should also be achieved elsewhere in the organisation.

- ***Benefits beyond helping patients***

The quality improvement should additionally help patients to have other benefits. The changes that occur should reduce added effort and make things run more smoothly. The staff should notice a definite difference in their daily work life.

3.3.4.2 Staff

The factors related to staff in the NHS Sustainability Model includes training and involvement, attitudes as well as senior and clinical leaders.

- ***Training and involvement***

The factor of staff involvement and training to sustain the quality improvement process or initiative is described as staff members that play a role in the implementation of change. The question should be asked whether the staff used their ideas to inform the change process from the initiation of the quality improvement initiative. It should further be determined if there is a training and development infrastructure to identify gaps in knowledge and skills and the staff should be trained to take the change forward accordingly.

- ***Attitudes***

The staffs' attitude or their behaviour towards sustaining change is described as whether staff members are motivated and able to communicate their ideas and if their ideas are used for quality improvement. The staff should be able to run PDSA cycles (Plan-Do-Study-Act) based on their ideas to determine if additional improvements are needed. Most importantly, the question to be asked is whether the staff members think that the new way of doing things are better.

- **Senior leaders**

Senior leadership engagement is determined by identifying whether leaders are trustworthy and influential, respected and believable. Senior leaders should be involved in the initiative; they should understand and encourage the changes. Furthermore, the question should be asked whether senior leaders are respected by their peers and if they can have a motivational influence on others. Also, if they are taking personal responsibility and giving of their time to help and ensure the change is sustained.

- **Clinical leaders**

The factor of clinical leadership engagement is also determined by identifying if these leaders are trustworthy, influential, respected and believable. Also, it should be established whether they are involved in the quality improvement initiative and whether they understand and promote it. Likewise, as for senior leaders, clinical leaders should also be respected by peers and be able to influence others positively. They should also take personal responsibility and time to help ensure that the changes created by the quality improvement initiative are sustained.

3.3.4.3 Organisation

The factors related to organisation in the NHS Sustainability Model relate to fit with the goals and culture of the organisation, and the infrastructure of the organisation.

- **Fits with the goals and culture**

To determine whether a quality improvement initiative and the changes that occur fit with the organisation's strategic aims and culture, one should first determine whether the organisation has successfully sustained previous quality improvements initiatives in the past. The goals of the quality improvement initiative should be clear and shared and should therefore be aligned with the organisation's strategic aims. The changes that occur due to the implementation of a quality improvement initiative should augment organisational aims; changes should be viewed as important by the leadership within an organisation. Most importantly, the organisation should have a 'can do' culture.

- **Infrastructure**

The infrastructure for sustainability should be in place. This factor is determined by enough staff trained to work according to the new quality improvement initiative. There should also be sufficient facilities and equipment to support the new quality improvement initiative. The new way of doing things should also be incorporated within the job description of staff and a good and effective communication system should be in place.

3.3.5 Determining the sustainability of a quality improvement initiative

The Master Score System (see Annexure Q) is used to identify the factor with the greatest potential for improvement (Maher et al. 2007:n.p.). The directions for using this system are set out below.

- *Read through the model.*
- *Select the level of each factor associated with process, staff and organisation that best describes the situation.*
- *Identify the box next to description with a tick.*
- *Use the master version (see Annexure Q) of the Master Score System and calculate the scores. Scores should be entered into the assessment panel at the bottom of the blank score system.*
- *The factors with the greatest potential for improvement should be plotted onto a bar chart. Preliminary evidence suggests that a score of 55 or higher indicates there is a possibility for the sustainability of the quality improvement initiative. A score of 45 or lower suggests action should be taken to increase the likelihood of sustaining the quality improvement initiative.*
- *The Master Score System can be used at intervals of three to six months to evaluate the sustainability of a quality improvement initiative.*

In this study the Master Score System was used to evaluate sustainability at the end of the study in the third cycle (see Chapter 7 section 7.4).

3.4 CONCLUSION

As previously mentioned, quality improvement initiatives are not sustained and therefore the NHS Sustainability Model which formed the basis of this study was developed to enhance the probability of sustaining a quality improvement initiative in healthcare. Quality improvement initiatives in healthcare are aimed at changing the behaviour and attitudes of healthcare workers to improve practice, healthcare delivery and patient outcomes. Essential key characteristics need to be in place to increase the probability for the sustainability of a quality improvement initiative. These factors are associated with the process, staff and organisation.

The aim of this study was to develop strategies to sustain a quality improvement initiative in neonatal resuscitation. In the next chapter the research methodology used to achieve this aim will be discussed.

CHAPTER 4: ACTION RESEARCH METHODOLOGY

4.1 INTRODUCTION

In the previous chapters the research overview (see Chapter 1), the literature review on neonatal care in South Africa (see Chapter 2) and the literature review on quality improvement initiatives and sustainability and theoretical framework (see Chapter 3) were discussed. In this chapter the research methodology is presented and discussed.

The neonatal mortality rates in South Africa, particularly in district hospitals, remain high. The poor quality of neonatal resuscitation and other modifiable and avoidable factors such as a lack of resources like staff, equipment, the lack of transport from institution to institution and so forth all contribute to the morbidity and mortality of neonates in South African district hospitals (Pattinson 2009:23-28; 2011:29-35, 57-58; 2013:16-21). Quality of care is dependent on adequately equipped and staffed facilities as well as appropriately skilled staff with a caring attitude (Pattinson 2013:13).

In the attempt to decrease neonatal mortality, neonatal resuscitation was identified for a quality improvement initiative to improve quality care. Importantly, such a quality improvement initiative should be sustainable over a period of time. Seventy per cent of quality improvement initiatives have a chance to fail due to a lack of sustainability (Maher et al. 2007:n.p.). To enhance the potential success of this quality improvement initiative, it was based on the NHS Sustainability Model (see Chapter 3).

This research problem, questions and aim of the study as well as the context in which it occurred (discussed in Chapter 1) lent itself towards action research. Action research is a research methodology that is increasingly used in healthcare. The purpose of action research is to bring about change in a specific context including the praxis and environment of such a context to improve quality of care (Koshy, Koshy & Waterman 2011:1). The overall aim was to reduce neonatal mortality in a district hospital in Gauteng by making changes in the environment to increase the sustainability of a quality improvement initiative in neonatal resuscitation.

This chapter serves as a summary of the definition of action research, its characteristics and the rationale and applicability of the participatory action research model to this study. Furthermore, the initiation of the research process, how the issue were defined, and discussion of the three action research cycles will also be addressed:

- CYCLE 1: The examination of the existing situation
- CYCLE 2: The implementation of strategies
- CYCLE 3: The evaluation of strategies

In these three cycles the research methods and techniques used as well as the sampling and claims to validity and trustworthiness will be discussed. Reflection as part of the action research process will also be discussed in detail. The results of the respective cycles will be presented and discussed in Chapters 5, 6 and 7:

- Chapter 5: CYCLE 1 – The examination of the existing situation
- Chapter 6: CYCLE 2 – The implementation of strategies
- Chapter 7: CYCLE 3 – The evaluation of strategies

4.2 DEFINING ACTION RESEARCH

Action research is an approach used to improve conditions and practices in healthcare environments. The purpose of action research is to bring about change and improvement in a specific context (Koshy et al. 2011:8; Schmuck 2009:1).

Meyer (2000) cited in Koshy et al. (2011:11) concludes that action research is focused on generating solutions to practical problems while simultaneously empowering participants through becoming engaged in the research. This leads to the development and implementation of certain activities to facilitate change in a specific context. This coincides with the viewpoint of Kemmis (2010:417) who states action research is focused on action, transforming practice, and the participants' understanding of practice and the conditions in which they practice.

Coghlan and Brannick (2010:4) discuss the broad characteristics that define action research as being “research in action”; it is a collaborative partnership where participants are actively involved in the research process; and it is research that takes place concurrently with the action part building up a body of knowledge. Furthermore, action research is a sequence of events or a cyclical process; it is an approach to problem solving while learning takes place at the same time. Reason and Bradbury (2006) cited in Koshy et al. (2011: 9) define action research as “a process to inform and influence practise with characteristics to involve, empower and improve”. According to Koshy et al. (2011:9), action research is a research approach used to improve practice as the process of change; it is bound to a specific context and is participative.

Action research is a cyclical process that can be followed when one wants to improve practice in a specific context. This study was context specific (the maternity section of a district hospital in Gauteng) and action research suited this approach to problem solving. A need was identified for a quality improvement initiative in neonatal resuscitation, and certain strategies (activities) were needed to sustain this quality improvement initiative in order to create change. During the course of this study, participants were made aware of the conditions in which they practice. They were engaged in this study through the research processes that were followed. Therefore, they were empowered to find solutions to the practical problems they experienced in practice, namely, the practice of neonatal resuscitation and its associated factors in the specific context.

In this study a collaborative partnership between the researcher and the steering group was established and this led to the active involvement of participants in this study. A cyclical approach to problem solving was taken with the three action research cycles, each with a specific focus: CYCLE 1 focused on the examination of the existing situation in the specific context and CYCLE 2 focused on the implementation of change while CYCLE 3 focused on the evaluation of change.

4.3 CHARACTERISTICS OF ACTION RESEARCH

Action research is a methodology used for *improving practice* in healthcare environments with the aim of developing solutions to practical problems within the healthcare environment (Maree et al. 2010:124-125; Williamson, Bellman & Webster 2012:52). It is a cyclical process linking interactive cycles and the purpose is to bring about change in a specific context. It creates a spiral based on a plan of action to improve the existing situation; to implement the plan action takes place; the effects of the action in the context in which it occurs is observed and, lastly, reflection on the changes implemented is done. Therefore, action research is an effective methodology that can be used to achieve organisational change in healthcare settings (Herr & Anderson 2005:5; Koshy et al. 2011:1; Maree et al. 2010:124-125; Williamson et al. 2012: 52).

Action research facilitates the *empowerment*, *transformation* and *emancipation* of the participants. Participants are actively involved in the research process as well as in the development of the solutions to the practical problems (Koshy et al. 2011:2; Maree et al. 2010:124). This characteristic of action research was crucial for the current study because ownership of the strategies implemented might have improved the sustainability thereof. According to Meyer (2000) cited in Koshy et al. (2011:11), action research requires

participation and demands that the participants recognise the need for change and are willing to play an active part in the research and change processes. The partnership between the researcher and the stakeholders are therefore fundamental to establish co-ownership and development (Maree et al. 2010:125). In this study the researcher worked in collaboration with the steering group that consisted of stakeholders in the specific setting. They were also participants in this study and were actively involved in the decision-making processes that took place during the course of this study. This resulted in the transformation and ownership that occurred as a result of this study.

Maree et al. (2010:125) state action research is also an *interactive* form of knowledge development. The purpose of research is to generate knowledge and in action research knowledge is developed since it is based on practice and all its aspects. Most importantly, action research generates knowledge within a specific practical context (Koshy et al. 2011:4, 142). Interactivity is established with the co-ownership of the knowledge generated for practical applicability through the action research process (Maree et al. 2010:125). In this study knowledge was generated throughout the research process. As the study continued, solutions to practical problems were found by the steering group. Stakeholders started to acknowledge the challenges they had in the specific context. This created an awareness regarding neonatal resuscitation and the associated influencing factors that were needed to contribute to the successfulness of neonatal resuscitation. These solutions were applicable to the specific context and participants were actively involved in improving practice regarding neonatal resuscitation. Most importantly, they were working towards the aim of reducing neonatal mortality through the sustainability of a quality improvement initiative in neonatal resuscitation.

Although there are many advantages pertaining to action research, a few potential limitations exist such as the concern for the lack of rigour and validity and the concern that the research findings are not generalisable (Koshy et al. 2011:33). The researcher acknowledged the fact that the study was context specific and therefore the findings would only be generalisable to the specific context. However, the researcher gave a thick description of the context and therefore the findings would also be applicable to similar situations and conditions in a similar context.

Action research depends on collaboration and it can be difficult to achieve and sustain change while the change itself can also be difficult to determine (Koshy et al. 2011:33). To achieve and sustain change, this study was based on the NHS Sustainability Model (see Chapter 1, Figure 1.1 in section 1.6.2 and Chapter 3, section 3.3.4). The changes that occurred as a result of the strategies implemented and whether it was sustained were

measured with the Master Score System instrument (see Annexure Q) in CYCLE 3. The Master Score System is a proven instrument and was used to determine the sustainability of the quality improvement initiative. To achieve collaboration, the researcher tried to keep the steering group motivated by continuously reminding them of the goals and vision of the group and the changes that they wanted to achieve. Unfortunately, due to the challenges that were experienced in the specific context this was not always an easy task.

The aforementioned are the common characteristics of action research, but within action research there are different action research models. These are, for example, Stinger's Action Research Interacting Spiral; Lewin's Action Research Spiral; Calhoun's Action Research Spiral; Bachman's Action Research Spiral and Riel's Action Research Model (Mertler 2009:13-17). For the purpose of this study the Problem Resolving Action Research (PRAR) Model developed by Piggott-Irvine (2009:3) was used. The PRAR Model was chosen for this study because it has all the features needed to address the current research problem and it suited the layout of the study. The focus of the three cycles were, in the first place, to examine the existing situation; secondly, to implement change and, finally, to evaluate the change (see Figure 4.1). The PRAR model is explained next.

4.4 PROBLEM RESOLVING ACTION RESEARCH (PRAR) MODEL

The action research model of choice for this study was the Problem Resolving Action Research (PRAR) Model developed by Piggott-Irvine (2009:3). From here on it is referred to as the PRAR Model. In this model a research group must develop a plan of critically informed action to improve what is already happening; act to implement the plan; then observe the effects of the action in the context in which it occurs and, finally, reflect on the effects of the implemented plan to use it as a basis for further planning and subsequent informed action through a sequence of cycles (Piggott-Irvine 2009:2) (See Figure 4.1).

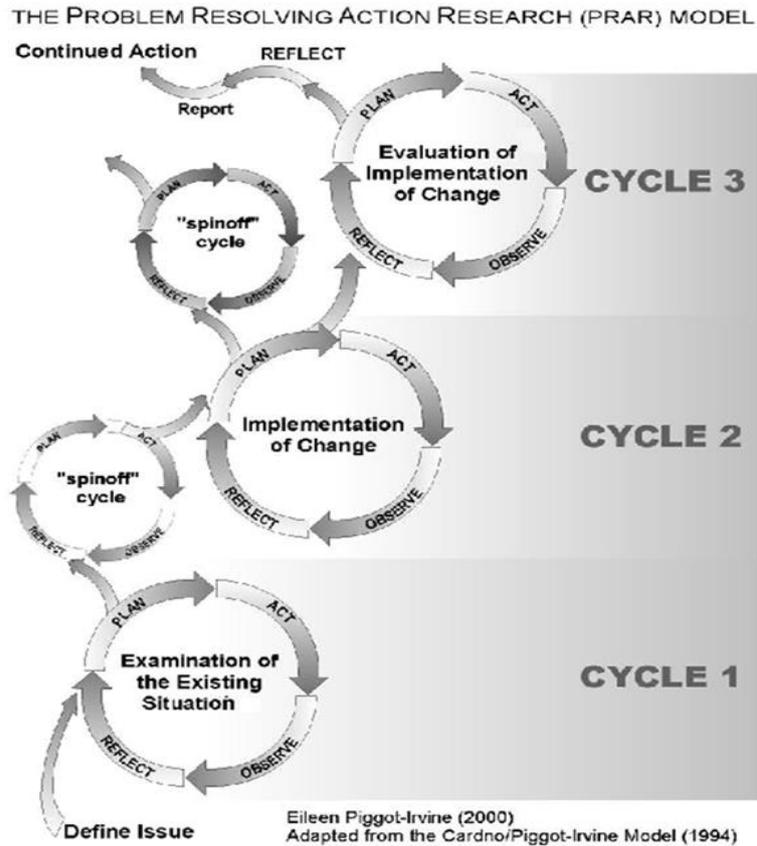


Figure 4.1: The Problem Resolving Action Research (PRAR) Model (Piggot-Irvine 2009:3)

The PRAR Model is illustrated with arrows moving in an upward direction to signify that action research is a continuous improvement methodology. It is a cyclical process consisting of cycles of reflection, planning, acting and observing that takes place in a specific context. It is experiential because knowledge is gained from observation and reflection in a specific context. The PRAR Model facilitates understanding, empowerment and transformation and is focused on facilitating change within a specific environment. Due to its participatory nature, this model contributes to the ownership of the participants in bringing about change in their own practice and towards teamwork within the organisation (Piggot-Irvine 2009:2-7).

In the PRAR Model multiple perspectives are acknowledged through the triangulation of data and the use of multiple data collection methods. The model is developmental in the sense that it facilitates professional development due to its improvement orientated features. The purpose of the implementation phase of the model is to change, improve and transform practice on a continuous basis. The model also facilitates reflection which is an important part of action research. It is also collaborative therefore facilitating collaboration between the

team members (stakeholders and researcher) from a single work environment (Piggot-Irvine 2009:3-7, 9).

The PRAR Model includes an obligation of accountability for stakeholders to enhance the validity of the action research. Therefore, it is ethically expected to make the findings of the action research public. This also enables other researchers to reflect and rethink their ideas. In this PRAR Model there are spin-off cycles making provision for unexpected issues to arise which may require action(s) to be resolved. In the context of this study there were no issues which required any spin-off cycle. Lastly, the PRAR Model supports narrowing the theory-practice gap. But most of all, this is a problem-resolving model; this significant characteristic was taken into consideration when the PRAR Model was chosen for this study (Piggott-Irvine 2009:3-7).

In the context of this study the practice of neonatal resuscitation needed to be improved. The PRAR Model suited the aim of the study which was to explore and describe the existing situation in the specific context (district hospital) and to develop strategies to sustain a quality improvement initiative in neonatal resuscitation with the purpose of decreasing neonatal mortality. In addition to this, the changes that occurred as a result of the implementation of strategies were also evaluated and reflected. This action research study consisted of three cycles. Figure 4.2 on the next page illustrates how the PRAR Model was applied to this study.

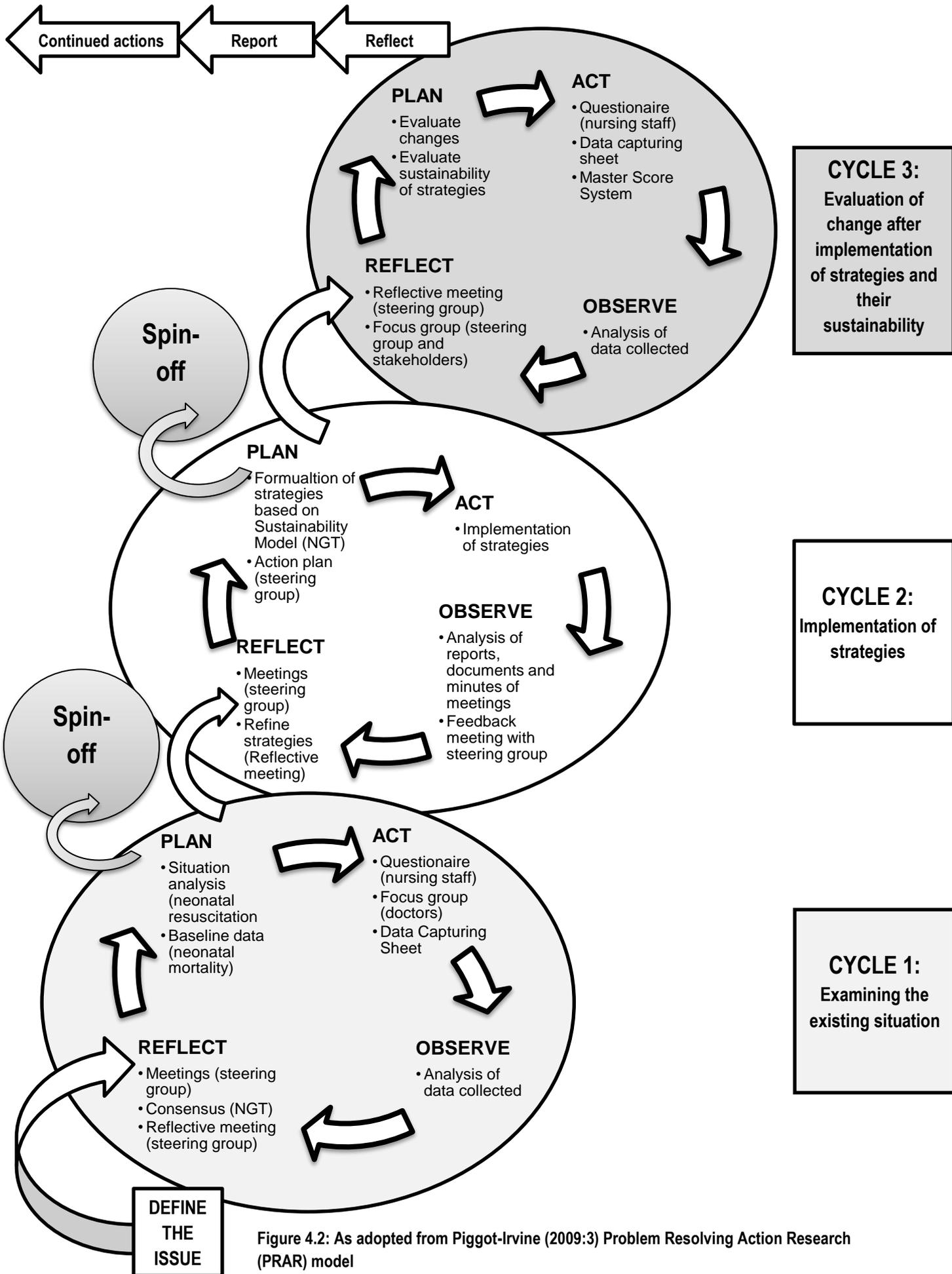


Figure 4.2: As adopted from Piggot-Irvine (2009:3) Problem Resolving Action Research (PRAR) model

The PRAR Model starts with defining the issue (see bottom of Figure 4.2). As previously explained under Figure 4.1, the PRAR Model is illustrated as moving in an upward direction to signify that action research is a continuous improvement methodology. In Figure 4.2 the PRAR Model therefore starts at the bottom with defining the issue. The defined issue can also be the existing problem. In this study the issue was identified and defined by doing literature reviews and exploring the research setting. As shown on the right-hand side of Figure 4.2, three cycles then follow. Each cycle consists of four steps, namely: PLAN, ACT, OBSERVE and REFLECT. CYCLE 1 is the examination of the existing situation. CYCLE 2 follows and focuses on the implementation of change. In this study the strategies were developed and implemented in this cycle. CYCLE 3 follows where the implementation of change (strategies and the changes that occurred as a result of the strategies) and the sustainability of the strategies are evaluated.

Additional to the main PRAR Model, there are spin-off cycles as illustrated in both Figures 4.1 and 4.2. Spin-off cycles facilitate the possibility that if unexpected issues occurs at any time during the action research process, the same process of PLAN, ACT, OBSERVE and REFLECT can be followed to address these issues. These can be addressed independently or as part of the groundwork for the next cycle (Piggot-Irvine 2009:6). There were no spin-off cycles in this study.

After completion of the three cycles, continuous reflection and continued action can follow. This lends itself towards being a more sustainable approach to problem resolving because it creates an opportunity to measure sustainability over a period of time. How these cycles were realised in this study is discussed in detail in Chapters 5, 6 and 7 respectively.

4.5 INITIATION OF THE RESEARCH PROCESS

The researcher obtained ethical clearance for the study from the Ethics Committee of the Faculty of Health Sciences at the tertiary institution (see Annexure B). Permission to conduct the study was obtained from the Gauteng Department of Health (see Annexure C). The researcher made contact with the CEO and management of the specific district hospital before permission was granted to access the research setting (see Annexure D). Permission was also obtained for the use of the retrospective documents of the maternity section of the district hospital (see Annexure E).

The researcher initiated the research process in March 2013. She was an outsider and was not an employee of the selected district hospital. However, she made contact with some of

the stakeholders in the district hospital and was known to some of the staff members. After the researcher had obtained permission from all the relevant parties, a scheduled meeting was held with the stakeholders at the district hospital.

Nursing service managers, operational managers as well as clinical and senior leaders were present at the meeting which also served as an introduction to this action research study. The researcher prepared a PowerPoint presentation and started the meeting by means of an introduction addressing the concern of neonatal mortality in South African district hospitals. During the introduction and background to the study the researcher paid attention to the concern, context and research issue – with the main issue being that there had been no decrease in the NMR in district hospitals and a quality improvement initiative in neonatal resuscitation might be the answer to the problem. This study was justified by the need to have clear strategies on how to sustain a quality improvement initiative in neonatal resuscitation. The researcher explained the holistic approach this study was based on, namely, the NHS Sustainability Model which addresses the process, staff and organisation to improve the sustainability of such a quality improvement initiative.

The researcher introduced the stakeholders to action research and discussed and explained the Problem Resolving Action Research (PRAR) Model that would be used in this study. The key factors of sustainability and the importance of the collaboration of stakeholders and ownership of the quality improvement initiative were highlighted. She then explained what a steering group is, the functioning thereof as well as who can form part of the steering group.

The role of the researcher as the facilitator was also explained. It was critical for the stakeholders to understand that the researcher would *facilitate* the research process, but that the steering group would *drive* the process. It was important for the researcher to give sufficient information regarding the study in order for stakeholders to make informed decisions on whether they wanted to participate in this study.

The researcher concluded the meeting by outlining the expected outcomes the study may have on the improvement of neonatal mortality, neonatal resuscitation and for the district hospital. Active participation, collaboration, co-learning and co-ownership were the expected outcomes.

The steering group was established in March 2013 and consisted of stakeholders from the district hospital. The steering group was instituted on a voluntary basis and formed by people who had been present at the introductory meeting. Their participation was of significance because they were the people with a passion for neonatal resuscitation and they wanted to be part of facilitating change in the district hospital and of its NMR. The steering group

comprised of the nursing services manager of the maternity section, operational managers from each of the three units (the labour ward, postnatal ward and NICU) as well as senior and clinical leaders in the maternity section. The gynaecologist and paediatrician also indicated they wanted to be part of the steering group. Unfortunately, due to the migration of staff some of the original group members did not serve on the steering group for the whole duration of the study process and new members joined. Five members were consistently part of the steering group throughout the whole study, the steering group member representing the labour ward alternated. The size of the steering group changed during the course of the study from the original nine to six members. The reason for this was staff shortages and staff that had resigned. For example, due to staff shortages the units could not spare more staff to attend steering group meetings as they had additional responsibilities to attend to.

The steering group had various functions. Firstly, they had to decide on a name. They then had to decide on a vision for the research project and, thirdly, the roles of the group members and how the group would function had to be discussed and agreed upon. Their final function was to decide on the ethical responsibilities of the steering group. The steering group was responsible for the planning, implementation, evaluation and reflection of each of the cycles of the research process in collaboration with the researcher.

The first steering group meeting took on the same form as the meeting with the stakeholders. The background of the study was discussed again; however, the focus of this meeting was on the functioning of the steering group. A brief overview of the research methodology and the three cycles of the action research model were provided by the researcher. The methods of data collection were also discussed. The researcher handed out reflective journals and stationery. The rationale and guidelines for keeping reflective journals were discussed in detail.

The steering group decided to discuss potential names with staff members in the different units before settling for 'The Saving Babies Steering Group and Project'. The steering group also discussed what their vision should be during a meeting. Their vision was to:

- *decrease neonatal mortality*
- *sustain and improve the quality of neonatal resuscitation*
- *deliver competent neonatal resuscitation*
- *provide improved maternal care*
- *ensure value added outcomes*
- *contribute towards a change in policy*

- *ensure the awareness of everyone involved (including after hours and casualty officers) in neonatal resuscitation including active involvement and participation*
- *organise and implement outreaches to surrounding clinics*
- *improve basic neonatal care to decrease the need for neonatal resuscitation.*

The steering group decided on the individual roles of the members. The researcher was assigned the role of the chairperson for the steering group meetings. The vice-chairperson was the nursing services manager and the secretary was one of the professional nurses working in the NICU. The group decided to meet on a regular basis – every third Friday of the month at 11h00 in the hospital boardroom. Communication would be via text message or short message service (sms) or electronic mail (e-mails). The researcher would be the contact person and organise the meetings with the steering group. The meetings would be based on an equal voice and full disclosure. The steering group adopted the fundamental ethical principles of respect, justice, and beneficence (see Chapter 1, section 1.12).

The initiation phase of the research project corresponded with descriptions of initiating action research projects in literature. The steering group drove the research process and was responsible for decision-making. They were the co-researchers in a co-learning and co-researching process as described by Koshy et al. (2011:72). The researcher acted as a facilitator and as such she became a research partner sharing power and ownership and collaborating with the participants for the development of the strategies to sustain the quality improvement initiative in neonatal resuscitation (Maree et al. 2009:125). Participation, cooperation and collaboration are important parts of the action research process to increase the feeling of ownership and the willingness to change practice (Coghlan & Brannick 2010:8; Koshy et al. 2011:81).

4.6 DEFINING THE ISSUE

After the steering group had been established the next important step was to define the issue and decide on the way forward. The researcher facilitated the process of defining the issue with the steering group to identify and clarify issues that needed to be addressed as part of the quality improvement initiative in neonatal resuscitation.

The issues and challenges they experienced in the maternity section of the district hospital coincided with the literature and the modifiable and avoidable causes identified in the Saving Babies Reports (see Chapter 2, section 2.3.1). The staff working in the maternity section of the district hospital also experienced challenges regarding neonatal resuscitation and the

factors influencing the successfulness of neonatal resuscitation, for example, staff shortages, a lack of resources and equipment and challenges regarding transport. The focus of this study was on how to sustain a quality improvement initiative in neonatal resuscitation and therefore this study was based on the NHS Sustainability Model (see Chapter 3, section 3.3.4). The Sustainability Model focuses on quality improvement initiatives and how it can be made more sustainable by following a holistic approach and focusing on the process, staff, and organisation.

Based on the issue being the quality of neonatal resuscitation, it was evident that the population for this study would be all healthcare staff working with neonates in the district hospital; therefore, all healthcare staff working in the maternity section of this hospital.

4.7 OVERVIEW OF ACTION RESEARCH PROCESS FOLLOWED

The model for the action research process that was followed in this study was the PRAR model (see Figure 4.2). The phases of PLAN-ACT-OBSERVE-REFLECT and the methodologies used in each of the three cycles are illustrated in Figure 4.1 and Figure 4.2.

The main research question for this study was:

- *“How can a quality improvement initiative in neonatal resuscitation be sustained in a district hospital in Gauteng?”*

To answer the main question certain sub-questions needed to be answered first. In the first two cycles a sub-question was focused on. The third cycle addressed two sub-questions:

- *CYCLE 1 – “What was the existing situation regarding factors influencing neonatal resuscitation and neonatal mortality in a district hospital in Gauteng?”*
- *CYCLE 2 – “What strategies could be implemented to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng?”*
- *CYCLE 3 – “What were the changes that occurred as a result of the strategies for a quality improvement initiative in neonatal resuscitation that was implemented? How sustainable was the strategies implemented to sustain a quality improvement initiative?”*

The sub-questions formed the basis of CYCLES 1, 2 and 3 respectively (see Figure 4.2). To triangulate the data, different methods of data collection and data analyses were used in each of the cycles.

A population by definition is the entire group of individuals that the researcher is interested in. They have some common characteristics and meet the inclusion criteria of a sample (Brink et al. 2009:123-124; Burns & Grove 2009:42, 344; Polit & Beck 2008:337-339). The population for this study was the entire group of individuals caring for neonates in the maternity section (labour ward, postnatal ward and NICU) in the selected district hospital.

A sample by definition is a subset/fraction of the whole of the population selected to participate in the study. A sample therefore consists of a selected group or unit of analysis (Brink et al. 2009:124; Burns & Grove 2009:343-345; Polit & Beck 2008: 339-340). Purposive sampling, a form of non-probability sampling, was used (Brink et al. 2009:133-134; de Vos et al. 2002:201-202; Maree et al. 2010:176-178). The sample therefore consisted of a selected group that had to meet the following inclusion criteria (Polit & Beck 2008: 339-340):

- *they had to be healthcare providers in the maternity section (labour ward, postnatal ward and NICU) who delivered babies and cared for neonates in the particular district hospital*
- *all participants had to voluntarily participate in the study*
- *in the case of senior leaders they had to be the matron or operational managers of the labour ward, postnatal ward, and neonatal intensive care unit (NICU)*
- *clinical leaders had to be shift leaders and doctors*
- *all participants had to be literate in English as this study was conducted in English.*

The population and sample were expected to remain the same throughout the study. However, this was not the case as there was a high turnover of staff. Participants who would be most informative were selected. Therefore, all the staff working in the maternity section of the district hospital was part of the population and sample. As many participants as possible were included to obtain sufficient and in-depth information for the specific context. However, in the end, the sample size was very small because of the shortage of staff in the hospital. For example all the nursing staff working in the maternity section of the district hospital received questionnaires. In CYCLE 1 the sample was 69 and in CYCLE 3 the sample was 71. In the context of this study nothing could be done regarding the small sample size. The different samples, sample sizes and units of analysis are discussed with each data collection method followed in each of the cycles (see Table 1.1 in Chapter 1 for a summary).

4.8 DISCUSSION OF CYCLES

The three cycles and the research techniques used are discussed and clarified in the following sections.

4.8.1 CYCLE 1 – Examination of the existing situation

Part of the aim of the study was to explore and describe the existing situation regarding neonatal resuscitation and its associated factors, namely, the process, staff and organisation. These factors were based on the Sustainability Model that served as the basis of this study (see Chapter 3, section 3.3.4).

The main focus of CYCLE 1 was to answer the sub-question related to the factors that currently affected neonatal resuscitation and neonatal mortality in the specific district hospital in Gauteng. To answer this first question (*“What is the existing situation regarding factors influencing neonatal resuscitation and neonatal mortality in a district hospital in Gauteng?”*) various data collection and data analysis techniques were used. It included a questionnaire, a focus group interview, data capturing sheets and a nominal group technique (NGT) discussion as illustrated in Figure 4.3.

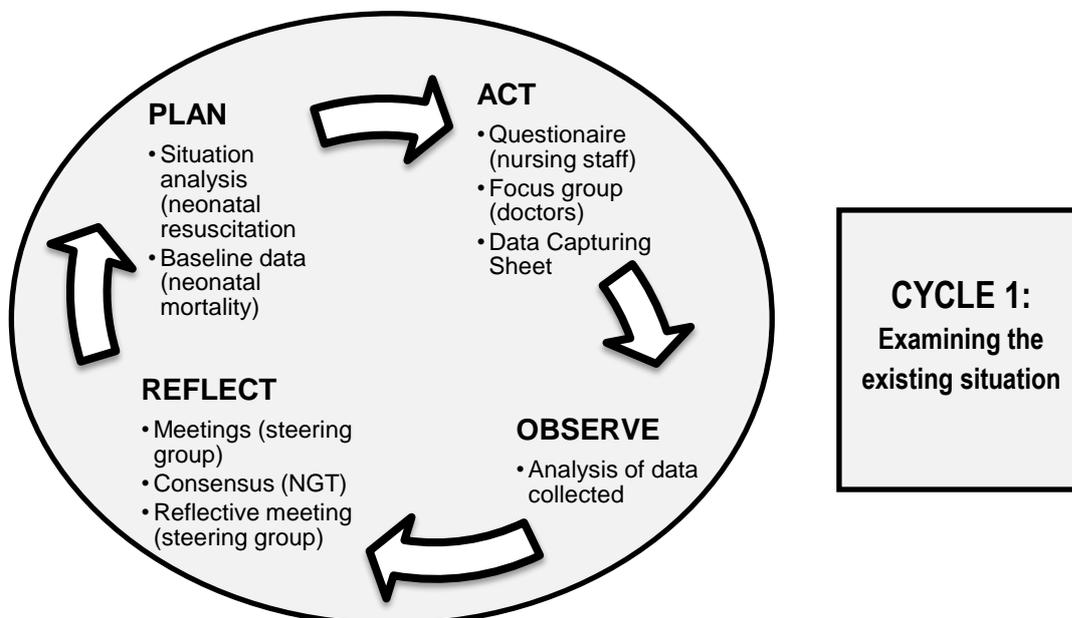


Figure 4.3: CYCLE 1- Examining the existing situation

As shown in Figure 4.3 the first step (PLAN) for CYCLE 1 included a situational analysis of neonatal resuscitation and the gathering of the baseline data (current neonatal mortality). The situational analysis focused on the practice of neonatal resuscitation and other influencing factors related to the process, staff and organisation, and neonatal mortality as the indicator of quality of care. This is discussed in more detail in Chapter 5.

PLAN (the first step) was followed by ACT (the second step on the right-hand side of Figure 4:3) which was the gathering of data. The data gathering tools included a questionnaire with the nurses, a focus group interview with the doctors, and data capturing sheets to provide the baseline data for neonatal mortality.

During the third step (OBSERVE), the data from the previous two steps (PLAN and ACT) were analysed. The quantitative data were analysed by making use of descriptive statistics and the qualitative data were analysed by using open-coding. (A thorough description of the data analyses follows in Chapter 5). The data analysis for CYCLE 1 is presented from two perspectives: from that of the nurses (questionnaire) and the doctors (focus group interview).

The fourth step in CYCLE 1 (REFLECTION) is indicated in Figure 4.3. During this step consensus was reached by means of a nominal group technique discussion based on the findings of CYCLE 1. Reflective meetings were also held with the steering group. The process followed in CYCLE 1 is discussed in detail in Chapter 5.

4.8.1.1 Examining the existing situation regarding neonatal resuscitation and its associated factors based on the perspectives of the nurses (questionnaire)

In the second step (ACT) (see Figure 4.3) the data were collected. The first method of data collection for examining the existing situation on the practice of neonatal resuscitation (the process, staff and organisation) was from the nurses' perspective by means of a questionnaire (see Annexure I). Questionnaires can be used to initiate the action research process to analyse the existing situation and gathering a broad overview of the baseline data (Koshy et al. 2011:113). In this study the existing situation regarding neonatal resuscitation and its associated factors were explored by means of a questionnaire that provided the baseline data from the perspectives of the nurses (nursing staff).

A questionnaire is “an instrument specifically designed to elicit information that will be useful in analysis” (Babbie 2010:225). It is important to make sure the questions contained in the questionnaire are relevant; asking questions pertinent to the topic under study will ensure that important and correct data are obtained. The questions also need to be structured so

that they are understandable, easy to follow and directions on how the questions should be answered must be clear. This will ensure that optimal data are gathered in a short time. (de Vos et al. 2002:170-171; Koshy et al. 2011:113-114). The researcher decided to use a questionnaire for this part of the situation analysis because the aim was to elicit as much information as possible from as many participants as possible to obtain baseline data in the shortest time. Importantly, the questionnaire provided information that could be followed up at a later stage in the action research process. In the case of this study, there was indeed information that could be followed up (see CYCLE 3). This was one of the advantages of using questionnaires to collect data as stated by Koshy et al. (2011:113).

The disadvantages of using questionnaires were taken into consideration. Koshy et al. (2011:114) mention possible bias where responses may be influenced by what the participant *thinks* the researcher believes as well as the risk of poor return of the questionnaires thereby leading to a low response rate. In the current study the importance of answering the questionnaires as honest and as objective as possible was explained to the participants. The participants were assured that anonymity was guaranteed as no names would appear on the questionnaires. Due to the low sample size there was a possibility of poor return and a low response rate. To prevent this from happening, a questionnaire was handed out to all the nursing staff members working in the maternity section in the district hospital.

The sample included all the nursing staff from all the nurse categories working in the specific hospital's maternity section in all three the units: the labour ward, postnatal ward and NICU units. The sample included professional nurses, enrolled nursing auxiliaries and nursing auxiliaries. The sample size was a total of 69 nursing staff (40 professional nurses, 13 enrolled nursing auxiliaries and 16 nursing auxiliaries). The response rate was 60.8% as 42 out of 69 questionnaires were returned. The sampling and data collection are discussed in Chapter 5 in more detail.

The questionnaire (see Annexure I) was compiled by the researchers and was based on the Sustainability Model and literature on neonatal resuscitation. The questionnaire consisted of 45 questions that were divided into 6 sections:

- *Section A determined the demographic data.*
- *Section B, C and D addressed the process, staff and organisation respectively.*
- *Section E addressed neonatal resuscitation including the prevention and early identification of risk factors, neonatal resuscitation as an intervention as well as post resuscitation care.*

- *Section F addressed reflection on neonatal resuscitation.*

The instrument contained both closed- and open-ended questions. Open-ended questions were chosen because it provided rich and meaningful data (Koshy et al. 2011:113). The open-ended questions allowed the participants to give their views and perceptions. For example instead of just answering yes or no, participants had the opportunity to explain their answer or give their perception of the question asked.

A statistician was involved to ensure construct validity as well as to determine the statistical value of the questionnaire. The researcher worked with the statistician at the Department of Statistics at the University of Pretoria to draft the initial questionnaire. Together they determined the relevancy of the questions to collect relevant and accurate information and to ensure that clear and structured questions were asked.

The questionnaire was used in a pilot test to make sure as an instrument for data collection it was understandable and usable for obtaining the baseline data. A pilot test can be used to pre-test a research instrument such as a questionnaire (Van Teijlingen & Hundley 2001:1). The results of the questions asked to participants of the pilot test after completing the questionnaire and the changes made will be discussed in Chapter 5, section 5.2.1.2.

The third step in CYCLE 1 (OBSERVE) reflected the analysis of the data obtained from the questionnaires (see Figure 4.3). Descriptive statistics were used to describe, organise, summarise and simplify the data in a meaningful way in order for certain patterns to emerge from the data. Averages and percentages are examples of descriptive statistics (Polit & Beck 2008:556). Frequency is the number of times a result occurs. The frequency distribution is a systematic arrangement of numeric values – from the lowest to the highest – together with a count or percentage of the number of times each value or score was obtained. Percentage is the number of parts per 100 that a certain portion of the whole represents (Burns & Grove 2009:470-471; Leard statistics, Descriptive and inferential statistics, [s.a.]; Mertler 2009:146-149; Polit & Beck 2008:556, 562-566). Frequency distributions, averages, standard deviations and graphs in the form of a boxplot were used to describe the demographic data and are discussed in more detail in Chapter 5.

Inferential statistics were used to make inferences about the population in the maternity section of the district hospital. Cross-tabulations were used to classify responses and compare summary data output on the basis of variables as suggested by Burns and Grove (2009:498) and agreed upon by Maree et al. (2010:185). In the cross tabulations/contingency tables the data output related to the two variables within the sample

can be visually compared in a summary. This is useful to examine large amounts of data. The data are presented in the form of frequencies and percentages. With cross tabulations two or more categories can be compared with two or more other categories (Burns & Grove 2009:498). Due to the small sample size in this study, the categories were reduced from a 4x4 to a 2x2 contingency table, therefore, only comparing two categories with two other categories.

Hypothesis testing with statistics provides objective criteria to determine if the hypothesis is supported by the data (Polit & Beck 2008:587). In the case of cross tabulations the null hypothesis states there is no association between the two factors/categories. The alternative hypothesis states there is an association between the two factors/categories (Burns & Grove 2009:173-174; Polit & Beck 2008:587-588). Various statistical tests can be performed and researchers seek to reject or accept the null hypothesis. The Chi-square test and the Fischer's exact test were chosen to determine the independence of two factors or categories because of the small sample size (Polit & Beck 2008:600-601). The Chi-square test or Fischer's exact test is used to test a hypothesis about a proportion of the sample that falls into different categories where contingency tables were created to test the significance of differences (Polit & Beck 2008:600-601). To manage the risk for error, the level of significance selected was 0.05 as suggested by Polit and Beck (2008:588). In this study the sample size was small and therefore both the Chi-square test and the Fischer exact test were used to determine p-values to test the null hypothesis against the alternative hypotheses. If the p-value of the test was less than the level of significance, which is 0.05, then the null hypothesis was rejected in favour of the alternative hypothesis. If the p-value was more than 0.05, the null hypothesis was not rejected in favour of the alternative hypothesis. The hypothesis and findings of the descriptive and inferential statistics are discussed thoroughly in Chapter 5 in section 5.2.2.

For the analysis of the qualitative data gathered through the questionnaires, the steps of Tesch's (1990) (cited in Creswell 2009:186) open-coding method for data analysis were used.

- *Get a general sense of the whole.*
- *Pick one document and find the underlying meaning. Write the thoughts in the margin.*
- *After this task has been completed group similar topics and arrange them in columns in the form of a list.*
- *Assign codes to the list and go through the data again writing down the codes.*

- *Arrange the topics in themes and the themes into categories by grouping them together.*
- *Make final decisions and alphabetise the codes.*
- *Assemble the data accordingly and perform a preliminary analysis.*
- *If necessary, recode the existing data.*

The purpose of the questionnaire (see Annexure I) in CYCLE 1 was to obtain baseline data and examine the existing situation regarding neonatal resuscitation and its associated factors. The findings from the questionnaire are presented and discussed in Chapter 5 (section 5.2.2.). The findings and results obtained from the analysis of the questionnaire provided part of the baseline data that formed the basis for the nominal group technique discussion (see Chapter 5 section 5.2.2 and 5.5).

4.8.1.2 Examining the existing situation regarding neonatal resuscitation and its associated factors based on the perspectives of doctors (focus group interview).

The second step (ACT) in CYCLE 1 reflected the data collection. The objective for CYCLE 1 was to explore and describe the existing situation regarding neonatal resuscitation and its associated factors. In order to triangulate data and examine the existing situation even further, a focus group interview was chosen as the method of data collection on the perceptions and views of the doctors working in the setting on neonatal resuscitation, the process, staff and organisation (see Figure 4.3; section 4.8.1). The sample for the focus group interview was all the doctors that cared for neonates in the maternity section in the district hospital as discussed in Chapter 5, section 5.3. Nine doctors were invited and eight participated. One of the doctors was on leave. During the course of the focus group two doctors had to leave early to attend to a patient.

A focus group interview is held with between 5 and 15 participants. If the groups are small everyone has the opportunity to give an input and share their views, experiences, perceptions, concerns and attitudes. This generates a variety of new ideas (Brink et al. 2009:152; Koshy et al. 2011:111-112; Krueger & Casey 2009:6; Maree et al. 2010:90-92; Polit & Beck 2008:394-395). However, Krueger and Casey (2009:6) advise that a focus group to be large enough to provide a diversity of perceptions. These authors advise a focus group should not have less than four participants

Focus group interviews have certain characteristics which suited the purpose of this study and the questions that needed to be answered. Focus group interviews involve participants with certain characteristics to provide qualitative data in a focused discussion to help understand the topic of interest (Krueger & Casey 2009:6-7). In this case the topic was the existing situation regarding neonatal resuscitation in the specific setting and context. Furthermore, a focus group interview was chosen as the data collection method of choice due to the following advantages as discussed in Koshy et al. (2011:112). It swiftly provided a view of the participating doctors' opinions, views and perceptions regarding the current situation at the district hospital whereas individual interviews with each of them would have taken up a lot of time and resources. Conducting a focus group interview with the doctors was quicker (the focus group interview lasted for one hour) and they could attend to their patients sooner. The participants' different viewpoints were expressed and added on to the information that had already been gained by the questionnaires thus enhancing the depth of the data. Another advantage is that focus groups can also provide insight into issues and concerns within an organisation regarding a specific topic (Krueger & Casey 2009:10). Therefore, this method of data collection lends itself towards accumulating diverse data about the topic under discussion.

The disadvantages of an focus group interview were taken into account such as poor attendance, the skill of the facilitator, group dynamics, the tendency to agree instead of disagree with the views of others in the group, bias from the facilitator and the difficulties that may be encountered with the data analysis such as difficulties to transcribe the focus group interview and the complexity of analysing the data generated (Koshy et al. 2011:112-113). The guidelines for conducting a focus group interview as noted by Koshy et al. (2011:112) were followed as well as the recommendations on moderating skills discussed by Krueger and Casey (2009:85) to enhance the successfulness of the focus group in this study. Both the facilitator and the co-facilitator (researcher) has held focus group interviews on previous occasions in the past and after extensive reading on the topic, they were therefore confident and competent to conduct the focus group interviews.

A very important characteristic of a focus group interview is that the guided discussion is focused on a specific topic or set of questions and the group dynamics (debate and conflict) generate data and an in-depth view of the phenomenon (Maree et al. 2010:90-92; Polit & Beck 2008:394-395). According to Krueger and Casey (2009:36), focus group questions need to have certain qualities to evoke conversation. If a question elicits conversation it helps to create and maintain an environment where the participants can build on each other's' comments and this creates an informal and social environment. Other significant qualities of focus group questions include it should be open-ended, easy, clear and short.

Categories of questions were used as suggested by Krueger and Casey (2009:38-41), namely, an opening question, introductory questions, transition questions, key questions and ending questions. This is further discussed in Chapter 5 in section 5.3.

Confidentiality implies that the researcher takes responsibility to protect all data gathered within the scope of the project from being made available to other persons unless the researcher has been given permission to make it known publicly (Burns & Grove 2009:189-207; Polit & Beck 2008:170-185). The researcher will keep all transcripts of this study under lock and key for a period of five years after completion of the study. The researcher only disseminated the findings after permission was granted by the relevant parties. The participants in the focus group were also requested to be sensitive to confidentiality.

Field notes (in written form) were made during the focus group interview to collect data regarding observations made and non-verbal cues observed during the proceedings. It is important for the person taking the field notes to know what should be captured (Krueger & Casey 2009:94). The co-facilitator took the field notes during the focus group interview. The observations made (non-verbal cues such as gestures) as well as summaries of what had been said by the participants were recorded in the field notes. At the end of the focus group interview the co-moderator gave a summary of what had been said and member checking was done.

The focus group interview was audiotaped and transcribed verbatim. During CYCLE 1, the third step (OBSERVE) reflected on the data analysis (see Figure 4.3). The qualitative data generated by the focus group interview and the open-ended questions of the questionnaire were analysed according to Tesch's (1990) method of open-coding (cited in Creswell 2009:186) as discussed in section 4.8.1.1.

Only one focus group interview was held in CYCLE 1 as most of the participating doctors working in the research setting attended the focus group. It was also important to note that their comments and views became repetitive. The findings from the focus group were used in combination with the findings from the questionnaires to provide rich data from different perspectives on the same phenomenon. The realisation of the focus group and the findings are discussed in detail in Chapter 5, section 5.3.

4.8.1.3 Exploring the existing situation regarding neonatal mortality in the district hospital

During CYCLE 1 the second step (ACT) reflected the data collected as shown in Figure 4.3. The objective for CYCLE 1 was to explore and describe the existing situation regarding

neonatal mortality as an indicator of quality of care. Data capturing sheets (see Annexure J) were used to collect data regarding the neonatal mortality in the district hospital (see Figure 4.3, section 4.8.1) as baseline data for neonatal mortality. The sources and units of analysis that were identified to obtain data included records and documentation (including incident reports and statistics) pertaining to neonatal mortality (early and late neonatal mortality according to birth weight as well as fresh stillbirths and macerated stillbirths); reports from mortality and morbidity (M&M) meetings; records and documentation related to the number of admissions, numbers of life births and preterm births, numbers of transfers and discharges and any other form of document or record related to the study topic. The researcher gained permission to access records and documentation from the Department of Health of Gauteng as well as from the CEO and management of the selected district hospital (see Annexures C, D and E).

The data capturing sheet for the labour ward in the district hospital indicated the months and then included the numbers of deliveries; life births; preterm births; babies born before arrival and born before arrival deaths; the numbers of neonatal mortalities classified according to age (early and late neonatal deaths); fresh stillbirths according to birth weight was also recorded as this is an indication of the quality of antenatal care, and the number of macerated stillbirths in a specific month (see Annexure J).

The data capturing sheet for the neonatal intensive care unit was also divided into months that indicated the numbers of admissions, discharges, transfers and the neonatal mortality rates according to age, for example, <24hours, 24-48 hours etc. and also the total number of deaths per month (see Annexure J).

The data capturing sheets were finalised and adopted from to the current statistics that are kept in the labour ward and the neonatal intensive care unit respectively. Descriptive statistics were used to analyse and describe the quantitative data collected from the data capturing sheets. The statistician assisted with the finalisation of the data capturing sheets and the analysis thereof. The results of these statistics are also presented and discussed in Chapter 5.

4.8.1.4 Setting priorities for the implementation of strategies

During CYCLE 1 the fourth step consisted of REFLECTION (see Figure 4.3.). Reflection consisted of reflection on meetings, consensus and reflective meetings with the steering group. The nominal group technique discussion was used to reach consensus and plan for CYCLE 2 (see Figure 4.2. in section 4.4 and Figure 4.3 in section 4.8.1). The purpose of the

nominal group technique discussion was to discuss and identify the main problems experienced in the research setting with regard to neonatal resuscitation and its associated factors like the process, the staff and organisation. The focus of the nominal group technique discussion was to prioritise the problems identified and to come up with solutions for them.

The nominal group technique discussion has a number of characteristics. This technique takes advantage of the collective input of a variety of people with their own talents, knowledge and skills. A nominal group technique discussion therefore facilitates a balanced participation across members where they can come up with a wide variety of creative ideas to confront issues on a problem solving basis. Every group member gets an opportunity to give feedback and ideas. Participants partaking in the nominal group technique discussion feel a great sense of satisfaction because there are immediate results and a sense of closure and accomplishment (Dunham 1998:1-2). This in turn also facilitates ownership of participants in the research project and it was therefore the data collection method of choice for this part of the action research cycles.

When conducting a nominal group technique discussion it is essential to follow the 4-step process because each step has its own advantages. The first step is to have participants generate key ideas silently and independently. They have to write their ideas on index cards. This step provides them with enough time to think, reflect and focus on being problem-centred. Secondly, the group facilitator must record the ideas from each group member in a round-robin recording on a flipchart visible to the entire group. This step facilitates equal participation and increases the problem-orientated nature of the nominal group technique discussion. It also provides a written record and guides the proceedings. Thirdly, a discussion follows to clarify ideas. This step provides an opportunity to eliminate misunderstandings and explain the logic behind ideas without argumentation. The last step is to determine the importance of each idea and to vote on the ideas. The group decision is then mathematically determined through rank ordering. If consensus is not reached, two additional steps can be added to the process. A brief discussion can be held to further clarify ideas. A final vote on an index card is then taken to finalise the priority of the ideas (Delbecq, Van de Ven & Gustafson 1975:8-9; Dunham 1998:2-5). This 4-step process was applied when the nominal group technique discussion was conducted in this study. Further discussion of the nominal group technique discussion and its findings follows in Chapter 5.

Due to the fact that the aim of a nominal group technique discussion is for the participants to reach consensus, the 4-step process followed in the nominal group technique discussion resulted in a set of prioritised solutions or recommendations that represented the group's preferences (Delbecq et al. 1975:33-34). In action research this is important because the

research is *for* the people and not *on* the people and for sustainability they must have ownership of the project (Allen et al. 2007:15; 29). These are all advantages that were facilitated by the nominal group technique discussion in this study.

The nominal group technique discussion can provide both qualitative and quantitative data and is cost-effective, time efficient and is easily implemented with health professionals in the clinical environment (Potter, Gordon & Hamer 2004:126). During the nominal group technique discussion in the current study data were collected and analysed simultaneously. The data were captured on a flipchart (see Annexure R for the paper trail). The findings of the nominal group technique discussion are presented and discussed in-depth in Chapter 5, section 5.5. The findings of the nominal group technique discussion formed the basis for the development of the strategies that formed the planning phase of CYCLE 2 (see Figure 4.2 in section 4.4) as discussed in section 4.8.2.

The nominal group technique discussion was easy to implement with the healthcare professionals who worked in the setting. It was important to have members of the working force also present to facilitate empowerment and ownership of the strategies that were developed and implemented as a result of the nominal group technique discussion.

The sample for the nominal group technique discussion was the steering group and staff members of the maternity section (labour ward, postnatal ward and NICU) in the hospital. The nominal group technique discussion was attended by a variety of staff members working in the maternity section of the selected district hospital. It included management, doctors, senior and clinical leaders as well as professional nurses with a passion for their hospital and, more specifically, for successful neonatal resuscitation. The participants were identified and invited by the steering group. Ten participants attended the nominal group technique discussion. The realisation of the nominal group technique is discussed in detail in Chapter 5, section 5.5.

4.8.1.5 Minutes of meetings and reflective meetings held with the steering group.

As part of CYCLE 1, step four (REFLECTION) included reflection through meetings with the steering group. As part of reflection regular meetings were held with the steering group. The minutes of these meetings served as a paper trail during the action research process. At the end of CYCLE 1 the researcher also facilitated a reflective meeting with the steering group during which they had the opportunity to reflect on CYCLE 1. The fourth step in CYCLE 1 (REFLECTION) is discussed in-depth in Chapter 5, section 5.6.

4.8.2 CYCLE 2 – Implementation of strategies

The focus of CYCLE 2 was to answer the following research question: *“What strategies can be implemented to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng?”*

During the first step (PLAN) of CYCLE 2 strategies were developed and formulated based on the findings from CYCLE 1; consensus was reached during the nominal group technique discussion and a literature control to sustain a quality improvement initiative in neonatal resuscitation in the maternity section of the district hospital. Figure 4.4 represents the overview of CYCLE 2 and the processes followed.

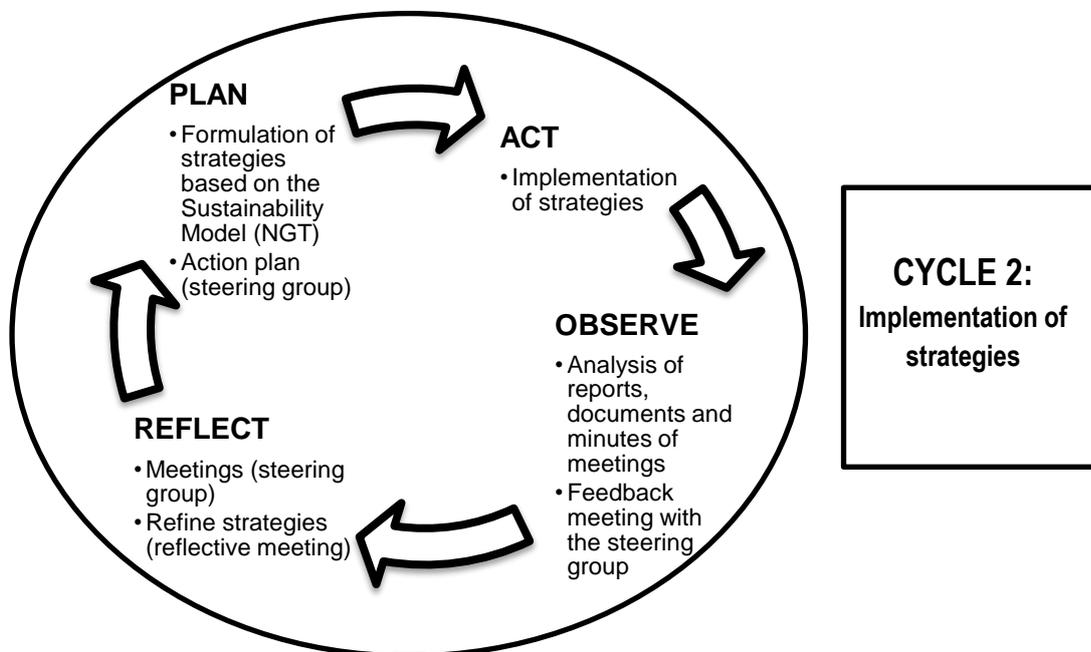


Figure 4.4: CYCLE 2 - Implementation of strategies

During the first step (PLAN) of CYCLE 2 strategies were formulated based on the findings from CYCLE 1, consensus was reached during the nominal group technique discussion and a literature control (see Figure 4.4). The strategies are discussed in detail in Chapter 6.

The core strategy document was given to the steering group members. The steering group discussed the document with the relevant stakeholders to come up with an action plan for implementation. This action plan was refined and the final strategy document was given to the steering group members for implementation in April 2014 (see Annexure P).

During the second step (ACT) of CYCLE 2 strategies were implemented. The implementation of strategies is thoroughly discussed in Chapter 6 (see Table 6.1).

During the third step (OBSERVE) of CYCLE 2 documents and reports were supposed to be analysed, but the documentation regarding the implementation of the strategies were insufficient. The researcher therefore had to rely on the minutes of meetings held by the steering group and a feedback meeting held with the steering group regarding the implementation of strategies.

During the fourth step (REFLECT) of CYCLE 2 a reflective meeting was held with the steering group members with regard to the implementation of strategies and also to further refine strategies if needed. During the time of implementation the researcher followed up with the steering group about their needs, the implementation of strategies, the challenges they experienced and so forth. The strategies that were implemented and the realisation of their implementation are discussed in detail in Chapter 6.

4.8.3 CYCLE 3 – Evaluation of implementation of strategies

The focus of CYCLE 3 was to answer the research questions: *“What were the changes that occurred as a result of the strategies for a quality improvement initiative in neonatal resuscitation that was implemented? How sustainable was the strategies to sustain a quality improvement initiative?”*

During the first step (PLAN) of CYCLE 3 the changes and sustainability of the strategies were evaluated six months after implementation. Figure 4.5 illustrates the data collection and processes followed.

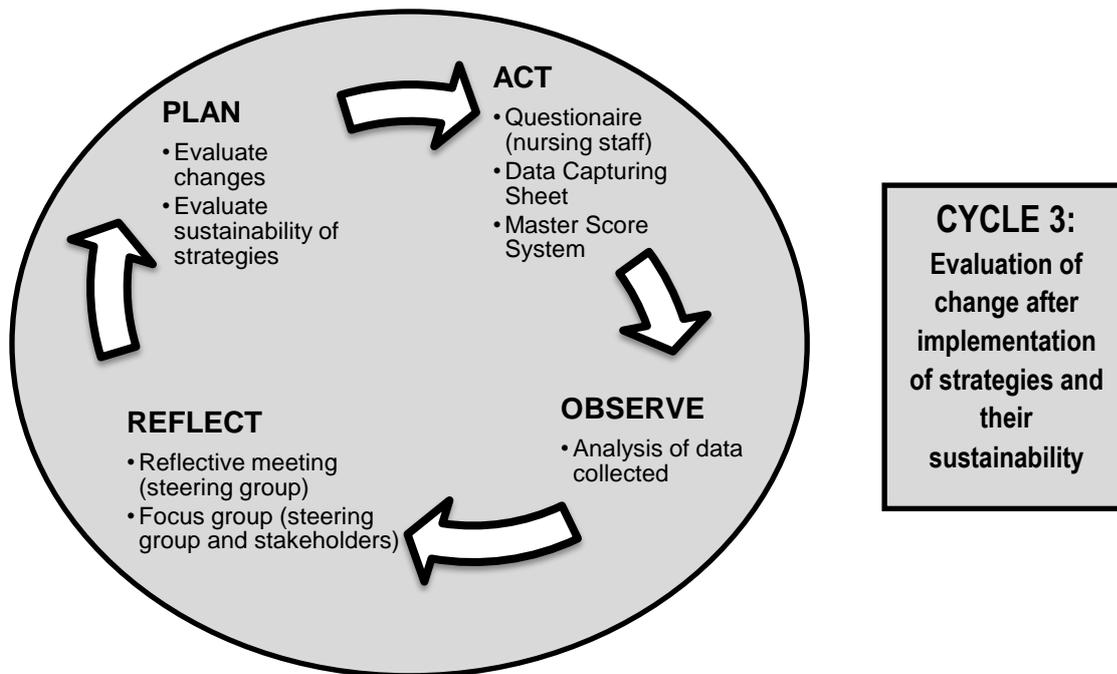


Figure 4.5: CYCLE 3 – Evaluation of change after implementation of strategies and their sustainability

The second step (ACT) of CYCLE 3 reflected on data collection to evaluate the changes that occurred after the implementation and to evaluate the sustainability of the strategies. The data gathering tools included a questionnaire (with nurses), data capturing sheets (to provide data on changes regarding neonatal mortality), and the Master Score System which served as a tool to evaluate the sustainability of the strategies that were implemented. Because of the small sample size it was decided not to hold a focus group interview with the doctors as the objective of this cycle was to evaluate changes; it was not a situation analysis. Therefore, the doctors were included in the sample for the focus group interview that was held in step four (REFLECTION) of CYCLE 3.

During the third step (OBSERVE) of CYCLE 3 the data from the previous steps in CYCLE 3 were analysed (see Figure 4.5). The quantitative data were analysed by making use of descriptive statistics and the qualitative data were analysed by open-coding. A detailed discussion of these analyses is presented in Chapter 7.

Lastly, in step four (REFLECTION) (see Figure 4.5) a focus group interview was held with the steering group and stakeholders. This focus group interview served a dual purpose, namely, to reflect on and evaluate the strategies. Reflective meetings were also held with the steering group. CYCLE 3 is discussed in-depth in Chapter 7.

The evaluation of the implementation of change took place six months after the implementation of the strategies had been initiated. The evaluation was thus done at the end

of September 2014. As this was an action research process, continuous refinement and further reflection had to take place meaning that these findings were not the final results.

4.8.3.1 Changes that occurred based on the perspectives of nurses

During the second step (ACT) of CYCLE 3 the same questionnaire (see Annexure I) used in CYCLE 1 (see 4.8.1.1) of this study was again used as a method of data collection. CYCLE 3 (see Figure 4.5) focused on the evaluation of the implementation of change that occurred as a result of the strategies that had been implemented.

The population and sample remained the same as for CYCLE 1. The sample included all categories of nursing staff working in the maternity section of the district hospital; the labour ward, postnatal ward and the NICU. The sample size for CYCLE 1 was 69 and the sample size for CYCLE 3 was 71. The reason for this slight increase in sample size was the appointment of new staff. This did not have any effect on the action research.

During the third step (OBSERVE) of CYCLE 3 the data were analysed by making use of descriptive and inferential statistics for the quantitative data and open-coding for the qualitative data as discussed in section 4.8.1.1.

The purpose of the questionnaire in this cycle was therefore to evaluate the changes that took place as a result of the strategies implemented to sustain a quality improvement initiative in neonatal resuscitation in the district hospital. The same questionnaire that was used in CYCLE 1 was also used in CYCLE 3. The realisation of the data collection with this questionnaire and its findings are discussed in detail in Chapter 7, sections 7.2 and 7.3.

4.8.3.2 Changes that occurred based on the perspectives and reflections of the steering group and the stakeholders

During the fourth step (REFLECT) of CYCLE 3 a focus group interview was held with the steering group and stakeholders as part of CYCLE 3 (see Figure 4.5.). The aim was to evaluate the implementation of change and reflect on the changes that had occurred as a result of the strategies that had been implemented to sustain the quality improvement initiative in neonatal resuscitation from the perspectives of the steering group and stakeholders working in the maternity section of the district hospital. The same principles and guidelines as well as data analysis techniques were applied as in the first focus group interview in CYCLE 1 (see Annexure O for the interview schedule). The realisation of this

focus group interview and its findings are presented and discussed in Chapter 7 in sections 7.2 and 7.3.

4.8.3.3 Changes that occurred regarding neonatal mortality in the district hospital

The same Data Capturing Sheets (see Annexure J) used in CYCLE 1 (see 4.8.1.3) was also used in CYCLE 3 (see Figure 4.5.) after the implementation of strategies as part of the second step (ACT) of CYCLE 3. The purpose of this data capturing sheet was to evaluate the changes that had occurred regarding neonatal mortality in this district hospital. Therefore, what changes had occurred as a result of the strategies that had been implemented to sustain a quality improvement initiative in neonatal resuscitation. Similar documents used during CYCLE 1 of this study were used to compare the results, thereby evaluating the changes that had occurred with regard to neonatal mortality. Descriptive and inferential statistics were used to analyse the data collected. The results are discussed in Chapter 7 in section 7.3.3.

4.8.3.4 Sustainability of the strategies based on the Master Score System

The Master Score System (see Annexure Q) is used to determine if the quality improvement project – in the case of this study the strategies to sustain the quality improvement initiative – have the probability of being sustainable (Maher et al. 2007:n.p.). The Master Score System (see Chapter 3, section 3.3.5) is part of the NHS Sustainability Model and Guide and is a valid and tested instrument to measure the probability of sustainability (Maher et al. 2007:n.p.). The research question, “*How sustainable was the strategies implemented to sustain a quality improvement initiative?*” was addressed by using the Master Score System. Permission to use the Master Score System was obtained from the NHS Institute (see Annexure F).

The Master Score System was completed as decided by the steering group. The three operational managers of the units, matron and researcher completed the Master Score System. It is suggested that the evaluation of the sustainability of strategies should be done every six months (Maher et al. 2007:n.p.). However, the steering group decided on when to evaluate the sustainability of the strategies after implementation (in the context of this study it was after 6 months). The realisation and findings regarding the evaluation of probable sustainability of the strategies with the Master Score System are attended to in Chapter 7 section 7.4.

4.9 REFLECTION

Reflection is an important part of the action research process and formed part of the fourth step (REFLECT) in CYCLE 3 (see Figure 4.5). The REFLECTION of CYCLE 3 was based on the minutes of meetings, a reflective meeting held with the steering group and reflective notes made by the steering group. Participants are engaged in the action research process and are continuously evaluating and reflecting on their practice (Koshy et al. 2011:37). In this study reflection was part of each of the cycles (see Figure 4.2 in section 4.4). Steering group meetings, reflective meetings at the end of each cycle and reflective journaling were part of reflection throughout this study.

4.9.1 Minutes of the meetings

Steering group meetings were held throughout the research process. The purpose of these meetings was to discuss the research processes that needed to be followed, what had been done and still needs to be done and so forth. The minutes of these meetings served as a record for what had been done and what had been discussed. These meetings formed part of the reflection throughout this action research process.

4.9.2 Reflective meetings

Reflective meetings were held with the steering group at the end of each of the cycles (see Figure 4.2 in section 4.4). The same base questions were asked in each of the meetings.

- *What was your experience?*
- *What did the group learn? (What worked and what did not work?)*
- *What can be changed or done differently?*

The purpose of the reflective meetings was to reflect on each of the cycles with regard to the groups' experience, the positive and negative aspects, and what the group had learned. These meetings also served as an opportunity to regroup and decide on the way forward.

4.9.3 Reflective journals

As part of reflection, reflective journals can be kept (Koshy et al. 2011: 114). Reflective journaling is a method of recording information during an action research study. Ideas that

evolve and things that happen during the action research process can be recorded (Koshy et al. 2011: 114). Winter and Munn-Giddings (2001) cited in Koshy et al. (2011:115) explain that keeping a reflective journal has the following benefits: the information recorded in reflective journals includes the process that was followed; the ideas that evolved; the problems encountered; and experiences, thoughts, feelings and reflections experienced. Such a journal generates a collaborative basis for reflection; it is a way of keeping the thread of thoughts alive. The contents can be shared with others because the notes can be shared in the final report of the study

The researcher decided to make use of reflective journals because it served as a collaborative basis for reflection; furthermore, it enhanced the professional development of the researcher and steering group. At the beginning of the research process, the researcher handed out reflective journals and pens to the steering group members as well as the guidelines for keeping reflective journals as explained in Koshy et al. (2011:116). Guidelines for keeping reflective journals were also discussed with the steering group during a meeting. These guidelines included the basic principles of keeping a reflective journal, the use of structure and analytical reflection (Koshy et al. 2011:114-116). The researcher was aware of the disadvantages such as writing too much or irregular diary keeping (Koshy et al 2011:116). These were addressed during the same meeting. Irregular diary entries was in particular a challenge in this study as the steering group members were very busy due to the staff shortages and therefore diaries were not kept. This was an inauspicious situation and might have been a limitation of the study; fortunately, the steering group members were able to give some reflective notes on the study as a whole at the end of CYCLE 3. The researcher kept reflective notes during the research process, and reported on these reflections where applicable.

4.10 Rigour

As mentioned earlier in Chapter 1, section 1.11, rigour in quantitative data refers to validity and reliability whereas for qualitative data rigour refers to trustworthiness and the quality criteria. Next rigour related to the quantitative data is discussed followed by rigour that concerned the qualitative data.

4.10.1 Validity and reliability

It is important to address validity and reliability when collecting and analysing quantitative data. Validity is the extent to which an instrument measures what it is “supposed to measure” (Maree et al. 2010:147). Reliability refers to the “consistency or the repeatability of the measure/instrument, for example, a questionnaire” (Maree et al. 2010:147).

4.10.1.1 Questionnaire

To ensure the face validity and content validity of the questionnaire the researcher developed and presented a provisional questionnaire to the steering group as well as the statistician assigned to the study for their comments before finalising it. The content validity of the instrument refers to the extent to which the method of measurement includes all the major elements relevant to the construct being measured. Content validity is obtained from literature, representatives of the relevant population and content experts (Burns & Grove 2009:381-384). The content of the questionnaire was based on literature on neonatal resuscitation and the Sustainability Model. The researcher worked in collaboration with the steering group to construct the final questionnaire.

The statistical techniques needed to obtain construct validity of the questionnaire were discussed with the statistician. Mertler (2009:10) defines statistical power or significance as “a decision made from the results of statistical procedures that enable researchers to conclude that the findings of a given study is large enough in the sample studied in order to represent a meaningful difference or relationship in the population from which the sample was drawn”. To enhance the validity and reliability of the questionnaire the researcher made use of the statistical power of the questionnaire as discussed with the statistician at the Department of Statistics at the University of Pretoria (see Annexure G).

4.10.1.2 Nominal group technique discussion

In the nominal group technique discussion consensus lies in the prioritising of information (Dunham 1998:1-5). The validity and reliability of the results of a nominal group technique (NGT) discussion lie in the fact that consensus among participants are reached. Recommendations in order to reach consensus lies in the range from 51- 70% (Polit & Beck 2008:327-328). In this study consensus was accepted at two-thirds (66%) of the participants attending the NGT session.

4.10.1.3 Master Score System

The Master Score system (see Annexure Q) that was used to determine the sustainability of the strategies (see CYCLE 3) was already an approved and tested evaluation instrument. Therefore, it is a valid and reliable instrument. Permission to use this Master Score System was obtained from the NHS (see Annexure F). In this study it was applied in a different context.

4.10.2 Trustworthiness in action research

To establish trustworthiness of the qualitative data the following criteria of Lincoln and Guba (1985) as advised by Polit and Beck (2008:538-540) have to be met. The same criteria are referred to as “quality criteria for rigour in action research” (Maree et al. 2010:133-134).

Credibility refers to whether the data collected and analysed and the interpretation thereof is the truth (Polit & Beck 2008:539). In the context of this study the researcher had prolonged engagement in the setting and with the participants as the study was conducted over a two-year period. The steering group was participant researchers and the multiple perspectives for collecting and analysis of the data enhanced the credibility. Through collaboration the participants had ownership in the quality improvement initiative and their multiple perspectives and member validation during reflection contributed towards credibility. Persistent observation took place during each of the three cycles which further improved the credibility of the study (Maree et al. 2010:133-134).

Dependability implies that the findings should be the same “over time and over certain conditions” (Polit & Beck 2008:539). The chain of evidence was transparent as the researcher made use of the same data collection techniques to collect the same data during each of the cycles. The researcher also kept notes regarding the research process and documented the data, methods, decision-making, relationships and participation of the research partners (Maree et al. 2010:133-134). The researcher further made use of the triangulation of the research methods. This was obtained by making use of reflective notes, focus group interviews and field notes as well as quantitative data collection methods such as questionnaires, data capturing sheets, a nominal group technique discussion and the Master Score System. Credibility and dependability goes hand in hand and the one cannot be attained without the other (Polit & Beck 2008:539).

Confirmability refers to whether the researcher remained objective and whether any form of bias was present. This implies that the data the researcher provides and the interpretation of this data must reflect the participants' point of view (Polit & Beck 2008:539). The researcher made use of purposive sampling and, although it might have led to bias, by reaching consensus during the nominal group technique discussions and meetings to reflect on the findings and whether the confirmability of results was possible. In action research, collaboration between the researcher (facilitator) and the steering group contributes towards confirmability as the researchers do not make the decisions on their own but, as was the case of the current study, the decisions are made by the whole group.

Transferability refers to “generalizability of the data” and whether the findings can be applied to other groups or different settings (Polit & Beck 2008:539). The researcher contextualised the study findings and gave a thick description of the data and the setting as well as the demographics of the selected district hospital. When the findings and setting is put into context, other researchers or healthcare providers can decide if the findings can be used in their specific context or even for resuscitation programmes in other wards in this particular district hospital.

4.11 CONCLUSION

This chapter discussed the action research methodology and explained the PRAR model that was used as a basis for this study. The characteristics of the PRAR model were also discussed. The steps taken to gain permission and ethical consent and the limitations of the action research process were explained. The methods of data collection and data analysis used in this research project were also explained. The realisation and findings of CYCLE 1 (examination of the existing situation), CYCLE 2 (the implementation of strategies) and CYCLE 3 (the evaluation of change after the implementation of strategies) are entirely presented and discussed in Chapters 5, 6 and 7 respectively. The importance of reflection as part of the action research process was also discussed. This chapter concluded with a discussion on the trustworthiness of the study.

In the next chapter the data collection and analysis as well as the findings of CYCLE 1 are described and discussed. CYCLE 1 aimed to answer the question: “*What was the existing situation regarding factors influencing neonatal resuscitation and neonatal mortality in a district hospital in Gauteng?*” This data formed the baseline for the existing situation.

CHAPTER 5: CYCLE 1 – EXAMINING THE EXISTING SITUATION

5.1 INTRODUCTION

In this chapter CYCLE 1 of the of the action research process based on the Problem Resolving Action Research (PRAR) Model (Piggot-Irvine 2009:3-7) is presented and discussed. CYCLE 1 addressed the research question: *“What is the existing situation regarding factors influencing neonatal resuscitation and neonatal mortality in a district hospital in Gauteng?”*

Piggot-Irvine’s (2009:3) PRAR Model was adapted to suit the purpose of this study (see Chapter 1, Figure 1.3). As shown in Figure 1.3, CYCLE 1 dealt with the gathering and analysis of data on the existing situation and factors influencing neonatal resuscitation in the maternity section of the selected district hospital in Gauteng.

CYCLE 1 (examination of the existing situation) included four steps: PLAN, ACT, OBSERVE and REFLECT (see figure 5.1).

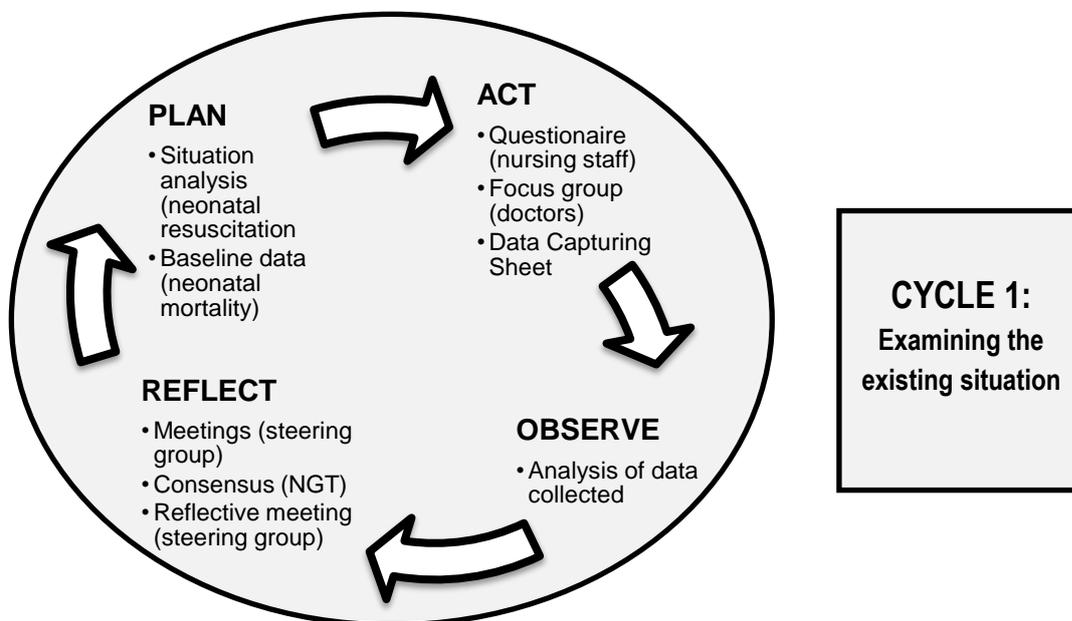


Figure 5.1: CYCLE 1- Examining the existing situation

The first step of CYCLE 1 was to PLAN (see Figure 5.1). This entailed analysing the prevailing situation regarding neonatal resuscitation and gathering baseline data on neonatal mortality in the setting. The situation analysis formed the basis of the first cycle.

The second step (ACT) involved gathering data related to the existing situation on neonatal resuscitation and factors influencing neonatal mortality in the setting. Three data gathering techniques (a questionnaire, a focus group interview and a data capturing sheet) were used to collect relevant data from three sources. (In Chapter 4 the research methodology for each of these data collection techniques is discussed). The three mentioned sources were the nursing staff (who responded to the questionnaire), the doctors (with whom a focus group interview was conducted) and a data capturing sheet (compiled from data obtained from hospital records and relevant documents). The data capturing sheet was used to provide data as the baseline for neonatal mortality.

During the third step (OBSERVE) data from the two previous steps (PLAN and ACT) were analysed. In action research data are gathered, analysed and reflected on throughout the action research process. Accordingly, after each data collection process the findings were discussed with the steering group to refine the next action (Koshy et al. 2011: 97-98).

The data analysis for CYCLE 1, an examination of the existing situation and factors influencing neonatal resuscitation, is presented and discussed from two perspectives. Firstly, the perspectives from the nurses as indicated on the returned questionnaires. This is followed by the doctors' perspectives obtained during the focus group. Lastly, the data capturing sheet provide data as a baseline for neonatal mortality.

5.2 EXAMINING THE EXISTING SITUATION REGARDING NEONATAL RESUSCITATION FROM THE PERSPECTIVES OF THE NURSING STAFF (QUESTIONNAIRE)

The objective for CYCLE 1 was to explore and describe the existing situation regarding neonatal resuscitation and its associated factors.

5.2.1 Questionnaire: Quantitative and qualitative data collection

CYCLE 1 included four steps: PLAN, ACT, OBSERVE and REFLECT. As shown in Figure 5.1, the first step (PLAN) included a situational analysis and the gathering of baseline data. The situational analysis focused on the factors influencing neonatal resuscitation, namely,

the process, staff and organisation and neonatal mortality as the indicator of quality care. The baseline data included the following:

- **pre-resuscitation:** prevention; early identification of risk factors
- **intervention:** resuscitation
- **post-resuscitation care:** care after resuscitation

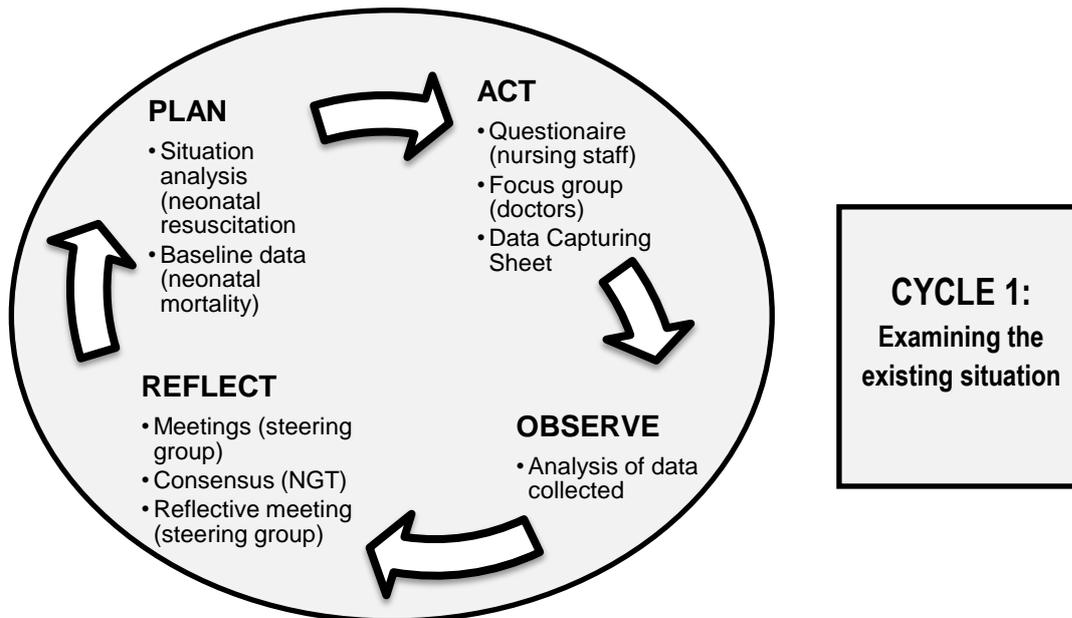


Figure 5.1: CYCLE 1- Examining the existing situation

It is important to take note of the following *formulations* used in the deliberation because both quantitative and qualitative data were collected with the questionnaire.

- The symbol 'N' refers to the total number of subjects (respondents) (Polit & Beck 2012:loc24262). 'N' is the total number of nursing staff respondents who completed and returned questionnaires. The researcher distributed 68 questionnaires and received 42 from respondents in CYCLE 1 (N=42). The response rate was therefore 61.7%.
- The symbol 'n' refers to the number of subjects in the sub-group of the study (Polit & Beck 2012:loc 24262). The data from all sub-groups are indicated by an 'n' including the nursing staff from the three maternity units (the labour ward, postnatal ward and neonatal intensive care unit [NICU]) who completed and returned questionnaires. From the labour ward 14 (n=14) completed questionnaires were received; 12 (n=12) were received from the postnatal ward and 16 (n=16) from the NICU.

- The frequency (f) indicates the number of responses obtained for a question in the questionnaire. Polit and Beck (2012:loc24262) note (f) refers to the frequencies within the total sample and serves as divisor to arrive at a percentage of the sample set. Percentages calculated for the 'N' and 'n' were dependent on whether the number of respondents was calculated for the sub-group (n) or the total number of respondents (N).
- The questions *not completed* in the returned questionnaires were calculated as *missing values* and were not included in the 'n' values as divisors. Where applicable, they are indicated in the text and the 'n' values were adjusted accordingly.

5.2.1.1 Developing the questionnaire

The questionnaire was based on the NHS Sustainability Model and literature and required information on the aspects listed below (See Annexure I).

- **Section A:** *Demographic data*
- **Section B:** *Process*
- **Section C:** *Staff*
- **Section D:** *Organisation*
- **Section E:** *Practice of neonatal resuscitation*
 - ❖ **Pre-resuscitation:** *Prevention and early identification of risk factors*
 - ❖ **Intervention:** *Resuscitation*
 - ❖ **Post-resuscitation care:** *Care after resuscitation*
- **Section F:** *Reflection after neonatal resuscitation*

This first draft of the questionnaire was printed out in hard copy and served as a starting point for the discussion with the steering group (stakeholders from the setting such as operational managers, senior and clinical leaders and specialists). (As mentioned in Chapter 4, section 4.5 only five members were consistently part of the steering group.) The researcher acted as the facilitator during this first meeting with the steering group and presented the preliminary questionnaire (see Annexure H) to them. The group had to decide whether the instrument was appropriate or whether some items should be excluded or others included.

Only minor changes were made to some of the questions. The biggest change was the decision made by the steering group to include not only the professional nurses and midwives but also the enrolled nurses and nursing auxiliaries working in the maternity

section of the district hospitals. The reason for including them also in the sample was that they played an integral part in rendering nursing care to neonates. The thinking was that because of the staff shortage in the research setting, these healthcare workers fulfilled an important role in neonatal resuscitation and therefore they also needed to be taught the basic skills of neonatal resuscitation. Including these extra two groups was of significance since the steering group's vision and aim was to elevate the ideal that everybody working with neonates in the maternity section of the district hospital should be competent in neonatal resuscitation. The steering group members who were not present at this meeting were given the opportunity to give feedback on the questionnaire via an e-mail. However, there was no feedback via e-mail. After the required changes had been made the instrument was approved by the steering group and they decided to run a pilot test to determine if the questionnaire would solicit the correct information.

5.2.1.2 Pilot test

The questionnaire (see Annexure H) was used in a pilot test to determine whether the questions were understandable and solicited the information needed to obtain the baseline data. The steering group, in consultation with the statistician from the Department of Statistics at the University of Pretoria, decided on the final sample size for the pilot test. The sample size for the pilot test was set at five respondents. The steering group requested the researcher to be responsible for the pilot testing of the questionnaire.

The researcher contacted possible respondents and sent the questionnaire (see Annexure H) with an information letter and evaluation document for feedback to respondents who indicated they would take part in the pilot test. These respondents did not work at the district hospital. Five respondents completed the questionnaire. In addition to responding to the set questions on the questionnaire, these five respondents were requested to give feedback on following five questions after completion of the questionnaire. Their feedback served as an indication regarding the timeframe for completion of the questionnaire and if the questions were clear and understandable.

- *How long did it take to complete the questionnaire?*
- *Please provide your views regarding the clarity of the instructions?*
- *Were there any major topic omissions?*
- *Was the layout clear and attractive?*
- *Any other views/comments with respect to the questions?*

The feedback on the above added questions revealed that, on average, the questionnaire took between 20 and 40 forty minutes to complete. The instructions were clear and there were no major topic omissions. The respondents felt that the layout was clear. It was, however, suggested that a minor change be made to Question 17 because the meaning was perceived as not clear (see Question 17, see Annexure H). After discussion, the steering group decided to add question 18. Question 18 was added to the questionnaire to simplify the meaning of Question 17 (see Question 18, Annexure I). In other words, Question 17 was divided into two separate questions to clarify its meaning.

5.2.1.3 Final questionnaire and qualitative and quantitative data collection from nursing staff

The results of the pilot test were discussed with the statistician and after the aforementioned change had been made, the final questionnaire was ready for distribution. The final questionnaires including the participant information leaflet (see Annexure I) were handed out to the steering group members in a meeting. The steering group members distributed the questionnaires to the selected nursing staff respondents. The steering group members were also responsible for retrieving the completed questionnaires. The completed questionnaires were retrieved after approximately three weeks.

Sixty-nine questionnaires were handed out by members of the steering group to the nursing staff in each of the three units (sub-groups) and 42 (N=42) completed questionnaires were returned. Fourteen (n=14) were received from respondents in the labour ward and 12 (n=12) from the postnatal ward (n=12). The NICU had the best response rate as 16 (n=16) completed questionnaires were received. The overall response rate for the questionnaires was 60.8%. Considering the small population size, both the steering group and statistician were satisfied with this response rate. Some questionnaires were incomplete; however, the questions that were completed were analysed; missing values were not included in the analysis and valid percentages were used. It must be noted that the term 'respondent' from here onwards refers to the nursing staff that completed the questionnaire.

The PRAR Model to signify that action research is a continuous improvement methodology. It is a cyclical process consisting of cycles of reflection, planning, acting and observing that takes place in a specific context (Piggot-Irvine 2009:2-7).

At this point it is reiterated that, as has been stated, the methodology followed in Piggot-Irvine's (2009:2-7) PRAR Model signifies action research is a cyclical process consisting of cycles of reflection, planning, acting and observing that takes place in a specific context.

Also, Koshy et al. (2011: 97-98) confirm data are gathered, analysed and reflected on continuously in action research. It therefore follows that the continuous interactive and back and forth movement among steps two (ACT), three (OBSERVE) and four (REFLECT) in CYCLE 1 (see Figure 5.1) meant that after each data collection process the findings were discussed with the steering group to refine the next action. Subsequently, a meeting was held with the steering group (REFLECT) regarding the data collected from the nursing staff (ACT) and the analysis (OBSERVE) thereof. The overall feedback from the steering group was positive regarding the data collection with the questionnaire.

The quantitative data collected with the questionnaire were analysed by a statistician who made use of descriptive and inferential statistics to describe and synthesise the data as explained in Polit and Beck (2008:665). Frequencies were done on the quantitative data collected on the whole sample (N=42) as well as separately for each of the sub-groups, namely, the labour ward (n=12), postnatal ward (n=12) and NICU (n=16) to get a more realistic view on the challenges experienced with regard to neonatal resuscitation and its associated factors in the different maternity domains. The frequencies were interpreted with the help of the statistician to make sense of the challenges experienced in the district hospital. The descriptive statistics from the situational analysis formed the baseline data and were used as the basis for the nominal group technique (NGT) discussion and strategy development.

Other data that formed part of the baseline data were the qualitative data retrieved from the open-ended questions (Questions 4 to 22 as well as 42 and 43) of the questionnaire (see Annexure I). The qualitative data generated by the open-ended questions were analysed by using Tesch's (1990) open-coding method (Creswell 2009:186) as discussed in Chapter 4, section 4.8.1.1.

5.2.2 Analysis of questionnaires: Quantitative and qualitative data discussion

Both the quantitative and qualitative data generated by the open-ended questions are discussed simultaneously to create a clear picture of the demographics and the existing situation from the perspectives of the nurses working in the maternity section of the district hospital. The data gathered from the following sections and the questions applicable to each section were analysed:

- **Section A: Demographic data** (Questions 1 and 2)

- **Section B: Process** (Questions 3 to 7)
- **Section C: Staff** (Questions 8 to 10)
- **Section D: Organisation** (Questions 11 to 22)
- **Section E: Practise of neonatal resuscitation** (Questions 23 to 43)
 - ❖ **Pre-resuscitation: Prevention and early identification of risk factors** (Questions 23 to 25)
 - ❖ **Intervention: Resuscitation** (Questions 26 to 38)
 - ❖ **Post-resuscitation care: Care after resuscitation** (Question 39)
 - ❖ **Other questions related to neonatal resuscitation** (Question 40 to 43)
- **Section F: Reflection after neonatal resuscitation** (Questions 44 and 45)

As the discussion progresses, the section as well as the number of the question as indicated on the questionnaire is specified for referral to Annexure I. Pie charts, diagrams and tables are used to statistically illustrate the perspectives of the nurses working in the maternity section of the district hospital obtained as quantitative and qualitative data from the questionnaires.

5.2.2.1 Section A: Demographic data (Question 1 and 2)

Section A of the questionnaire pertained to the demographics of the nursing staff working in the maternity section of the specific district hospital. To give a thick description of the research setting, some demographic data were collected. Descriptive statistics were needed to describe the context and the demographic data. The respondents were asked to indicate the section they were working in (see Question 1, Annexure I). From the 42 (N=42) respondents that completed the questionnaire, 33.3% (n=14) were working in the labour ward 28.6 % (n=12) in the postnatal ward and 38.1% (n=16) in the NICU.

The respondents were also asked to indicate the nursing categories they were registered for at the South African Nursing Council (SANC) (see Question 2, Annexure I). From the 39 (n=39) respondents who answered this question, 41% (n=39; f=16) were registered nurses and midwives; 15.4% (n=39; f=6) were advanced midwives; 2.6% (n=39; f =1) were trained in paediatric care; and 41% (n=39; f 16) were sub-category nurses such as nursing assistants and auxiliary nurses. Figure 5.2 illustrates the skills mix of the nursing staff working in the maternity section of the district hospital.

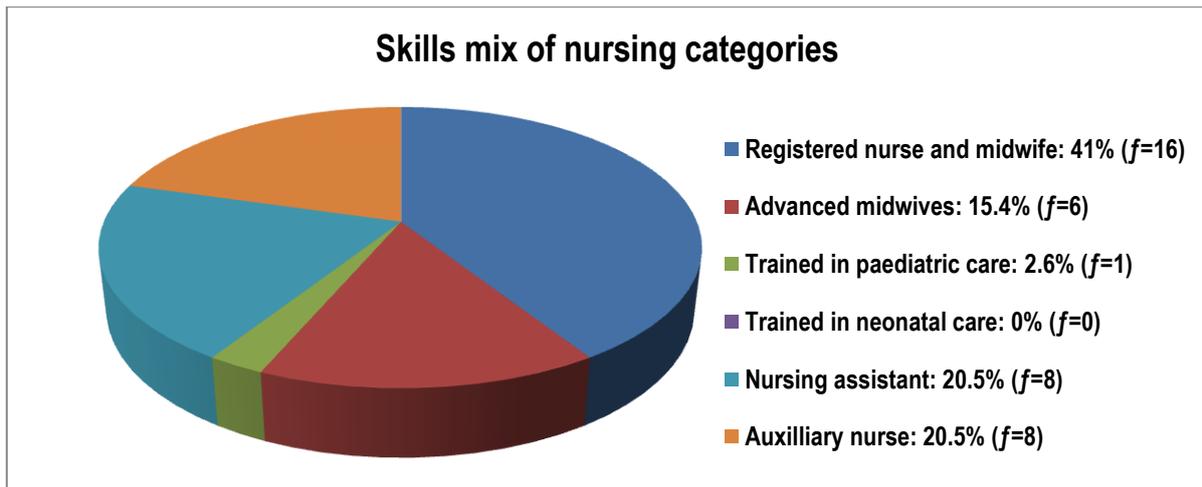


Figure 5.2: Skills mix of nursing categories (n=39)

The skills mix during either the day or night shift usually included two or three registered nurses/midwives while the rest of the staff was made up of nursing assistants and auxiliary nurses. Nursing assistants and auxiliary nurses do not normally actively partake in resuscitating neonates but in a hospital where there is such an overload of patients as well as a dire shortage of staff they can be involved in basic neonatal resuscitation.

From the results it is clear that most of the nursing staff who participated in this study were midwives. The skills mix, number of staff and their experience played a significant role in rendering quality care. The role that staff members play within an organisation is also important.

Process, staff and organisation are the main components of the NHS Sustainability Model (see Figure 1.1. in Chapter 1, section 1.6.2). Therefore, in Section B (Process [Questions 3 to 7]), Section C (Staff [Questions 8 to 10]) and Section D (Organisation [Questions 11 to 22]) in the questionnaire were based on these components (see Annexure I and section 5.2.1).

5.2.2.2 Section B, C and D: Process, staff and organisation (Question 3 to 22)

The respondents were asked to identify the aspects that contributed towards quality neonatal resuscitation and the factors that needed improvement if quality care was to be achieved. They had to suggest possible changes that would improve neonatal resuscitation. Work experience can play a significant role in quality care and therefore it was important to understand the level of experience of the staff working in the maternity section.

From the 37 (n=37) responses it was clear the nursing staffs' years of work experience varied (see Question 3, Annexure I). The highest years of work experience was indicated as 20 years and the lowest less than one year. The median was three years for the labour ward and the postnatal ward and that of the NICU four years. Figure 5.3 illustrates the years of working experience of staff according to the three different areas (labour ward, postnatal ward and NICU).

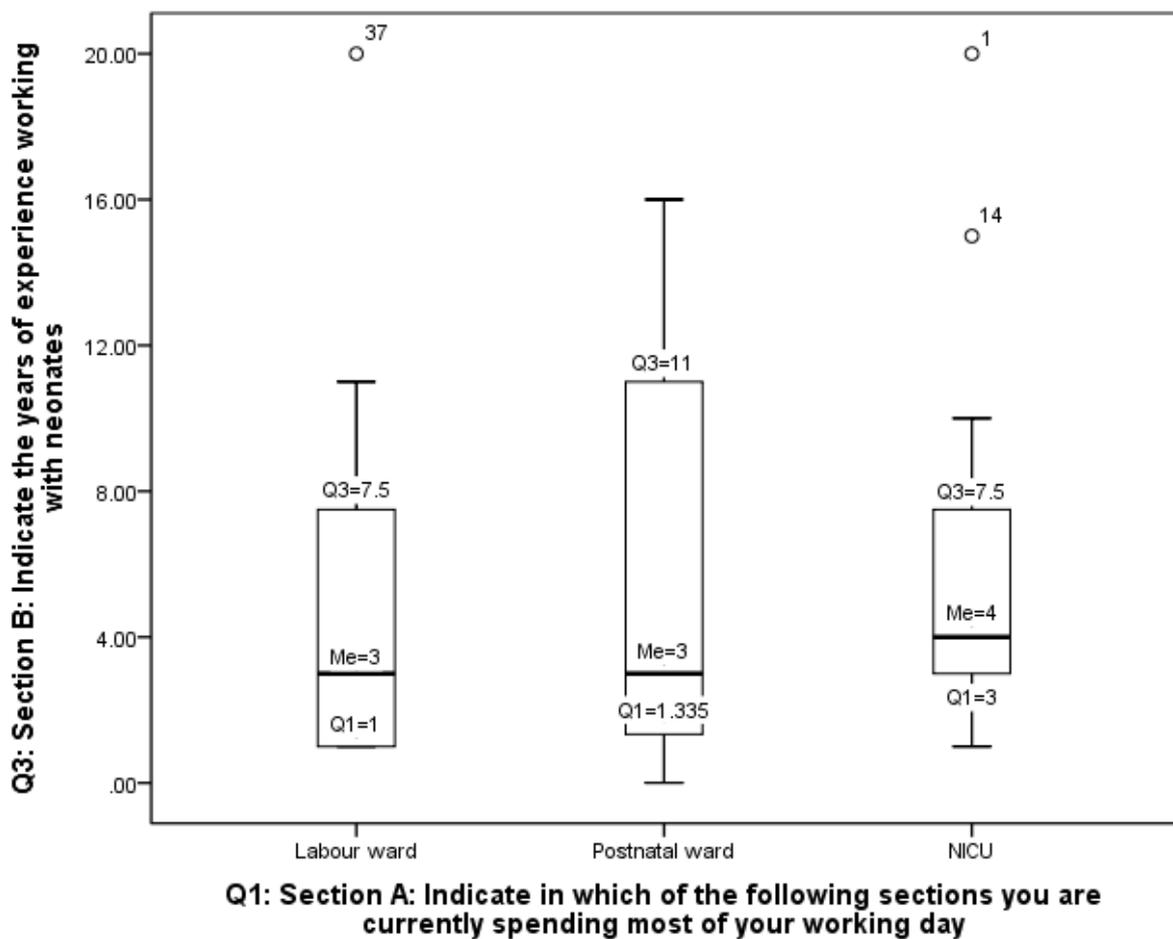


Figure 5.3: Years of work experience of the respondents (n=37)

To analyse the existing situation in this specific context of the study it was important to identify what would contribute towards quality neonatal resuscitation. Respondents (N=42) working in the maternity section (labour ward, postnatal ward and NICU) of the district hospital identified staff training, staff resources, good quality and operational equipment, a positive staff attitude and staff involvement all contribute towards quality neonatal resuscitation (see Question 4 Annexure I).

It was also important to identify factors that needed improvement to also improve the quality of neonatal resuscitation at this district hospital. Factors that needed to be improved to this

end were staff training, sufficient staff resources and equipment, and changes in the staff's attitude and involvement. These were recurrent themes and correlated with the suggested changes to be made to improve neonatal resuscitation in the maternity section of the district hospital (see Question 5 and 6 Annexure I). It also correlated with the avoidable and modifiable causes of neonatal mortality identified in the Saving Babies Reports as explained in Chapter 2, section 2.3.1. To improve on these factors identified by the staff, quality improvement initiatives needed to be implemented; moreover, for these improvements to be successful they needed to be sustainable.

In this particular district hospital the staff indicated that quality improvement initiatives seemed to be sustainable. Additionally, the staff indicated in the open-ended questions a quality improvement initiative in neonatal resuscitation would enhance their daily work life as it would improve their practice and decrease neonatal mortality and morbidity rates. It would promote their confidence and competence in neonatal resuscitation and also contribute towards a more positive staff attitude by decreasing the stress and frustrations associated with unsuccessful neonatal resuscitation, and obviate the current problems encountered with the resuscitation of neonates (see Questions 7 and 11, Annexure I). Through training one acquires the knowledge and skills to practise neonatal resuscitation. Therefore, training would contribute to the staff developing more self-confidence and self-assurance thus becoming more competent in neonatal resuscitation.

Respondents (N=42) working in the maternity section of the district hospital all had different kinds of training at different times related to neonatal resuscitation (see Question 8, Annexure I). The findings from the open-ended question indicated some had attended workshops and refresher courses but others had not. Neonatal resuscitation training was thus inconsistent among the staff. Receiving neonatal resuscitation training on a regular basis is important to stay updated regarding new trends and guidelines.

Nursing staff were asked if they considered themselves updated regarding the new trends/guidelines in neonatal resuscitation (see Question 9, Annexure I). Only 39 of the 42 respondents (nursing staff) completed this question, from these respondents 56.4 % (n=39; f=22) considered themselves to be knowledgeable (knew what it entails/had expert knowledge) about the new trends and guidelines in neonatal resuscitation. Figure 5.4 below illustrates the results.

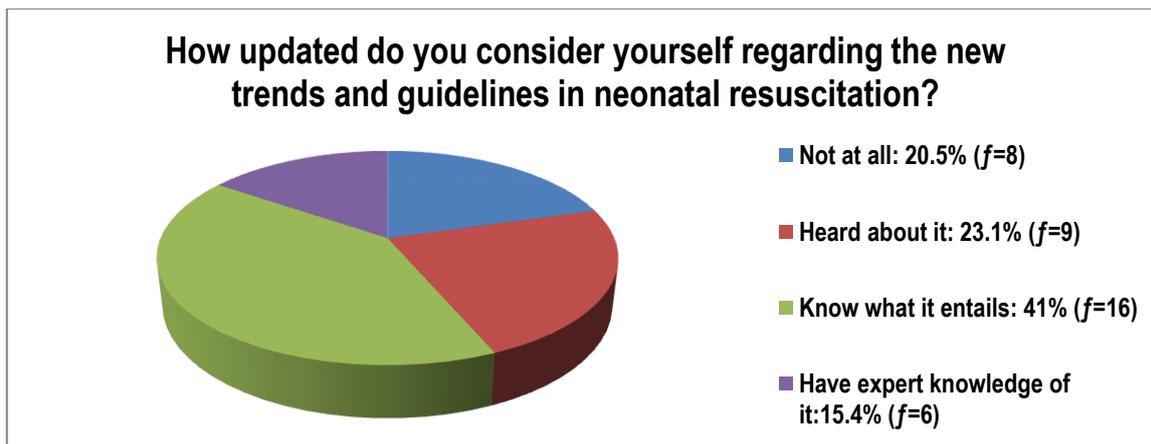


Figure 5.4: Respondents' perception on considering themselves updated regarding the new trends/guidelines in neonatal resuscitation (n=39)

Of the 14 (n=14) respondents in the labour ward who completed the question, 66.7% (n=12; f=8) considered themselves to be knowledgeable; all 16 (n=16) respondents in the NICU who completed this question 68.7% (n=16; f=11) mostly considered themselves to be knowledgeable whereas of the 12 (n=12) staff working in the postnatal ward only 27.3% (n=11; f=3) considered themselves knowledgeable regarding the new trends and guidelines in neonatal resuscitation. Table 5.1 below illustrates the frequency distribution of respondents' perception on their knowledge regarding new trends and guidelines in neonatal resuscitation.

Table 5.1: Frequency distribution: Respondents' perceptions on their knowledge regarding the new trends and guidelines in neonatal resuscitation

HOW UPDATED DO YOU CONSIDER YOURSELF REGARDING THE NEW TRENDS AND GUIDELINES IN NEONATAL RESUSCITATION?	LABOUR WARD (n=12)		POSTNATAL WARD (n=11)		NICU (n=16)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Knowledgeable (know what it entails or expert knowledge)	8	66.7%	3	27.3%	11	68.8%
Not knowledgeable (only heard about it or not at all)	4	33.3%	8	72.8%	5	31.3%
TOTAL	12	100%	11	100%	16	100%

When one receives training in neonatal resuscitation and have the necessary knowledge and skills, one is more likely to feel competent in neonatal resuscitation (Cowen, Norman & Coopamah 2005:355-362). Likewise, nursing staff were asked whether they felt competent in neonatal resuscitation (see Question 43, Annexure I). Figure 5.5 illustrates the nurses' perception of their competence in basic neonatal resuscitation.

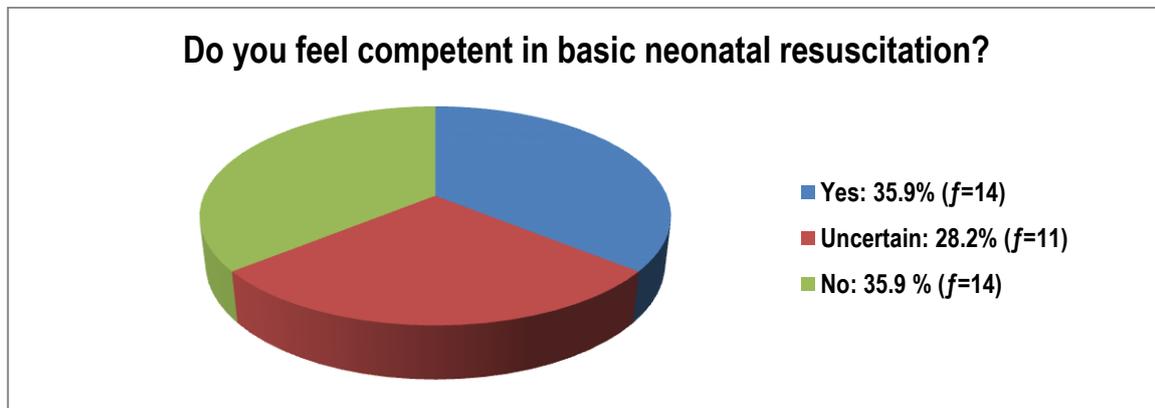


Figure 5.5: Respondents' perception on feeling competent in basic neonatal resuscitation (n=39)

Only 39 of the 42 respondents (n=39) answered the question. Of the 14 (n=14) respondents in the labour ward who completed this question 50% (n=12; f=6) perceived themselves as competent and 11 (n=11) from the 12 (n=12) postnatal ward were of the same opinion, thus, 27.3% (n=11; f=3) viewed themselves as competent. Sixteen (n=16) in the NICU, thus 31.1% (n=16; f=5), perceived themselves as competent. Table 5.2 below illustrates the frequency distribution for respondents' perception on their competence related to neonatal resuscitation.

Table 5.2: Frequency distribution: Respondents' perception on their competence related to neonatal resuscitation

DO YOU FEEL COMPETENT REGARDING NEONATAL RESUSCITATION?	LABOUR WARD (n=12)		POSTNATAL WARD (n=11)		NICU (n=16)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Yes	6	50%	3	27.3%	5	31.3%
Uncertain	2	16.7%	1	9.1%	8	50%
No	4	33.3%	7	63.6%	3	18.8%
TOTAL	12	100%	11	100%	16	100%

Inferential statistics were used to draw inferences from some of the data. The hypotheses were tested by drawing up cross tabulation/contingency tables and applying the Chi-square test and the Fischer's exact test. These two tests were used to test for independence or association between two categories. The sample size was very small and therefore most of the time the Fischer's exact test was used to interpret the p-value. The level of significance was 0.05. If the p-value was less (<) than 0.05 the H_0 would be rejected in favour of the H_A . Therefore, the H_A would be valid indicating an association between the two categories. If the p-value was more (>) than 0.05, the H_0 would not be rejected in favour of H_A , and the H_0 would be valid – meaning that there is no statistically significant association between the two categories and the changes may be due to other influencing factors.

Because of the small sample size (N=42) the categories were reduced from a 4x4 to a 2x2 contingency table. These categories were allocated with a name to make the interpretation and the reporting of the findings more understandable. (A detailed discussion on data analysis from the questionnaire is given in Chapter 4, section 4.8.1.1).

The *alternative hypothesis* (H_{A1}) was that nurses who are knowledgeable regarding the new trends and guidelines in neonatal resuscitation should feel competent in basic neonatal resuscitation. The *null hypothesis* (H_{01}) indicated no association between nurses who are knowledgeable regarding the new trends and guidelines in neonatal resuscitation and feeling competent in basic neonatal resuscitation. The categories that were cross-tabulated were *knowledgeable and not knowledgeable* regarding the new trends and guidelines of neonatal resuscitation against *feeling competent or not competent* in basic neonatal resuscitation (see Question 9, Annexure I). A total of 38 (n=38) respondents out of 42 (N=42) respondents answered this question. The sample size was sufficient to use the Chi-square test to interpret the p-value. The p-value was 0.088 (>0.05). The H_0 was not rejected in favour of the H_A indicating there is not a statistical significant association between being knowledgeable regarding the new trends and guidelines in neonatal resuscitation and feeling competent in neonatal resuscitation. The finding was therefore that staff considering themselves as *knowledgeable* are not necessarily *competent* in neonatal resuscitation.

Similarly, all the other hypotheses (to be discussed later on in Table 5.6 and Table 5.7) were tested. Where applicable, the Chi-square test was used but most of the time, due to the small sample size and in cases where the assumption of a minimum expected count of at least 5 was not met, the Fischer's exact test and only 2x2 contingency tables were used to cross-tabulate two categories.

Transporting critically ill neonates on time and rendering quality care during transport have an influence on neonatal mortality and morbidity (Goldsmid et al. 2012:304; 308). Most of the

nursing staff working in the NICU experienced problems with the transport of critical ill neonates from the district hospital to a tertiary institution or from the clinics to the district hospital on a regular basis (see Question 12, Annexure I). The labour ward and postnatal ward rarely experienced the problem of needing urgent transport for ill neonates because critically ill neonates are transferred directly from the postnatal ward to NICU and it is from here that they are transported to a tertiary institution. Therefore, the data reflects only the respondents' answers from the NICU. Figure 5.6 below illustrates the above mentioned results.

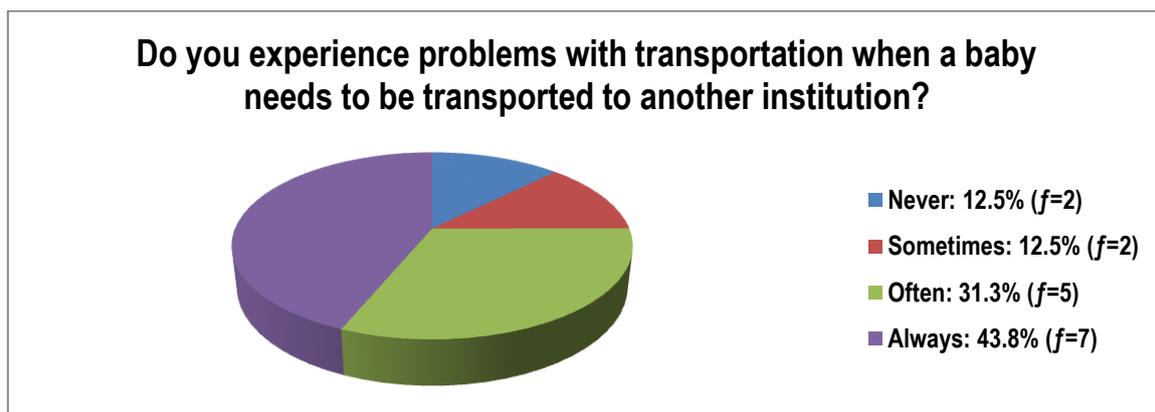


Figure 5.6: Perceptions of respondents working in NICU on problems experienced with transport (n=16)

All 16 (n=16) respondents from the NICU answered this question and from the results it can be concluded that 31.3% (n=16; f=5) often experienced problems regarding transportation and 43.8% (n=16; f=7) indicated they always experienced problems with transportation of critically ill neonates to other institutions. The qualitative aspects of the questionnaire reflected themes of transport delays, ineffective communication, the lack of equipment and insufficient (emergency services [EMS]) staff competence.

Respondents reflected on transport problems during the qualitative aspects of the questionnaire as follows:

- *“The doctor will phone and inform the people at transport office about the transfer of the baby on time. They [EMS services] delay until the baby die. Sometime they come without an incubator, and then they went back to take an incubator when they come back the baby has died.”*
- *“EMS services are centralised. For doctor to finally communicate with EMS staff it take a lot of time sometimes 30 minutes as the doctor talks to answering machine. Babies wait for up to four hours before the ambulance pick up. Sometimes,*

paramedic's refuses to take baby as they say it is not stable sometimes they come and go back send a better ambulance that can transport a sick baby."

- *"Lots of babies died while awaiting transport they are intubated we will bag for hours we don't have a ventilator."*
- *"EMS personnel does not respect the emergency part of the baby's condition, we can't wait for the ambulance for four hours. They can even delay the whole day and come at night with no excuse. Their personnel...some of them are not competent."*

The reflections of the NICU staff on the challenges experienced regarding neonatal resuscitation clearly indicated they felt despondent regarding transport and that it had a direct implication on the neonatal mortality in this district hospital. Having the correct equipment to render quality care is also important especially when waiting on transport, for example, having a ventilator is essential when one has to wait for transport of a critically ill intubated neonate.

The lack of equipment is also a challenge in this district hospital as reflected in Figure 5.7 below (see Question 13, Annexure I). Some of this equipment is essential for neonatal resuscitation, for example, suctioning and laryngoscopes and so forth.

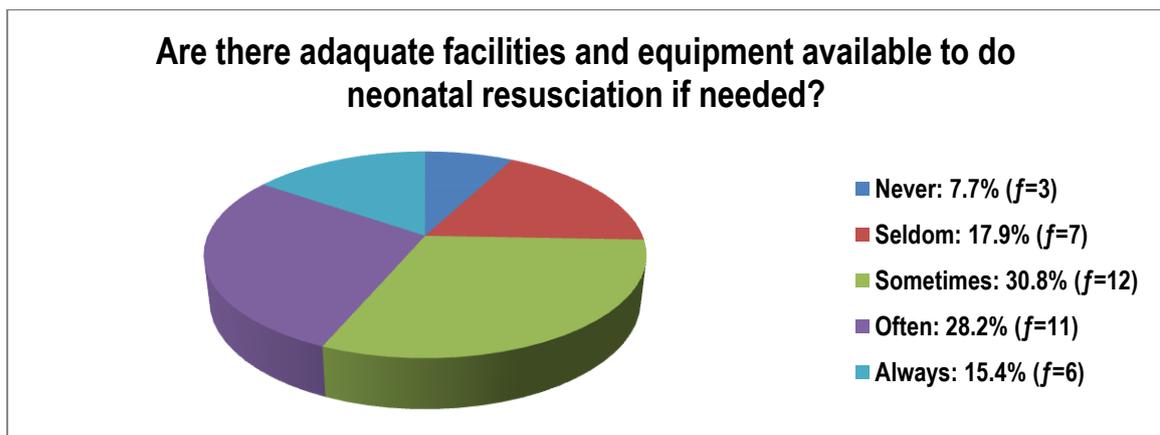


Figure 5.7: Perceptions of respondents on availability of adequate equipment and facilities (n=39)

Only 39 (n=39) of the 42 (N=42) respondents answered this question. From the results there was clearly an urgent need for adequate facilities and equipment to do neonatal resuscitation in the maternity section of the hospital. Table 5.3 below illustrates the frequency distribution of the participants' perceptions regarding facilities and equipment to do neonatal resuscitation for each of the three units.

From the 15 (n=15) respondents in the NICU that completed the questionnaire 46.7% (n=15; f=7) indicated they sometimes have adequate facilities and equipment available

whereas in the labour ward 30.8% ($n=13$; $f=4$) of the 13 ($n=13$) respondents indicated there was often facilities and equipment available.

Table 5.3: Frequency distribution: Respondents' perception regarding the availability of adequate facilities and equipment needed for neonatal resuscitation in each of the three units

ARE THERE ADEQUATE FACILITIES AND EQUIPMENT AVAILABLE TO DO NEONATAL RESUSCITATION?	LABOUR WARD ($n=13$)		POSTNATAL WARD ($n=11$)		NICU ($n=15$)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Never	1	7.7%	1	9.1%	1	6.7%
Seldom	3	23.1%	3	27.3%	1	6.7%
Sometimes	2	15.4%	3	27.3%	7	46.7%
Often	4	30.8%	2	18.2%	5	33.3%
Always	3	23.1%	2	18.2%	1	6.7%
TOTAL	13	100%	11	100%	15	100%

From the above results it can be concluded that the biggest need for equipment and facilities to do neonatal resuscitation were in the labour ward and NICU. The reason for this could be because neonatal resuscitation was practiced more in these two units.

Equipment needed according to the respondents include laryngoscope blades in the different sizes, suction machines, and ambubags to radiant warmers to name a few. One respondent also indicated the need for a ventilator for when neonates do not respond to treatment on a CPAP machine. In the qualitative aspect of this questionnaire the respondents in all three the maternity sections had the following perceptions on facilities and equipment availability:

- *“The necessary equipment e.g. laryngoscope blade size is not available to be [and needs to be] borrowed from neighbouring unit. Efforts to produce it are taking time.”*
- *“Equipment is not enough and the one that is there is sometimes wrong.”*
- *“Equipment’s [equipment] are not always available we sometimes have to run to other wards to get equipment’s.”*
- *“We do not have ventilator machine if baby does not respond well to CPAP machine.”*
- *“There was an incident where there was no ambubag to resuscitate.”*

- “[There is] *only one resuscitation room with one suction machine.*”
- “*We only have radiant warmer, it is very difficult to resuscitate baby in incubator.*”

To resuscitate the neonate effectively and sufficiently, specific resuscitation equipment is needed. If these are not available it could have a negative implication on the outcome of the neonate after resuscitation. Therefore, the lack of equipment may have a direct influence on the morbidity and mortality of neonates. More significantly, even having the correct equipment is not enough when there are not enough staff resources.

Adequate staff resources remains a challenge in the maternity section of this district hospital as illustrated in Figure 5.8 below (see Question 14, Annexure I). This also correlates with the findings of the Saving Babies Reports regarding staff shortages in district hospitals (Pattinson 2011:21-41; Velaphi & Rhoda 2012:68). Sixty-eight per cent of the respondents working in the maternity section and who had completed the questionnaire (n=38; f=26) signified there was not adequate staff available to do neonatal resuscitation if needed.

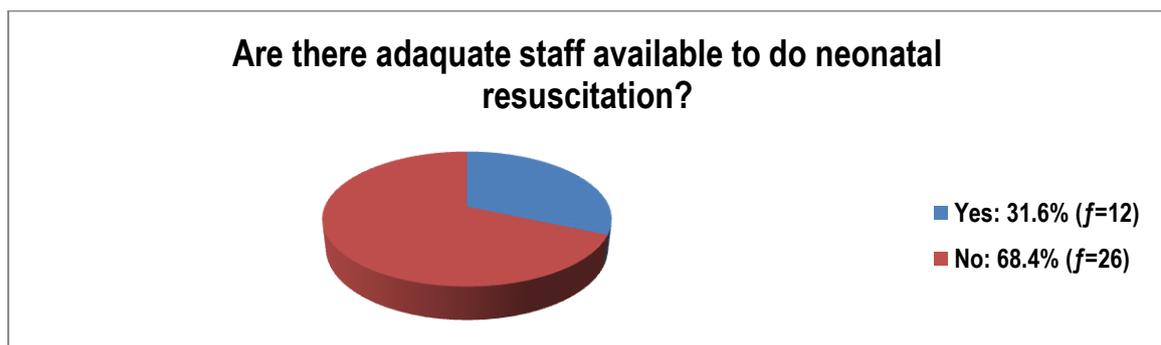


Figure 5.8: Perceptions of respondents on the availability of staff for neonatal resuscitation (n=38)

Only 38 of the 42 respondents (n=38) answered this question. From the results it is clear that 68.4% (n=38; f=26) of the respondents felt that there was a shortage of staff. Table 5.4 illustrates the frequency distributions regarding the availability of staff in each of the three units.

Table 5.4: Frequency distribution: Respondents' perception of the availability of staff to do neonatal resuscitation.

IS THERE ADEQUATE STAFF AVAILABLE TO DO NEONATAL RESUSCITATION IF NEEDED?	LABOUR WARD (n=13)		POSTNATAL WARD (n=10)		NICU (n=15)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Yes	7	53.8%	4	40%	1	6.7%
No	6	46.2%	6	60%	14	93.3%
TOTAL	13	100%	10	100%	15	100%

From the results it is clear that the biggest need for more staff was among the 15 (n=15) in the NICU where 93.3% (n=15; *f*=14) of the respondents indicated a lack of staff followed by 60% (n=10; *f*=6) respondents from the postnatal ward who also reported a shortage of staff.

Staff shortages specifically during the night shift, was a challenge at this district hospital. The patient load was very high with a very low nurse-to-patient ratio. During night duty the nurse to patient ratio is 1:4 in the labour ward, 1:16 in postnatal ward and 1:7 in the NICU. The nursing staff of all three units indicated they felt there was a dire need for more staff in the maternity section as reflected in Figure 5.8. Furthermore, a definite need existed for more registered nurses and nurses specialised in neonatal care in the maternity section. Respondents reflected on the qualitative aspect of the questionnaire as follows:

- *“Sometimes there are only two professional nurses on duty during the day and at night only one professional nurse, one staff nurse and one nursing assistant allocated for the ward.”*
- *“Ratio of nurse to patient is low. We need more RN [registered nurses] who will be able to take responsibility and accountably.”*
- *“There is a lot of shortage of personnel. We do not have personnel who specialise in neonate [neonatal care].”*

It is very difficult to render quality care if there are staff shortages; therefore, it is important to have enough senior leaders who can teach staff and lead by example. Senior leaders (for example, matrons and operational/unit managers) play an integral part in training, staff resources and staff involvement as well as ensuring that there is

sufficient stock and equipment (see Question 15, Annexure I). All of these have an implication on successful neonatal resuscitation. Respondents reflected on the roles of senior leaders in the open-ended questions as follows:

- *“The sectional matron arrange for staff to be trained and the unit manager allocate staff to be trained (but inadequate due to lack of staff and lack of planning).”*
- *“Unit managers play a role in neonatal resuscitation by informing senior leaders about lack of equipment.”*
- *“Unit managers are operational and usually present during resuscitation.”*
- *“Unit managers make sure that enough staff is allocated.”*

The senior leaders of the three units seemed to be operational and present during neonatal resuscitation and they also played a role in arranging training for the staff. Senior leaders and clinical leaders, for example, doctors and shift leaders, play a significant role in leadership and can lead by example to render quality care.

According to the respondents, clinical leaders also play a role in training unit personnel as they play a key role in neonatal resuscitation (see Question 16, Annexure I). However, staff shortage resulted in inexperienced locums or session doctors over weekends. This influenced neonatal resuscitation practices negatively. There was furthermore also a lack of staff resources among the clinical leaders and the respondents therefore experienced more challenges. Clinical leaders in the context of this study included doctors and shift leaders. The following qualitative comments were made by respondents in this regard:

- *“Doctors who are working in the ward are eager to learn and help the unit personnel.”*
- *“Unit doctors are competent in neonatal resuscitation but locum or weekend doctors who are not working in the unit are not skilled and competent in neonatal resuscitation.”*
- *“Shift leaders are not necessarily competent in neonatal resuscitation they are just professional nurses or registered nurses sometimes.”*
- *“Doctors on call and session doctors are the problematic personnel. They want sisters to do their jobs during resuscitation.”*
- *“Unfortunately the doctors are short staffed so most of the time they are either busy somewhere [else and not available for assisting in the maternity ward at a time when needed there].”*
- *“During resuscitation doctors teach junior staff and show them the procedure to be followed during neonatal resuscitation.”*

- *“When in crisis and labour ward doctors are in theatre we have problems with doctors in assisting with resuscitation some doctors does not want to assist us.”*

It seems that doctors allocated to a specific unit such as the NICU are of great value and are involved in neonatal resuscitation, but the sessional doctors and doctors on call do not play a significant role in neonatal resuscitation. Communication between senior leaders, clinical leaders and nursing staff needs to be clear and precise to improve quality care, especially where neonatal resuscitation is concerned.

The perception of the respondents was that communication *during* resuscitation was effective, but the feedback *after* resuscitation was inconsistent (see Question 17, Annexure I). Apparently, staff in the NICU focused more on feedback *after* resuscitation. Communication related to information *about* neonatal resuscitation was seemingly effective. From the answers of the open-ended question the perception of the respondents regarding communication was as follows:

- *“During resuscitation the doctors and staff communicate effectively, post-resuscitation if there are areas that need correction are [they must be] addressed.”*
- *“Everyone involved in neonatal resuscitation gives clear messages and communicate effectively with other members of the team.”*
- *“Doctors and senior staff attending the resuscitation give report about the end of the results of the procedure.”*
- *“Communication is effective regarding neonatal resuscitation as our seniors taught us.”*
- *“No communication.”*
- *“We never discuss the outcome.”*

Good communication implies that everyone should have the same goal, namely, to resuscitate the neonate as soon as possible; there should therefore be a singular clear vision and aim towards successful neonatal resuscitation. Only 36 (n=36) of the 42 (N=42) respondents answered this question. Although 41.7% (n=36, f=15) of the respondents indicated there was a clear vision in place regarding neonatal resuscitation (see Question 20, Annexure I), the nursing staff working in the maternity section each seemingly had their own vision (as seen in the quotes) regarding neonatal resuscitation. In other words, in reality there was no mutual vision from all the staff members involved in neonatal resuscitation in the maternity section as a whole. Most of them viewed decreased neonatal mortality and healthy neonates as their vision as reflected in the qualitative aspect of Question 20:

- *“To save lives of neonates.”*
- *“Perinatal mortality is reduced.”*
- *“The vision is to discharge a healthy baby to its mother and to render quality nursing care.”*
- *“There is a vision, because after neonatal resuscitation we want to have 90-100% healthy babies.”*

Likewise, the same applied to having a clear aim regarding neonatal resuscitation (see Question 21, Annexure I). Only 35 (n=35) of the 42 (N=42) respondents answered this question. From the respondents 54.3% (n=35, f=19) agreed an aim was in place regarding neonatal resuscitation; however, the aims reflected in the qualitative aspect of the question reflected different definitions and interpretations of aims regarding neonatal resuscitation:

- *“To reduce perinatal mortality rate, to promote quality care, to give professionals nurses and doctor in the unit to equip them.”*
- *“Incorporated in the resuscitation algorithm.”*
- *“Aiming to preserve life. To reduce neonatal mortality and morbidity.”*
- *“To save babies and reduce the number of neonatal death.”*
- *“To have effective resuscitation. The aims are to have 90-100% healthy babies.”*

Without a clear vision and aim nursing staff would not know what their goals are with regard to neonatal resuscitation and they would not know what is expected from them. Likewise, protocols regarding neonatal resuscitation need to be in place.

Protocols were present but inconsistent among the three units in the maternity section and awareness of staff regarding the existence of the protocols (see Question 22, Annexure I). Only 38 (n=38) of the 42 (N=42) respondents answered this question. Figure 5.9 reflects the awareness of respondents (n=38) regarding protocols.

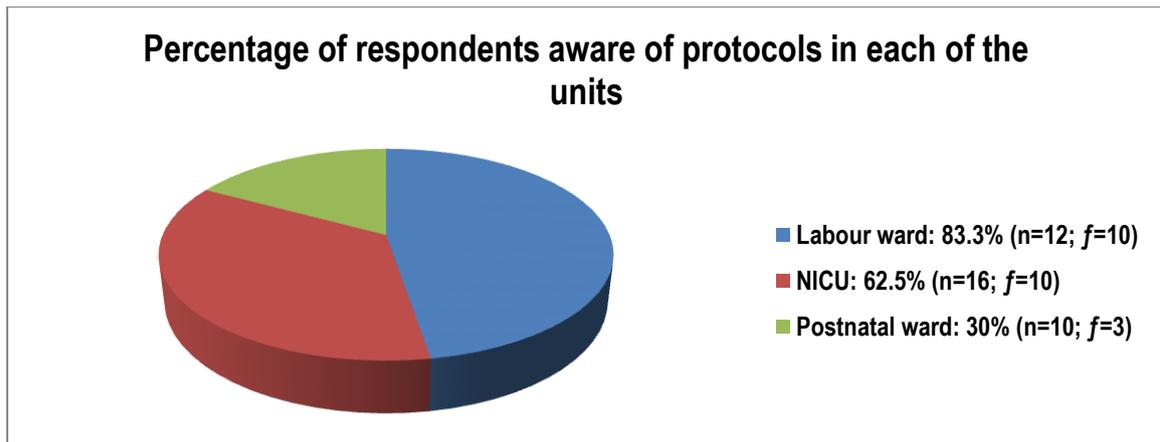


Figure 5.9: The percentage of respondents aware of neonatal resuscitation protocols in each of the units (n=38)

From the results illustrated in Figure 5.9 it can be concluded that there was room for improvement regarding awareness of protocols in all three the units, but mostly in the postnatal ward as only 30% (n=10; f=3) of the respondents who completed the question from the labour ward indicated they were aware of the protocols. Table 5.5 below illustrates the frequency distribution regarding awareness of protocols in each of the three units.

Table 5.5: Frequency distribution: Respondents' awareness regarding protocols for neonatal resuscitation.

ARE THERE PROTOCOLS IN PLACE REGARDING NEONATAL RESUSCITATION?	LABOUR WARD (n=12)		POSTNATAL WARD (n=10)		NICU (n=16)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Yes	10	83.3%	3	30%	10	62.5%
Do not know	0	0	3	30%	0	0
No	2	16.7%	4	40%	6	37.5%
TOTAL	12	100%	10	100%	16	100%

Protocols were written for the NICU by the paediatrician in 2012 and were available in a file in the NICU. Resuscitation algorithms were visible in the labour ward and NICU, but the protocols regarding neonatal resuscitation were not present in the postnatal ward. Having protocols available regarding neonatal resuscitation is important when one wants

to achieve consistent quality care with good outcomes. Quality care in neonatal resuscitation should therefore also be addressed.

It seems that respondents had mixed perceptions of how the quality of neonatal resuscitation was addressed at the time the study commenced (see Question 19, Annexure I). Some respondents felt the procurement of equipment was a problem and that there was a slow response regarding the procurement of equipment. Senior leaders were also aware of the need of staff and equipment. Ward meetings and meetings with management were held to discuss problems regarding staff, equipment and so forth. The perceptions of the respondents on the qualitative aspect of the questionnaire were as follows:

- *“Very difficult sometime you order equipment’s for more than three years without response.”*
- *“Matron are [is] informed about need for adequate staffing and procuring equipment.”*
- *“By arranging a staff meeting and discuss all the matters regarding neonatal resuscitation.”*
- *“They are addressed in the unit. I think they are addressed in senior level with management regarding shortage of equipment, more staff is needed. It is a financial challenge as well.”*
- *“I think management are trying but there hasn’t been an in-service or anything where neonatal resuscitation was being discussed in my presence.”*
- *“We discuss all concerns during our weekly maternity unit meetings.”*

Communication between the management, senior leaders and clinical leaders as well as the nursing staff is important to identify challenges experienced and to address problems. One of these challenges was identified as training as regards neonatal resuscitation.

Training in neonatal resuscitation seemed to be inconsistent (see Questions 8 and 10, Annexure I). Some staff received training and others had never received training. The following comments are the reflections of the respondents regarding training from the qualitative aspect of the questionnaire:

- *“My certificate has expired it has been over 2 years since my neonatal resuscitation attendance and technological concepts improved almost daily.”*
- *“After receiving training I am confident in performing basic neonatal resuscitation but regular training is needed for me to remain updated.”*
- *“Didn’t attend any workshop on neonatal resuscitation.”*

- *“Attended training twice and no refresher courses.”*
- *“Did not get any training and haven’t done it. Have seen it being done.”*
- *“I’ve been trained to resuscitate.”*
- *“Need more practise and exposure.”*

Neonatal resuscitation as an intervention can be influenced by various factors, like staff, equipment, the transport of critical ill neonates to name a few, but it is also important to have knowledge of the practice of neonatal resuscitation and what principles to follow. Therefore, training is essential to acquire the knowledge and skill to practise neonatal resuscitation competently and with confidence.

5.2.2.3 Section E: The practise of neonatal resuscitation (Question23 to 43)

Prevention and early identification is an important part of neonatal resuscitation (see Questions 23-25, Annexure I). Only 40 (n=40) of the 42 (N=42) respondents replied to the questions related to prevention and early identification of risk factors. Figure 5.10 reflects the average in percentage indicating the importance of prevention and early identification as perceived by the respondents in the labour ward, postnatal ward and NICU respectively. Figure 5.10 illustrates the average in percentages of importance of prevention and early identification.

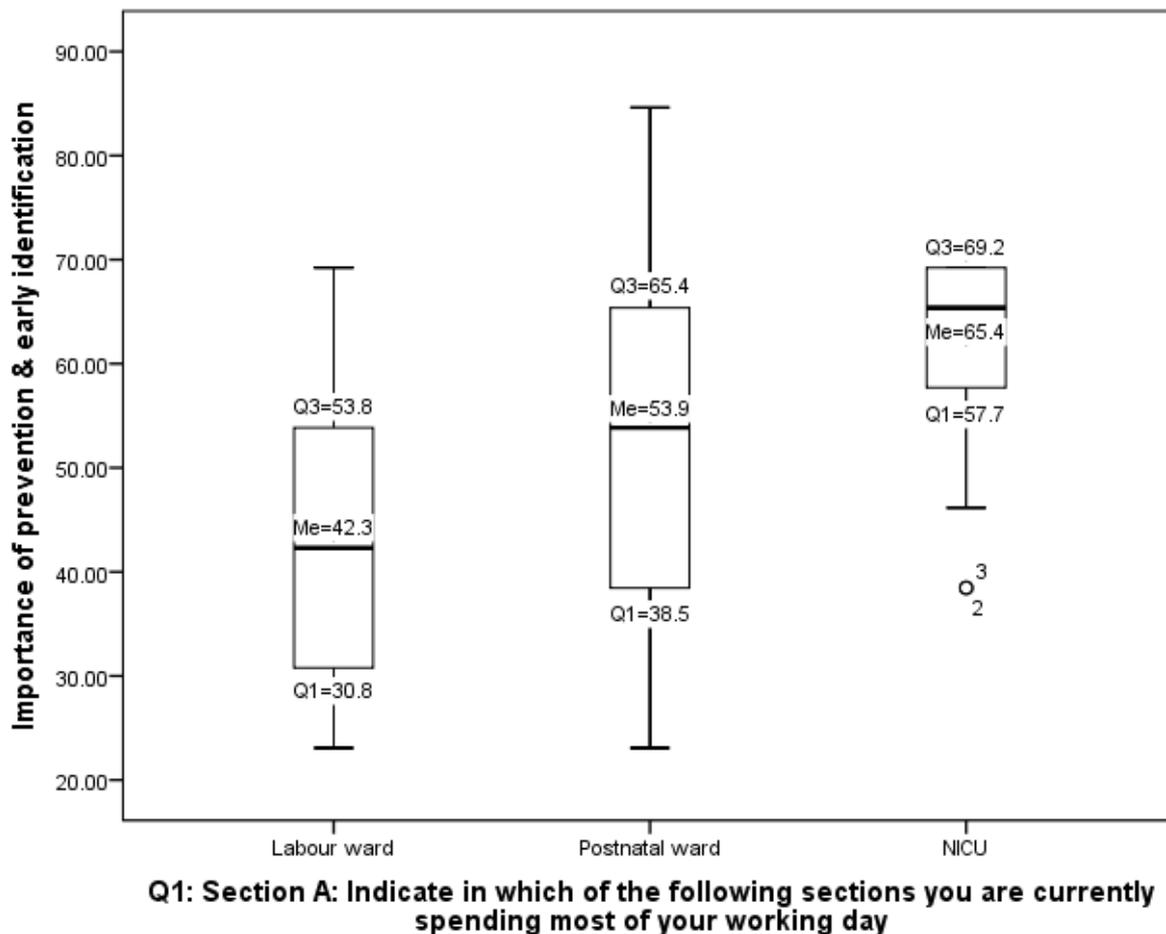


Figure 5.10: Importance of prevention and early identification of risk factors as indicated by respondents from labour ward, postnatal ward and NICU respectively (n=40)

When analysing the average in the percentages of identifying the risk factors, hazards and responsiveness to the neonate's condition (prevention and early identification of risk factors), it is apparent that the staff in the NICU viewed this as more important than those working in the labour ward. This is a problem because the prevention and early identification of risk factors are pivotal before and directly after delivery of a neonate. Consequently, there is a need during training to enhance the responsiveness of the staff in the labour ward and the postnatal ward to early identification of risk factors with regard to neonatal resuscitation. By identifying the risk factors the staff will be better prepared to take action to possibly prevent the need for neonatal resuscitation.

However, effective and sufficient neonatal resuscitation requires adherence to certain principles and guidelines regarding neonatal resuscitation. The *alternative hypothesis* (H_A) is that nursing staff who perceive themselves as being knowledgeable regarding neonatal

resuscitation should be able to know the critical aspects thereof and which steps to follow during resuscitation (see Questions 26-39, Annexure I).

For example, to secure the airway of a neonate in need of resuscitation the neonates head has to be positioned in a sniffing position. This allows the airway to be open and when bag and mask ventilation is applied, oxygen rich air will enter the lungs. However, if head is overextended or flexed too much ventilation will be ineffective and cause the resuscitation to be ineffective (Little et al. 2011:84; Zaichkin & Weiner 2011:43-49). Therefore, it is crucial healthcare professionals to know the importance of the correct positioning of the head.

The *alternative hypothesis* (H_A2) was that nurses who perceive themselves as knowledgeable regarding neonatal resuscitation would answer *head in sniffing position*. The H_0 is that there is no association between the perception of being knowledgeable and answering *head in sniffing position*. The p-value was 0.408 (> 0.05); therefore, the H_0 was not rejected in favour of the H_A thus indicating there is not a statistical significant association between being knowledgeable and answering *head in sniffing position*.

Likewise, with nurses perceiving themselves as knowledgeable and answering, *Tight seal over nose and mouth; Tempo of ventilation of 40-60 per minute; Observing for chest rise; Commencing cardiac compression when heart rate is under 60 beats per minute; Sustaining a tempo of 120-160 compressions per minute with a depth of 1/3 – 1/2*. The aforementioned are all examples of critical aspects of neonatal resuscitation (see Questions 26-39, Annexure I). Nurses who are knowledgeable regarding neonatal resuscitation should answer these critical aspects correctly. All the p-values (see Table 5.6) indicated the H_0 was not rejected in favour of the H_A thus showing no statistical significant association between nurses perceiving themselves as knowledgeable and answering these questions correctly.

Table 5.6: p-values for the cross-tabulations of critical aspects regarding neonatal resuscitation and respondents' perceptions of being knowledgeable

VARIABLE A	VARIABLE B	P-VALUE	CONCLUSION
Knowledgeable	Tight seal over the nose and mouth	p-value 1.000	Not a statistical significant association between A and B
Knowledgeable	40-60 breaths per minute	p-value 1.000	Not a statistical significant association between A and B
Knowledgeable	Chest rise	p-value 0.683	Not a statistical significant association between A and B
Knowledgeable	Heart rate under 60 beats per minute	p-value 1.000	Not a statistical significant association between A and B
Knowledgeable	120-160 beats per minute	p-value 0.710	Not a statistical significant association between A and B
Knowledgeable	1/3-1/2 depth of compression	p-value 0.184	Not a statistical significant association between A and B

The same applied to feeling competent and being aware of the critical aspects of neonatal resuscitation as reflected in Table 5.7 (see Questions 26-39 and Question 43, Annexure I). It can be argued that when a healthcare worker feels competent about basic neonatal resuscitation, she or he should be aware of the critical aspects of neonatal resuscitation as they are vital for the successfulness of neonatal resuscitation thereby reducing neonatal mortality and morbidity.

Table 5.7: p-values for the cross-tabulations of critical aspects regarding neonatal resuscitation and feeling competent

VARIABLE A	VARIABLE B	P-VALUE	CONCLUSION
Feeling competent	Head in the sniffing position.	p-value 0.237	Not a statistical significant association between A and B
Feeling competent	Tight seal over nose and mouth	p-value 0.656	Not a statistical significant association between A and B
Feeling competent	40-60 per minute	p-value 0.325	Not a statistical significant association between A and B
Feeling competent	Chest rise	p-value 0.762	Not a statistical significant association between A and B
Feeling competent	Heart rate under 60 beats per minute	p-value 0.709	Not a statistical significant association between A and B
Feeling competent	120-160 beats per minute	p-value 0.453	Not a statistical significant association between A and B
Feeling competent	Depth of compression 1/3-1/2	p-value 0.095	There could be a tendency for an association between A and B

The finding indicated although nurses perceived themselves to be knowledgeable regarding the new trends and guidelines of neonatal resuscitation, they did not know the importance of the critical aspects of neonatal resuscitation. The same applied to their perception that they felt competent. A nurse's perception of feeling competent in neonatal resuscitation should reflect he or she has knowledge of the critical aspects. These critical aspects are vital if the nurse wants to make sure that neonatal resuscitation is practised successfully. For example, if the head of the neonate is not in the sniffing position, air and oxygen received from the bag and mask will not be able to move into the lungs, no chest rise will be seen and assistance to help the neonate breathe will be unsuccessful meaning that the resuscitation will fail. The nursing staff indicated they were often involved in neonatal resuscitation (see Question 40, Annexure I) and therefore training to improve knowledge and skills is of significance to reduce neonatal resuscitation. It also appeared that there was a lack of practising their

neonatal resuscitation skills on a mannequin as indicated in Figure 5.11 below (see Question 41, Annexure I).

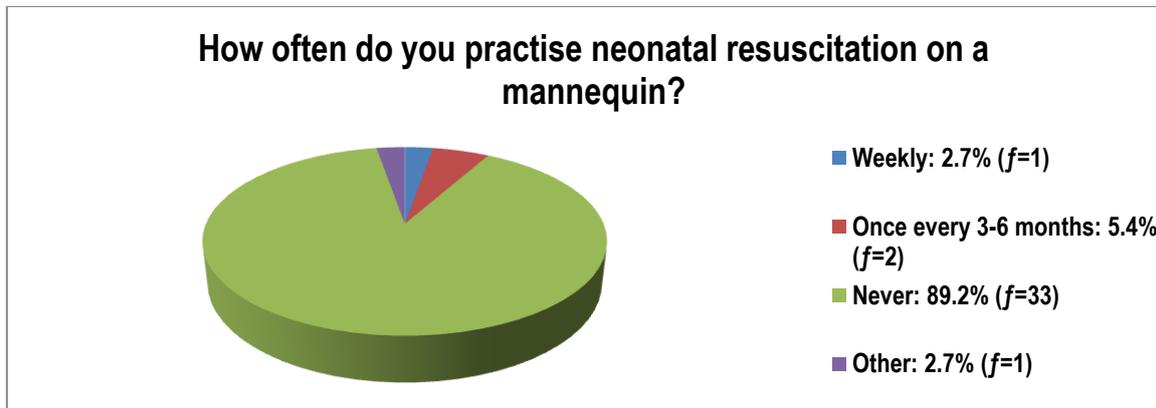


Figure 5.11: Frequency of practising neonatal resuscitation on a mannequin (n=37)

Only 37 (n=37) of the 42 (N=42) respondents answered this question. From the results it can be concluded that 89.2% (n=37; f=33) of the respondents never had the opportunity to practise neonatal resuscitation on a mannequin. Table 5.8 illustrates the frequency distribution regarding the practise of neonatal resuscitation on mannequins in the three units.

Table 5.8: Frequency distribution: Respondents' awareness regarding protocols for neonatal resuscitation

ARE THERE PROTOCOLS IN PLACE REGARDING NEONATAL RESUSCITATION?	LABOUR WARD (n=10)		POSTNATAL WARD (n=11)		NICU (n=16)	
	f	%	f	%	f	%
Weekly	1	10%	0	0	0	0
Once every 3-6 months	2	20%	0	0	0	0
Never	6	60%	11	100%	16	100%
Other	1	10%	0	0	0	0
TOTAL	10	100%	11	100%	16	100%

The results showed that none of the respondents from the NICU who completed this question had ever had the opportunity to practise neonatal resuscitation on a mannequin. This is troublesome because being a nurse in a NICU requires one to be competent in neonatal resuscitation since the nurse often needs to practice neonatal resuscitation due to the critical state of neonates in an NICU.

From the results it was obvious a great need exists for training in neonatal resuscitation. Most importantly, training in prevention and early identification of risk factors need to be focused on as well as the critical aspects of basic neonatal resuscitation. Furthermore, the staff should be given the opportunity to practise basic neonatal resuscitation on a mannequin. The principle of “see one, do one, teach one” would definitely apply within this context, but as Mills, William and Dobson (2013:168) points out the principle of “see one, do one, teach one” may progress into “see one, simulate many, do one competently, and teach everyone”.

5.2.2.4 Section F: Reflection on neonatal resuscitation from the perspectives of the respondents

Reflection on neonatal resuscitation was inconsistent (see Questions 44 and 45, Annexure I). Some respondents attended maternal and perinatal mortality meetings. Depending on the availability of a paediatrician, mortality and morbidity meetings were scheduled to be held weekly in the NICU; however, these meetings were not held consistently. The majority of the nursing staff working in the maternity section also did not attend the mortality meetings or debriefing sessions.

Reflection on past neonatal resuscitation and their outcomes provide maternity staff with an opportunity to identify challenges and mistakes. It is an opportunity where discussions can centre on what could be done differently and more effectively in the future. Furthermore, mortality meetings or debriefing sessions create opportunities to acknowledge positive things (actions, behaviours, interventions) thereby motivating the staff. Therefore, reflection is not a random activity; it is a decisive step taken towards improving the quality care during neonatal resuscitation as reflection on the past can lead to the formulation and appropriation of new ways and means to decrease the neonatal morbidity and mortality rates and increase the survival rate.

The conclusion on the perception of respondents on the existing situation of neonatal resuscitation and its associated factors was that they experienced challenges every day. The maternity staff faced the same challenges as those identified in the various Saving Babies Reports (2009; 2011). For example, the problems with transporting neonates; the lack of staff; scarcity of resources as well as the fact that a need existed for neonatal resuscitation training if competency was to be enhanced. Staff involvement and staff attitude were challenges in the district hospital due to, amongst others, staff shortages and the scarcity of equipment or, alternatively, equipment that was available but not in a working condition. The

ideal situation should be that, when nurses are knowledgeable regarding the new trends and guidelines regarding neonatal resuscitation, they would be competent and enabled to perform neonatal resuscitation competently and effectively. But, as the results signified, at the time this study commenced there was an urgent need for training of the nursing staff in the maternity section of the district hospital on neonatal resuscitation.

In CYCLE 1 the first step (PLAN) was achieved through the second step (ACT) which was the data collection. The data collection instruments included a questionnaire (with the nursing staff), a focus group (with the doctors) and a data capturing sheet to obtain baseline data regarding neonatal mortality. During the third step (OBSERVE) the data from the previous steps were analysed.

Nursing staff work in a team together with the doctors. The doctors' perceptions regarding neonatal resuscitation and its influencing factors were collected during a focus group interview. In the next section the collection and analysis of the data collected from the focus group interview with the doctors are presented and discussed.

5.3 EXAMINING THE EXISTING SITUATION REGARDING NEONATAL RESUSCITATION FROM THE PERSPECTIVES OF THE DOCTORS

During CYCLE 1 the second step (ACT) reflected the data collection. The objective for CYCLE 1 was to explore and describe the existing situation regarding neonatal resuscitation and its associated factors. In order to triangulate the data and explore the situation from another perspective than the data collected from the questionnaires (Koshy et al. 2011:111) a focus group interview with the doctors working at the district hospital was planned. The purpose of a focus group is to collect data through open-ended questions and therefore a focus group discussion takes place in a logical and natural sequence (Kreuger & Casey 2009:7).

A literature control did not form part of the discussion of the findings from the focus group as the data used for the focus group interview were obtained from the data that had been collected from the questionnaires for the generation of the strategies in a nominal group technique (NGT) discussion. The literature control was done after the generation of strategies to ensure that all the aspects were covered; thus, to enhance the validation of these strategies before implementation thereof.

The participants for this section were doctors and included a selected group of nine doctors who could contribute to specific data and generate more in-depth data than descriptive statistics. The steering group invited the doctors (from here on referred to as ‘the participants’) working in the maternity section of the district hospital to attend the focus group. Eight participants attended the focus group. During the focus group two doctors had to leave early to attend to patients. One invited participant was on leave and did not attend. The experience of these participants ranged from only working a few weeks in the setting to having worked in the setting for 13 years. Specialists and medical doctors attended the focus group.

The steering group members reminded the participants to attend the focus group. In a busy district hospital when there is already a lack of staff (such as the one where this study was conducted) it is very difficult to assemble professional participants at a specific time because of their busy individual schedules. For this reason the focus group discussion was held during lunch hour and a light lunch and some refreshments were provided. The environment suited all doctors and the atmosphere was relaxed.

It was important to establish trust. The researcher handed out participant information leaflets to each participant (see Annexure K). They willingly signed the informed consent forms after the purpose of the study as well as that of the focus group, the study process and all matters relevant to the study, for example, the benefits, had been explained to them. The steering group decided to use an independent facilitator to facilitate the focus group. The reason for choosing an independent facilitator was to eliminate possible bias that could potentially influence the discussion (Koshy 2011:113). The independent facilitator was chosen based on their availability to conduct the focus group interview. This particular person also did extensive reading and had experience in conducting focus group interviews. The researcher acted as the assistant facilitator and was responsible for taking field notes. She was therefore mostly a silent observer taking notes but there were instances where the researcher just asked follow-up questions for context purposes.

Ground rules for the focus group were set by the independent facilitator. The facilitator encouraged the participants to participate actively and assured them that all comments are welcome whether it was positive or negative. The participants were requested to give everyone a fair chance to speak and to speak one at a time. They were informed that everyone’s opinion and input was important and they would not be judged on their opinions, views or experiences. The facilitator requested permission to audiotape and transcribe the focus group discussion and all the participants gave verbal consent. This introductory

session was followed by the independent facilitator introducing the first question on the interview schedule (see the interview schedule in Annexure L).

Categories of questions were used as suggested by Kreuger and Casey (2009:38-41). The opening question served as the icebreaker to relieve tension and start the discussion. Next, to introduce the topic to be discussed, the introductory question was asked. The introductory question (see Annexure L) allowed participants to share their overall experience and views on neonatal resuscitation. The participants felt comfortable and at ease because they talked freely and openly shared ideas and experiences. The introductory question was followed by two transitional questions. The purpose of these was to move the conversation to the key questions that formed the basis of the study. Key questions followed. Probes for key questions were given by the facilitator to allow for a thorough discussion of these questions. The focus group interview ended with the ending questions which brought closure to the discussion and enabled the participants to reflect on what had been said (see Annexure L for the interview schedule).

The facilitator summarised what had been said after each question to elicit possible additional viewpoints. The facilitator identified those participants who dominated the group, and ensured that all participants were able to voice their opinions. The facilitator made sure the quiet participants were given an opportunity to air their views or experiences or add to the discussion (the facilitator addressed them directly or asked for their opinion in a subtle way). At the end of the focus group interview the assistant facilitator (in this case the researcher) gave a summary of what had been said during the discussion. In this way member checking was done. The participants agreed that the summary reflected truthfully what had been shared. The focus group discussion was concluded by the independent facilitator and the researcher thanking the group members for their participation and time.

Step three (OBSERVE) of CYCLE 1 reflected the data analysis (see Figure 5.1). The qualitative data generated by the focus group discussion were analysed by making use of Tesch's steps for open-coding as indicated by Creswell (2009:186) (see Chapter 4, section 4.8.1.1). The data collected from the doctors in the focus group interview were coded in themes, categories and sub-categories based on the NHS Sustainability Model. Four main themes emerged after the transcription of the data, namely, **staff**; **equipment/stock**; **transport** and **organisation**. Each of these themes rendered categories and sub-categories and the data were analysed accordingly as shown in Table 5.9.

Table 5.9: Overview of themes, categories and sub-categories derived from the perceptions of doctors on the existing situation regarding neonatal resuscitation during the focus group

THEME	CATEGORY	SUB-CATEGORY
5.3.1 THEME 1: STAFF CHALLENGES	5.3.1.1 Staff attitude	<ul style="list-style-type: none"> • <i>Staff attitude</i> • <i>Staff behaviour</i>
	5.3.1.2 Staff shortages	<ul style="list-style-type: none"> • <i>Staff resources</i> • <i>Staff shortages and ethical issues</i>
	5.3.1.3 Staff training	
	5.3.1.4 Staff communication	
	5.3.1.5 Clinical leaders	<ul style="list-style-type: none"> • <i>Loss of experienced staff</i> • <i>Staff expertise</i>
5.3.2 THEME 2: EQUIPMENT AND STOCK	5.3.2.1 Lack of management of equipment and stock	<ul style="list-style-type: none"> • <i>Lack of equipment</i> • <i>Lack of equipment maintenance</i> • <i>Lack of stock</i>
5.3.3 THEME 3: TRANSPORT	5.3.3.1 Delay in transport for transfer	
	5.3.3.2 Incompetent EMS staff	
	5.3.3.3 Miscommunication during the transport process	
5.3.4 THEME4: ORGANISATIONAL ASPECTS	5.3.4.1 Culture of the organisation	<ul style="list-style-type: none"> • <i>Infrastructure</i> <ul style="list-style-type: none"> ○ <i>Communication</i> ○ <i>Management support for staff training needs</i> ○ <i>Provision of human resources</i> ○ <i>Provision of equipment</i>
5.3.4.2. Infrastructure		

5.3.1 THEME 1: STAFF CHALLENGES

Staff members play a critical part in rendering quality care; especially in neonatal resuscitation. Scribante and Bhagwanjee (2007:1315) point out: “Nurses are the backbone of any healthcare system”, therefore the quality of nursing care “directly affects patient outcomes” including mortality and morbidity. Five categories pertaining to staff issues emerged from the focus group interview with the doctors:

5.3.1.1 staff attitude (two sub-categories: *staff feelings* and *staff behaviour*)

5.3.1.2 staff shortages (two sub-categories: *staff resources*; *staff shortages and ethical issues*)

5.3.1.3 staff training

5.3.1.4 staff communication

5.3.1.5 clinical leaders (two sub-categories: *loss of experienced staff* and *staff expertise*).

5.3.1.1 Staff attitude

The doctors who participated in the focus group interview verbalised that the staffs' attitude was extremely important if the maternity section in the selected district hospital was to function successfully and provide quality care. The participants shared that the staffs' attitude influenced the feelings of the staff members and their behaviour towards maternal and neonatal care delivery.

- **Staff feelings**

It was the perception of the participants that the staff in the maternity section felt overwhelmed. Some staff lacked confidence and were afraid of taking responsibility and accountability. This had a negative effect on their quality service delivery in the sense that they did not become too involved but carried on doing their work in the maternity section automatically and without much enthusiasm. The participants perceptions were that all the staff (including the doctors) were demoralised by their circumstances. The feelings they perceived among the maternity staff members were reflected in the focus group interview as follows:

- “*The size of it [the district hospital and the amount of patients] and the workload in it ... it's just ... you know ... too much.*” (Participant 7).
- “*... so everyone is scared of maternal death ... rather be safe on the maternal side ... So it is always a challenge.*” (Participant 5).
- “*... the nursing staff doesn't have confidence in themselves.*” (Participant 1).
- “*... low level of confidence because they are scared of like something happens then managers will say, 'Why did you do something' ...*” (Participant 5).
- “*... basically everybody's scared ... I'm not covered, I'm not talking because of that issue you know of being scared of accountability.*” (Participant 7).

- *“... everybody will be excited and high morale at work and if something goes wrong people is demoralised now everybody is scared of writing a serious advert effect...”* (Participant 7).

The participants, who all worked in the maternity section of this district hospital, experienced feelings of being “scared” to take accountability because they were “not covered” (with insurance in case of death of mother or neonate) and they were afraid of managers who would hold them accountable for decisions made. It seemed as if they were more concerned about preventing maternal deaths than focusing on the neonate (“so everyone is scared of maternal death”). The many staff challenges they were experiencing in this unit included the work overload and feeling incompetent resulting in working in an atmosphere of demoralisation. Feeling demoralised and afraid may lead to staff avoiding or withdrawing from certain situations; a behavioural pattern and attitude of not caring can ensue.

- **Staff behaviour**

According to the perceptions of the participants working in the maternity section of the district hospital, there was no unified behaviour among the maternity staff when neonatal resuscitation had to be performed. Some demonstrated a commitment towards it while the rest avoided involvement in neonatal resuscitation. The following quotes verify this:

- *“They [nursing staff] do go beyond what they are supposed to [do] ...”* (Participant 5).
- *“... because everybody want to be somewhere behind the curtains not closer to [neonatal] resuscitation ... everybody start running away because they [nursing staff does not want to get involved and have to write a statement of what went wrong regarding neonatal resuscitation and incidents that occurred] are going to write a statement and also then you don’t have that teamwork anymore.”* (Participant 7).
- *“You can’t be competent if you are not involved.”* (Participant 1).
- *“... whatever they are doing just about finished delivering the baby now it’s easier to say ‘oh I don’t want to be part of that [neonatal resuscitation] you know at least I will say I was delivering a baby.”* (Participant 7).
- *“... a midwife would go to theatre to receive ... to receive a baby. She would like to stay there [in theatre] for a whole hour finishing the ceaser [caesarean section] instead of going back to the ward because she don’t want to [go back to labour ward and risk making mistakes with possible neonatal resuscitation] ... so she would stay there [in theatre] tiding ... walking around.”*(Participant 2).

The participants seemed to believe that the workload and the incompetence of nurses influenced their behaviour and attitude towards quality nursing care. Some participants said it felt to them as if only basic nursing care was the aim of the maternity staff; taking down the vital signs had become part of their daily work activities and was seen as merely a repetition of duties and, subsequently, abnormalities in a neonates' vital signs were either not noticed, considered not as important as taking care of the mother and thus not acted upon. Close monitoring of the neonates' vital signs was lacking and, as a result, the urgency of the neonates' plight was often ignored or not realised. Steps were not taken to inform the doctor when a neonate's condition worsened. The next verbatim quotes substantiate the staff's lack of commitment to take action to resuscitate a neonate:

- *“Competency is also how committed you are. Even if you have knowledge you’ve done so many courses but if when you are at work you don’t apply yourself then they will say you are incompetent.”* (Participant 5).
- *“... because of the workload I’ll just say it is very difficult for them [nursing staff] to really do the right thing the way they were trained.”* (Participant 5).
- *“It’s a big issue because you’ll assume that ok ... that ok when looking at that the vital signs you know that ok the baby is doing well. Only to be called you know hours later that ... that baby has crashed [meaning the baby needs neonatal resuscitation or has died] ... that surprise us too... But the vital signs were normal ... the baby was stable but all of a sudden the baby is dead.”* (Participant 6).
- *“... if you get a lot of work you are bound to make some mistakes ... mistakes they [management] count, they count them against you ... so that you know you are even scared ... now you are scared of ... many mistakes ... so they [nursing staff] don’t want to go that extra mile ... because if they are lazy ... not many mistakes.”* (Participant 2).
- *“... [the abnormal vital sign] is circled in red meaning danger but nobody will be summoned at that you know ... I got this baby the temperature is this much until you get there and say, ‘But sister it’s written in red why was I not notified?’”* (Participant 7).

The excessive workload caused by patient overloads versus staff shortages led to certain noticeable behaviours among the staff members such as becoming inattentive which, in turn, led to unnecessary mistakes being made. This had a snowball effect: the more mistakes were made, the more a fear was created of making additional mistakes. Behavioural patterns and attitudes emerged: avoiding certain situations such as neonatal resuscitation; a tendency to perform only what is basic and necessary thus neglecting the quality-of-care principle; becoming “lazy” due to tiredness; and not making an effort (“*don’t want to go the*

extra mile”) to perform the tasks as had been trained to perform. In addition, the work overload caused the maternity staff to be so busy and preoccupied with the many other tasks that neonates presenting with abnormal vital signs went unnoticed and were not brought to the attention of the doctors which resulted in death.

Updating the staffs’ awareness of what basic nursing care entails can improve the quality of care to neonates; improvement in their care will prevent neonatal resuscitation in the first place as early warning signs of deterioration should be noted and acted upon timeously.

In conclusion, the workload and incompetence challenges experienced in the maternity section of the district hospital had an influence on staff behaviour and this directly affected the prevention and successfulness of neonatal resuscitation.

5.3.1.2 Staff shortages

The shortage of staff was overall an enormous challenge (according to the participants in the focus group) in this district hospital. It is essential for the maternity section to be staffed with enough healthcare personnel to ensure that, when necessary, neonatal resuscitation can be done. A shortage of staff directly impacts on the quality of nursing care. According to the participants, the shortage of staff demoralised nurses and increased their workload. Staff shortages also led to ethical issues regarding neonatal resuscitation and quality nursing care.

- **Staff resources**

The participants shared that staff resources are linked to staff shortages which influenced quality care in this district hospital. Staff shortages (nurses and doctors) influenced the staff attitude in that it increased the workload of those on duty. On the other hand, the burden of the heavy workload they had to cope with resulted in high levels of absenteeism among the staff on duty which, in turn, lead to an even higher workload for the remaining staff. It simply became a viscous circle which was almost impossible to break. According to the participants, the limited number of staff had a negative impact on neonatal resuscitation and therefore the ideal situation of appointing roles to staff members during neonatal resuscitation was not possible. The lack of staff resources also has an impact on staff training. Participants reflected on this as follows:

- *“Sometimes you will find that there is a nurse only so you are the [only two] people.”*
(Participant 2).

- “So here [maternity section] we don’t have that enough personnel to say we are prepared for such an incident [resuscitation of a neonate] we don’t know like if, for example, in like academic hospital you know if the paediatrician is there I’ll get it to neonates like if there is anything that needs to be resused [resuscitated] they are there with their team of people.” (Participant 5).
- “They book also training courses for nurses but the thing is they can’t go because they are short staffed.” (Participant 2).
- “... staff shortage you’ll find that some of the vital signs are being done by the students ... you know ... when you’ll get to the ward you’ll find that well everyone has got a respiratory rate of 8.” (Participant 6).
- “Absenteeism ... because of this workload People are not coming because they is ... they are tired ... because of absenteeism.” (Participant 2).

The nurse-to-patient ratio was also very low in the maternity section where there is always a huge influx of patients from 32 clinics. This also had a huge impact on quality neonatal nursing care as one participant observed:

- “You’ll find that there are three midwives and about fifteen patients in labour ward and you know they cannot give attention to their patients the way it should be done. You know ... they will deliver a macrosomic baby and you know for some time she will forget that the baby will need to be fed or if not so that baby will ... might develop hypoglycaemia ... not deliberate but because of workload.” (Participant 7).

Staff shortages does not only have an impact on quality care but also leads to ethical issues especially were neonatal resuscitation is concerned.

- **Staff shortages and ethical issues**

Staff shortages leads to ethical issues. By implication, doctors and nursing staff are sometimes forced to make very difficult and unfair decisions, for example, when the staff members have to decide whether they are going to assist the mother or the newly born baby or which neonate will get preference. In the district hospital ethical issues also impacted on the staffs’ attitude because they were more scared of maternal death and its consequences than for that of a neonate. The mothers’ care would therefore have preference over the neonate’s; however, making this decision (whether consciously or unconsciously) further complicated the ethical dilemma of whose care had to be prioritised. The impact of which decision would be ethically ‘right’ in such a situation elicited various comments from the focus group participants who all agreed it was a profoundly complicated challenge:

- *"... there is [are] not enough personnel ... Sister has [have] to ahhh leave the mother ... go resuscitate the baby. Sometimes the mother is also not well ... so it's challenging ... Yeah you have to decide whether to abandon the baby or save the mother ... so everyone is more scared of maternal death ... rather be safe on the maternal side ... So it is always a challenge."* (Participant 5).
- *"... you find that you are only two sometimes you leave your child to do something you know and then ... you gets you know your attention is focused on something else you compromise that particular child. These are the challenges."* (Participant 6).
- *"... but because of constraints of staff and personnel we don't have that. So you know the person who is going to struggle is the anaesthetist he deals with the mother ... he deals with the baby. That's a very difficult situation."* (Participant 2).

Staff shortage has an influence on the functioning of a hospital as well as on rendering quality care to patients. Ethical aspects of care are compromised by staff shortages. As indicated, healthcare providers in the maternity section of this hospital were often expected to make an impossible decision in an impossible situation. There was not enough staff to take care of both the mother and the neonate. This could have left the staff on duty at the moment with making the decision of whether to save the mother or the neonate. However, as indicated in the verbatim quotes, at the time this study was started the prevailing tenet was to take care of the mother.

The maternity staffs' focus was on the mother for various reasons: a shortage of staff; the heavy workload; tiredness; incompetence with regard to basic neonatal care and resuscitation; not wanting to be held accountable for a death and fearing the reaction of senior staff in case of the mother's death. It is emphasised here that giving priority to the mother's well-being was not perceived as intentional by the participants, but was ascribed to the "*difficulty*" and "*challenge*" of working in an environment where there is constantly too much work and too few human resources. Nevertheless, staff shortages had a direct influence on neonatal mortality and morbidity in this district hospital. Therefore, all staff who worked in the maternity section needed to be trained in neonatal resuscitation so that also the lives of the neonates could be saved.

5.3.1.3. Staff training

The general perception of participants was that training was insufficient and inconsistent. The participants noted the main factors which impacted on staff training were the shortage of

staff and the lack of financial resources. They all agreed that training in neonatal resuscitation and an in-house training programme regarding neonatal care were essential. The participants further mentioned sustainability was a crucial aspect in enhancing the quality of neonatal resuscitation. The participants reflected on staff training as follows:

- *“... I think everyone [nursing staff] in labour ward has gone for neonatal resuscitation, but you know they look like they never went for that course.”* (Participant 1).
- *“The training is there but the practice is not good as they’ve said because of the equipments.”* (Participant 3).
- *“Uhm not really I think we ... what we have got is the basic things you know but we don’t get the updates ...”* (Participant 6).
- *“We’ve been invited so was it two weeks back to Kalafong we couldn’t go because if you go who is going to look at the patient ... so training are there ... workshops are there but there is no personnel ... because if you leave then ...”* (Participant 2).
- *“We come from training everybody is excited and in no time the morale dies ... because of the workload I think that is also we don’t have enough time to see as if I’m coming from a refresher course to sit with colleagues and share the new [knowledge/skill] ... you know that’s when you know it’s that time that we cannot sustain it ...”* (Participant 7).

According to these quotes, training in neonatal resuscitation was provided in the form of, for example, workshops. However, it seems as if due to the staff shortages and the added workload, even if the training sessions were available maternity staff could not attend because there was no replacement staff available and other problems arose such as equipment that was inadequate or not in a working condition. Also, the staff members were not kept up to date on new skills or developments in the field of neonatal resuscitation. After attending a training session or workshop the ideal situation would be to share what they have learned with colleagues, but the staff was kept so busy that they there was no time to communicate newly acquired knowledge or skills to their co-workers. This lack of communication may influences the sustainability of knowledge and skills acquired through training. According to Allen et al. (2007:14-17), evidence for quality improvement initiatives should be shared (communicated) to improve its effectiveness as evidence improvement is a key factor influencing sustainability. In the context of this study the evidence of the quality improvement initiative pertains to knowledge and skills regarding neonatal resuscitation. Communication between staff members regarding neonatal resuscitation is important to enhance quality care.

5.3.1.4 Staff communication

Noticeable contradictions regarding communication emerged during the focus group. Some participants felt that communication was positive while others said fighting and blaming occurred among the staff because of frustration brought about by the workload and staff shortages. One participant reflected on this challenge as follows:

- *“Sometimes we fight, but during communication with the nursing staff when you invite them to work together they do come and help. Yeah ... and well sometimes we out of frustration we normally blame each other ... when I take the child [neonate] this side Dr. X... everyone [in the NICU] thinks I haven’t done enough for the child during resuscitation. I haven’t resuscitated the child enough during ... after delivery.”...“Normally we discuss it [discussion of problems and challenges experienced] with the clinical manager.”* [Referring to discussion of problems and challenges experienced]. (Participant 1).
- *“There is a formal one [meeting] in the boardroom where it’s a meeting with the clinical manager and that we can talk about such [problems and challenges experiences] and there is also an M and M [mortality and morbidity meeting].”* (Participant 5).

Communication plays a crucial role in successful neonatal resuscitation not only during the process, but also afterwards reflection is needed on what has been done; the positive as well as the negative outcomes of the resuscitation process. It is important for the staff to communicate and sustain communication if quality care is to be improved. Sharing the challenges experienced on a daily basis, learning from mistakes and implementing new ideas or actions enhance the quality of care, empower individuals with confidence in their work and promote positive group dynamics. Clinical leaders play an important part in addressing challenges that may eventuate in the death of a neonate.

5.3.1.5 Clinical leaders

In the context of this study clinical leaders referred to doctors and shift leaders. They are normally the individuals with the experience and expertise who take the lead during neonatal resuscitation.

- **Loss of experienced staff**

It was the perception of the participants that there was a lack of experienced staff. They verbalised it was also difficult to retain experienced staff and noted the staff turnover was high at this district hospital:

- “... we are training but ... retaining our staff especially experienced ones ... we end up losing them ... you get demoralised.” (Participant 7).
- “Let’s see how many doctors left ... up to June it’s more than eight...” (Participant 1).
- “... I’ve noticed one thing we have lost a number of our experienced nursing unit ... nursing staff ... because of the issue of workload ... so they go somewhere else ... so you end up having all these young ones.” (Participant 7).

General practitioners (doctors) and clinical leaders play an important role in the district hospital. They often have to take over the work of a person specialised in a specific field, for example the paediatrician, because such specialists are not employed in the hospital or has resigned. Over the course two years, three different paediatricians (only one paediatrician are appointed at a time) had worked in the hospital and all three had resigned. When staff with experience resigns the hospital automatically loses leaders in the clinical field. In the district hospital shift leaders and doctor (clinical leaders) had to take over the work of paediatricians because, although paediatricians were appointed from time to time, they tended to resign fairly quickly. Similarly, doctors also resign or leave after a short period. According to one participant, six doctors had left in quick succession meaning the shift leaders had to take over the workload.

- **Staff expertise**

There was a lack of healthcare practitioners with expertise in this study setting due to staff shortages. At the time the focus group interview was conducted there was no paediatrician. The paediatricians seemed to come and go. The perception of the participants was that one needs to work in an area for a long time to improve quality of care. Some staff loses confidence and experience difficulties when dealing with neonatal problems due to their lack of experience in the neonatal field as reflected in the following comments:

- “So it’s much better when sometimes if certain things are done by people who have been doing that thing at least quite a long time ... the quality improves like even the patient resus [resuscitation].” (Participant 5).

- *“I do agree with that you know uhm because the outcomes when the baby is been resuscitated by somebody who is working in paed[s] [paediatrics] ... you know as good as compared to somebody who has lost touch with paed[s].” (Participant 6).*
- *“If we take a patient to caesarean section for foetal distress, there must be a paediatrician there that’s the ideal situation. But because of constraints of personal we don’t have that.” (Participant 2).*

In a busy district hospital there is a need for clinical leaders to teach and guide inexperienced staff. Staff shortages have a negative influence on in-service training and hands-on teaching because when there are staff shortages there is no time for such training opportunities. This is very unfortunate because clinical leaders can play an important role in teaching inexperienced staff the principles of neonatal resuscitation. This will improve the quality of care and positively contribute towards sustaining a quality improvement initiative in neonatal resuscitation. Achieving sustainability will have a positive impact on neonatal mortality and morbidity. Unfortunately, it is also important to have the correct neonatal resuscitation equipment for resuscitation to be successful; having the knowledge to perform it is not always enough.

5.3.2 THEME 2: EQUIPMENT AND STOCK

Equipment and stock in this study referred to the neonatal care equipment and stock but more directly linked to neonatal resuscitation. This includes emergency equipment and equipment needed to identify early warning signs and risk factors that will indicate a need for resuscitation. For example, during labour cardiotocography (CTG) machines play a role in identifying whether the baby is compromised and will be in need for resuscitation. The lack of management of equipment and stock will now be discussed.

5.3.2.1 Lack of management of equipment and stock

The management of stock and equipment is important because without the necessary emergency equipment neonatal resuscitation cannot be done properly. Equipment and stock, for example, suction equipment, laryngoscopes and ambubags have to be readily available and need to function properly.

- **Lack of equipment**

According to the participants, there was a lack of resuscitation equipment in the setting. They mentioned that the laryngoscopes were the wrong size, there was not enough ambubags, also lacking an arterial blood gas machine and incubators etc.

- “... we couldn’t monitor the child as far as blood gas were [was] concerned.” (Participant 6).
- “What I normally have a problem with is when there is meconium aspiration you have to put your laryngoscope and then sometimes you don’t have the actual size ...” (Participant 1).
- “One doctor needs to run out with the child from ward 4, running here so he can get an ambubag, by the time he came the child was dead. Running more than 100 m to get the equipment.” (Participant 2).
- “The ambubag is sometimes, you don’t find it.” (Participant 3).
- “And then part of resuscitation is putting up the drips so you don’t have enough lights so that you can see well. Lack of equipment, that’s the problem, lack of equipment.” (Participant 1).
- “So the problem is there are two babies and then the resus ... we share.” [This participant was referring to the availability of suction and an overhead heater.] (Participant 5).

Without equipment neonatal resuscitation cannot be performed. Having equipment that does not function or is the wrong size is distressing and should not be tolerated. A participant shared that a doctor ran “*more than 100 m to get the equipment*” but the neonate died. There should not be a need to share, run around or make do with what is available when trying to save a neonate’s life. According to the participants, there was only one working suctioning in and one functioning radiant warmer for resuscitation in the labour ward. Having functioning suction available during neonatal resuscitation is essential as clearing the airway is important in maintaining an open airway. It is also important to provide heat during neonatal resuscitation as hypothermia may result into cold stress which can cause further abnormalities and enhance the need for recurrent neonatal resuscitation. It is obviously critical to have the necessary, functioning equipment available to render quality neonatal resuscitation when needed.

The maintenance of the equipment procured is important in order for it to be usable and in a working condition.

- **Lack of equipment maintenance**

The experiences of the participants indicated the equipment that was available lacked maintenance. If equipment is not maintained and serviced it can break down or not work.

Faulty equipment leads to a lack of quality care. The following were some of the comments made by participants in the focus group:

- *“Suction is not always working.”* (Participant 3).
- *“The CTGs [cardiotocography machines], there are a lot of CTGs in the corner there not working.”* (Participant 1).
- *“Machines has [have] not been maintained they break down.”* (Participant 2).

As previously mentioned having certain equipment available during neonatal resuscitation is essential. Equipment has to be in working order. For example, the CTG machines are used to monitor the foetal heart rate during birth. When abnormalities are detected in the foetal heart rate, it is anticipated that neonatal resuscitation will be needed once the baby is born. Knowing this, the staff can prepare for neonatal resuscitation by ensuring that all the necessary equipment and stock are available and that competent staff is available and present to perform the neonatal resuscitation.

- ***Lack of stock***

According to one of the participants a lack of stock was another challenge in this district hospital, this was verbally confirmed by the other participants in the focus group. Certain stock is essential during neonatal resuscitation, for example, the correct size endotracheal tubes, intravenous needles, fluids, suctioning catheters and so forth must be there and available. However, as the one participant pointed out this was not the case:

- *“The suction tubes are bigger than what the child can take and they didn’t find the size ... the right size of [for] its nose...”* (Respondent 1).

The challenges described in this focus group were more related to equipment than stock in particular. The lack of equipment and stock as well as not maintaining it was a huge challenge. It needed to be addressed urgently because it directly impacts on the successfulness of neonatal resuscitation and the outcome after resuscitation. Therefore, it has a profound impact on neonatal mortality and morbidity. The lack of the correct equipment was also a challenge on the ambulances used by the emergency services for the transport of critical ill neonates from the district hospital to other institutions and from the clinics in the surrounding areas to the district hospital.

5.3.3 THEME 3: TRANSPORT

The participants indicated they experienced problems with the transport of neonates from the district hospital to other institutions and from the clinics in the surrounding area to the district hospital. Delay in transport for transfer of neonates, the lack of equipment on ambulances, incompetent EMS staff and the lack of communication in the transport process were identified by participants as challenges resulting in inadequate transport.

5.3.3.1 Delays in transport for transfer

Delay in transport for transfer of ill neonates to tertiary institutions and from the clinics to the district hospital was identified by the participants as a serious problem of concern which directly contributes to neonatal mortality. Neonates die while waiting for ambulances to arrive. Below are some of the reflections of the participants related to delay in transport for the transfer of critically ill neonates:

- *“With my experience ... I once resuscitated a baby ... successfully, but I had to bag for three ... three hours, while waiting for transfer to another institution ... so the problem was equipment ... equipment ... equipment. ... We called an ambulance but it took time you know to come ... the other challenging thing was that well we couldn’t monitor the child as far as blood gas for example were concerned.”* (Participant 6).
- *“... we use the same [telephone] line as the people outside so we go through the same waiting ... like holding the phone ... for an hour ... we waiting for the consultant to answer the phone and book a transport ... after booking it takes another hour.”* (Participant 5).
- *“... you look at the time that you’ve been waiting and you wondered ... what is the quality of the patient going to be ... it’s anything between an hour and two to three hours?”* (Participant 7).
- *“Very, very, very long time ... yeah and I had a couple of babies dying waiting for ambulances ... and that I believe that should they come earlier on you know ... that baby could have been saved.”* (Participant 6).

The delay of transport as identified by the participants also correlates with the perceptions of the nurses as respondents regarding challenges experienced with transport (see section 5.2). The lack of equipment on ambulances transporting critically ill neonates also contributes to the delay in transport and neonatal deaths (explained in the next paragraph).

The participants were also concerned about the lack of equipment, for example, incubators and ventilators, on the ambulances. Participant 1 verified this: *“The problem with the local ambulance people they don’t have incubators with them...”* Furthermore, the ambulances tended to arrive with incorrect equipment for the transfer of a critically ill neonate. This means they have to return to the despatch centre to get the right equipment and staff and, as evidenced by the quotes, by the time they arrive back at the hospital the infant might have died. If the district hospital had advanced equipment such as ventilators and blood gas machines, they would be able to treat the ill neonate and possibly keep it alive until transport arrived.

However, it was not only the equipment but also possible miscommunication between the hospital staff and the EMS personnel or misunderstanding from the latter’s side that caused delays as signified by the following quote:

- *“Well sometimes they [EMS personnel] will come and say no this is not ours even though you have told them that your ... I’ve got this type of patient ... that you need a ventilator you know ...”* (Participant 6).

The lack of equipment on ambulances correlates with the perception of the nurses as discussed in section 5.2. Likewise, the incompetent EMS personnel further contribute to delayed transport.

5.3.3.2 Incompetent EMS staff

The participants commented on the incompetence of the EMS staff which often seemed to compromise the emergency situation with a seriously ill neonate. The ambulances tend to arrive with EMS staff that does not have the knowledge or skill to transfer and take care of a critically ill neonate while being transferred. Returning to the despatch centre to pick up trained staff wastes valuable time and causes a further delay which has negative effects on the mortality and morbidity of neonates. The following comments were made by participants regarding incompetent EMS staff:

- *“... and then they will just send somebody who is not competent ... and then they will go back to their ... you know control ... and then they gone for [a long time] ...”* (Participant 6).

- “... sometimes they [EMS staff] come they look at the baby and the ... personnel say no ... no ... no ... I can't ... we need someone [trained or competent EMS staff] they go back ...” (Participant 5).

Miscommunication (or a lack of stating precisely that a critically ill neonate has to be transferred) was troubling to the participants. It results in precious time wasted which is exactly what the neonate does not have; it is even more critical if the maternity staff is not trained in neonatal resuscitation and they have no equipment to work with while waiting for the neonate to be transferred.

5.3.3.3 Miscommunication during the transfer process

The perception of the participants was that miscommunication existed between the district hospital staff and the despatch centre regarding the transport process. Although the “*clinical picture*” of the ill neonate was given to the person in the call centre, the EMS services still arrived without the correct equipment and/or competent personnel to transfer a critically ill neonate. Participant 6 specifically related to the fact that “*even if you have given the clinical picture before ...*” confirming that the EMS services arrived unprepared and thus unable to transport a neonate.

Timeous and safe transport of the critical ill neonate is essential in ensuring continuous quality care. Communication between the district hospital arranging the transfer and the EMS services call centre and despatch team needs to be very clear and specific regarding the needs of the neonate to be transferred. The EMS services need to be aware of the clinical condition of the neonate and the level of care the neonate will need for transfer. This can help to decrease unnecessary delays. When an ill neonate is not transferred in the correct way or with the correct lifesaving equipment and competent staff, such a neonate can develop severe complications during the transport process which may cause an increase in neonatal mortality and can directly impact on morbidity.

5.3.4 THEME 4: ORGANISATIONAL ASPECTS

Each organisation has its own culture and infrastructure and in the context of this study it is important to understand the culture and infrastructure of this particular district hospital in order to analyse the existing situation and to determine solutions to the problems experienced.

5.3.4.1 Culture of the organisation

It was apparent from the discussion in the focus group that the maternity section of this district hospital had a specific culture. The perception of the participants (doctors) was that the staff felt management was harsh on them. Staff members were scared to make even the smallest mistake. The perception of the participants attending this focus group was that management was not always aware of the unique challenges experienced by the maternity staff resulting in the overworked staff feeling demoralised and unsupported. The participants shared that the staff experienced a tendency among management to miss the positive things and only focus on the negative things that went wrong in the maternity section.

According to these participants, some protocols were based on the culture of the organisation, for example, if a neonate is resuscitated in the labour ward, the nursing staff must first wait for the doctor to give permission before the neonate can be transferred to the NICU. Following this prescription obviously creates challenges because the doctors can be busy elsewhere while the staff in the labour ward may feel (or know) that the NICU staff is better equipped and qualified to treat the critically ill neonate. Having such strict policies without room for own decision-making by the nursing staff creates a situation where the survival of the ill neonate is compromised by the culture of the organisation which can lead to delayed post-resuscitation care and a risk for the neonate to develop hypothermia.

The overall lack of moral support (the nursing staff did not have the confidence to take accountability and make informed choices regarding the best care for the newborn because they were afraid of the implications) was another urgent matter the doctors raised. The example mentioned was that the nursing staff would not even administer an analgesic (paracetamol) to a patient if the doctor has not written and signed a prescription. In an environment where there is minimum staff (nurses and doctors) and an overload of patients such organisational cultures create unnecessary limitations in rendering quality care. Some of the participating doctors' perceptions associated with the culture of the organisation were:

- *“The managers they are very harsh on the nurses ... Small mistakes are a big thing for the managers.”* (Participant 2).
- *“I was saying like you know they are trying, you know the nurses ... the nurse they are short staffed ... very short staffed like they ... they really like they try hard ... cover here and there you know ... they try so hard and then if something wrong happened ... the management overlook the fact that they try so much then focus on that little thing that happened ... and then it kind of affect them they don't notice the lot of work they [nurses] are doing ...”* (Participant 5).

- *“I think of the patient complains of a headache and I’m not there for four hours so the patient will stay with that headache if by accident the nurse gives the panado then they will question the sister.”* (Participant 3).
- *“Yeah look this nurse has seven patients that she’s taking, looking after ... now during this period of labour one of the patient’s foetal heart disappears and they don’t look what the nurse was doing during that time now always even though they see this nurse is looking after seven patient but they always pinpoint ... ‘No you should have done this’ ... why?”* (Participant 1).
- *“... so there is no moral support.”* (Participant 7).
- *“... the sister does the resuscitation she can ... she can. But now she would like to transfer the patient here [NICU]. She can’t transfer ... she can’t transfer the baby she must wait for ... [mentions Participant 5] to finish the caesar [Caesarean section] ... really those are the challenges you know ... cause these people we feel that ... that they [NICU] are better equipped ... to take care of the baby ... than the sister in the ... the midwife there ... so also being that in that time they baby needs you know to be put on the ... the CPAP machine now but she has to wait until [the doctor finishes the Caesarean section] ...”* (Participant 2).

The culture of an organisation determines the staffs; attitude and behaviour; in this instance the staffs’ level of involvement in rendering quality patient care. It also has an impact on the self-confidence of staff. If they are constantly afraid of making even the slightest mistake and feel there is a lack of support, it will have an impact on their overall attitude – towards each other and towards management. The participants believed it was important to have a specific infrastructure in place.

5.3.4.2 Infrastructure

Infrastructure in the context of this study refers to organisational factors such as the provision of competent and train healthcare personnel, equipment resources and the overall management of the maternity section. Aspects of infrastructure that emerged from the focus group were communication, management support for staff training needs, provision of human resources and equipment.

- **Communication**

A communication infrastructure seemingly existed in the maternity section. Some formal meetings such as meetings with the clinical manager and mortality and morbidity meetings were being held. The participants indicated that problems were discussed with the clinical

manager during these meetings. Mortality and morbidity meetings were held but only operational managers were involved in these meetings. Some incidents were dissected and alternative solutions given for the prevention of similar mistakes in the future. However, there was an additional need for effective communication between casualty or weekend doctors and doctors working in the maternity section. Below are some comments made by the participants regarding the aspect of communication:

- *“Normally we discuss it [challenges/problems/incidents] with the clinical manager.”* (Participant 1).
- *“... if something happens like say overnight and stuff maybe it come from or something he [clinical manager] comes with the file and try to dissect [analyse the file and the incident that occurred] it ... us [what the staff did] ... also you know this and this and then maybe from obstetric side [say] we should have done 1, 2, 3 ... and we could have prevented that [the particular incident] and things like that we do ... there is a formal one [meeting] in the boardroom where it's a meeting with the clinical manager and we ... can talk about such an [incident/challenge] ... there is also a M and M [mortality and morbidity meeting].”* (Participant 5).
- *“... following your patients up and make sure you don't leave gaps, because tomorrow your boss or whatever the department they will see ... what happened and they will end up they will come to you and say what are you doing.”* (Participant 5).
[This comment related to the need for communication between weekend or casualty doctors and doctors working in the maternity section].

Effective communication is the backbone of any hospital as it ensures continuity in quality of care. Communication between doctors and nurses, the staff and management is essential to create a health infrastructure. Management is also part of the hospital's infrastructure.

- ***Management support for staff training needs***

Staff training, in this case training in neonatal resuscitation, is one of the hospital management's responsibilities.

Training was requested from management but denied due to the lack of financial resources. The participants felt that they needed to work most of the time in a certain area, but if problems arose in another area they were expected to be competent – although they did not feel competent – to deal with it. They agreed training in neonatal resuscitation would increase the competence of staff who felt (or knew) they lacked confidence in this area. They

argued it would improve the quality of care and particularly that of quality of neonatal resuscitation as the next verbatim quotes signify:

- “... when it comes to the doctors the training is not there really ... we’ve been filling up requests but we are not taken [enrolled for the course] ... always money ... money.” (Participant 1).
- “Because we’ve arranged courses they say there is no money.” (Participant 2).
- “... because of the size of the hospital we can’t we end up kind of having departments yet we are a district hospital you know and the ... the department [NDoH] expects us to work like a typical district hospital. You have to spend most of the time in a certain section ... and then when disaster strikes they want you to go there and be competent ... It should be having departments like we say it should be able to have somebody doing paediatric calls and then we will be sure that the quality of our babies will be good ... we should be having somebody in labour ward on call you know ... knowing exactly what they are doing.” (Participant 7).

It is important for management to create learning opportunities for staff to attend training. In order for staff to attend training there must be enough human resources and enough finances available.

- **Provision of human resources**

From the participants perspective there was a lack in the consistency of experienced staff. Staff shortages also had a direct impact on training because sometimes some staff members could not attend training courses or programmes because there was a shortage of staff and there were no replacement staff to take over their duties. The participants shared there was a need to have experienced staff on call 24-hours a day to ensure consistency in the quality of care. The perceptions of the participants were as follows:

- “... the baby is resused [resuscitated] by someone who is been like dealing with that specific department, resuscitating babies, or dealing with paediatrics ... the quality of resuscitation will be better that when its resused by doctors who, like tomorrow, he is working in casualty ... the other day [another day or time] he is in gynae [gynaecology] ... the other day he is in psych [psychiatry].” (Participant 5).
- “... they book also training courses for the nurses but the thing is they can’t go because they are short staffed. ... There must somebody who is on call here for 24 hours ... for that time period ... that person might be able to know what’s going on not a copy here and a doctor from casualty.” (Participant 2).

- *“Ideally someone working in peds [paediatrics] should do the rounds in labour ward ... anticipating a problem with a baby...”* (Participant 6).

It is the responsibility of management to ensure that there are enough staff resources and staff expertise as well as equipment to render quality care.

- ***Provision of equipment***

It came to light during the focus group interview that the equipment was either not available or maintained and services due to the lack of finances:

- *“... machines has [have] not been maintained ... they break down.”* (Participant 2).
- *“... they buy the CTGs [Cardiotocography] now they don't pay these people and those people can't come and maintain that ... the CTGs.”* (Participant 1).

For successful neonatal resuscitation to take place certain measures and infrastructures also have to be in place. Numerous factors influence the outcome of neonatal resuscitation and the mortality and morbidity rates. The challenges experienced by the participants of the focus group were related to staff challenges, equipment and stock, inadequate transport and organisational aspects (related to communication, management support for staff training needs, staff resources as well as equipment resources). To address these challenges experienced, one need to have a holistic (all inclusive) plan in place. For example, training in neonatal resuscitation is not nearly sufficient to decrease neonatal mortality. Other influencing factors, for example, the delay in transport, staff shortages and lack of equipment also contribute towards the success or failure of neonatal resuscitation.

Neonatal mortality is an indicator of the quality of care and therefore baseline data were needed to determine the existing situation of neonatal mortality in the district hospital. Related data were obtained from a data capturing sheet, documents and statistical records.

5.4 THE EXISTING SITUATION REGARDING NEONATAL MORTALITY IN THE DISTRICT HOSPITAL AS REFLECTED BY THE DATA CAPTURING SHEETS

In CYCLE 1 the second step (ACT) reflected the data collected. The objective for CYCLE 1 was to explore and describe the existing situation regarding neonatal resuscitation and its associated factors as well as neonatal mortality. The existing situation regarding neonatal

resuscitation were discussed from the perspectives of the nursing staff and the doctors (see section 5.2. and 5.3). The existing situation regarding neonatal mortality is reflected by the data capturing sheets.

The baseline data of neonatal mortality were collected by means of a data capturing sheet (see Chapter 4, section 4.8.1.3) for 2012 and 2013. Data were collected by the researcher in the neonatal intensive care unit (NICU) as well as in the labour ward, but no data were collected from the postnatal ward because they transfer babies in need of neonatal resuscitation to the NICU and therefore do not keep records of neonatal mortality.

The data were retrieved from documents and statistics made available by the operational managers of the NICU and the labour ward. The researcher gained permission to access records and documentation from the Department of Health of Gauteng as well as from the CEO and management of the selected district hospital (see Annexures C, D and E).

Data capturing sheets (see Annexure J) were used to collect data on neonatal mortality in the district hospital from 2012 to 2013 (see Figure 4.3, section 4.8.1) as baseline data for neonatal mortality. The sources and units of analysis used to obtain data included records and other documentation pertaining to neonatal mortality (statistics; neonatal mortality reports; reports from mortality and morbidity [M&M] meetings; records and documentation related to the number of admissions; numbers of life births and preterm births; numbers of transfers and discharges) and any other form of document or record related to the study topic.

Some of the data that needed to be recorded were not available and were subsequently not recorded. Therefore, only the available data were recorded on the data capturing sheets. For example, for some months the data were found to be incomplete (for example the number of preterm births or born before arrival deaths were not recorded). The researcher met with the statistician to finalise and refine the data capturing sheets to obtain information that would be of relevance to the study and would have statistical value.

The data capturing sheet for the NICU included the following information for the year 2012 to 2013:

- *the number of admissions*
- *number of discharges*
- *number of transfers to tertiary institutions*
- *total number of deaths.*

The following data were included in the data capturing sheet for the labour ward:

- *the number of deliveries*
- *number of life births*
- *number of preterm births*
- *born before arrival and born in transit*
- *born before arrival deaths*
- *neonatal mortality*

The first step task in CYCLE 1 step three (OBSERVE) was to analyse and reflect the obtained data on the current situation (2012 – 2013) on the data capturing sheet. The statistical data obtained from the documents in the study setting are presented and discussed next.

5.4.1 Statistics regarding neonatal mortality for labour ward and the NICU

The total number of admissions for the labour ward in 2012 was 5 363. In 2013 admissions increased with 76 to 5 487. The neonatal deaths as a percentage of the total admissions (5 363) for 2012 was 0.52 % and for 2013 (5 487) it was 0.33%, thus also showing a decline. The total number of deliveries for 2012 was 5 214 and for 2013 it was 5 349. The number of life births counted 5 057 in 2012 and 5 250 in 2013. The number of preterm births (recorded in labour ward) as a percentage of the admissions was 9.99% for 2012 and 10.73 % for 2013. The total number of deaths as a percentage of the total number of admissions in labour ward was 3.26% for 2012 and 2.93% for 2013.

From the records in the NICU the percentage of neonatal deaths related to the number of admissions in the NICU was 6.97% for 2012 and 6.19% 2013; therefore, a total of 90 neonatal deaths for 2012 and a total of 82 for 2013. The percentage of neonates transferred to other institutions were 1.47% in 2012 and 2.49% was transferred in 2013. Table 5.10 illustrates the neonatal mortality rate/1 000 live births in this district hospital for 2012 and 2013.

Table 5.10: Neonatal mortality rate/1 000 live births in the maternity section of this district hospital

YEAR	NEONATAL MORTALITY RATE/1000 LIVE BIRTHS IN THE DISTRICT HOSPITAL
2012 (February – December)	52/1 000 live births
2013 (January – December)	46/1 000 live births

The decline in mortality in 2013 may be attributed to various factors such as the availability of a paediatrician and machines like the Infant Flow SiPAP system and the Neopuff infant resuscitator in the district hospital. The SiPAP system is a method of non-invasive ventilation offering synchronised nasal intermittent positive pressure ventilation used for the management of respiratory support (Owen, Morley & Davis 2014:F24). The Neopuff is a “flow controlled pressure limited” infant resuscitator fitted with a T-piece to fit a neonatal mask and settings for maximum peak inspiratory pressure (PIP) and peak end expiratory pressure (PEEP). Breaths are delivered by occluding a T-piece. The PIP is pre-set and the PEEP can be adjusted to prevent damage to the fragile lungs of neonates (Hussey, Ryan & Murphy 2004:F490).

Although there was a decline in neonatal mortality from 2012 to 2013, the aim of this study was to reduce neonatal mortality related to avoidable and modifiable causes linked to neonatal resuscitation thus saving one neonate at a time by preventing unnecessary neonatal deaths. It was also important to determine the percentage of causes of neonatal deaths in the maternity section of this district hospital.

5.4.2 Causes of neonatal deaths

As part of the records on neonatal mortality the causes of neonatal deaths were also documented in the hospital records. These causes of neonatal death were document for each of the mortalities. This data were also captured and handed to the statistician to determine the percentage of neonatal deaths for each of the main causes of death such as prematurity, asphyxia and infection. However, two additional categories were added. The reason for adding two additional categories (prematurity and asphyxia, prematurity and infection) to the causes of deaths relates to the fact that some neonates died due to a combined cause: *prematurity and infection* or *prematurity and asphyxia*. In some cases it was difficult for the researcher and the statistician to determine whether, for example, the cause of death was prematurity or infection; therefore, two new categories were created.

The researcher analysed the data with the help of the statistician. Figures 5.12 below illustrate the causes of neonatal deaths in the maternity section of the district hospital.

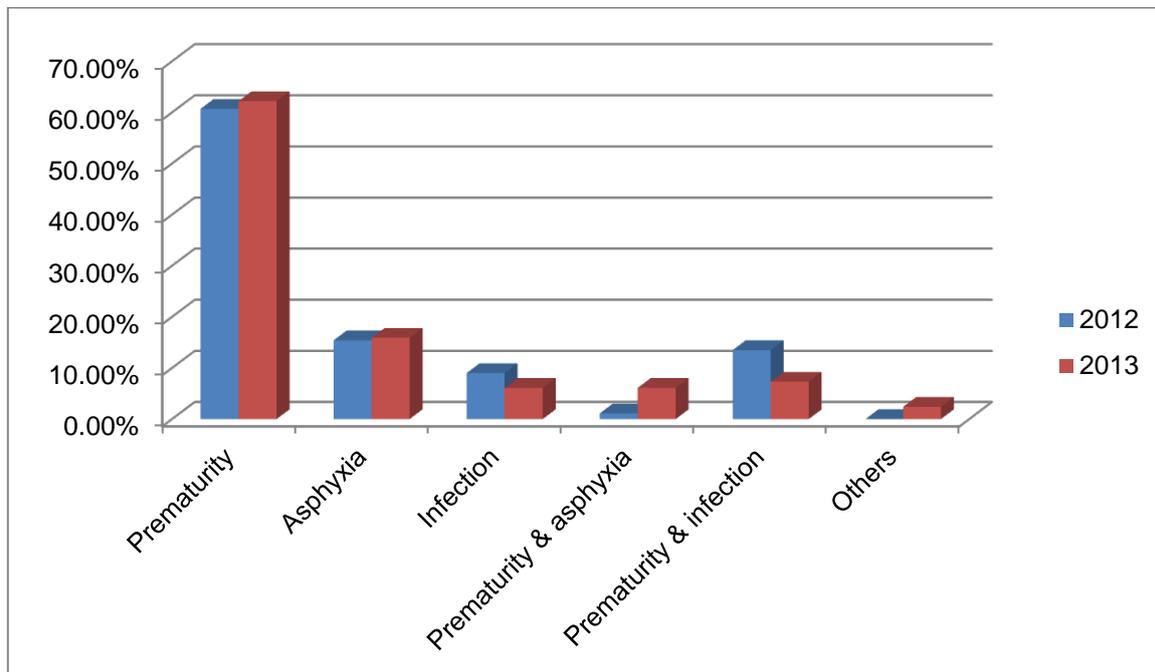


Figure 5.12: Bar chart of the percentage of deaths according to cause of death per year in the maternity section of this district hospital

As seen in Figure 5.12, prematurity was the highest cause of death (approximately 60%) followed by asphyxia and infection. Comparing the statistics of 2012 to that of 2013, neonatal morality related to infection decreased (9% to 6.1%) and there was a slight increase in mortality due to asphyxia (15.7 to 15.9%). Looking at Figures 5.12 it is obvious there was an increase in neonates who died due to *premature- as well as asphyxia-related* causes (1.1% to 6.1%) and a decrease in *premature as well as infection-related* causes (13.5% to 7.3%).

The main causes of deaths in this research setting correlate with the Saving Babies Reports and other district hospitals in South Africa. Prematurity is the number one cause of death followed by asphyxia and infection (Pattinson 2009:23-25; 2011:29-32; 2013:10).

The focus of this study was to formulate strategies to sustain a quality improvement initiative in neonatal resuscitation. Therefore, the findings from the baseline data from the questionnaire and the focus group were used to prioritise the challenges and reach consensus on the prioritisation of the strategies. This process, by means of a nominal group technique discussion will now be discussed.

5.5 CONSENSUS AND PRIORITISATION OF STRATEGIES TO BE IMPLEMENTED IN THE MATERNITY SECTION

In CYCLE 1 the fourth step consisted of REFLECTION (see Figure 5.1). As part of this reflection a nominal group technique (NGT) discussion was held with the stakeholders and staff from the district hospital to prioritise the challenges and issues experienced in the maternity section of the district hospital. Other methods of reflection on CYCLE 1 are discussed in section 5.6 but for now the focus is on the nominal group technique discussion.

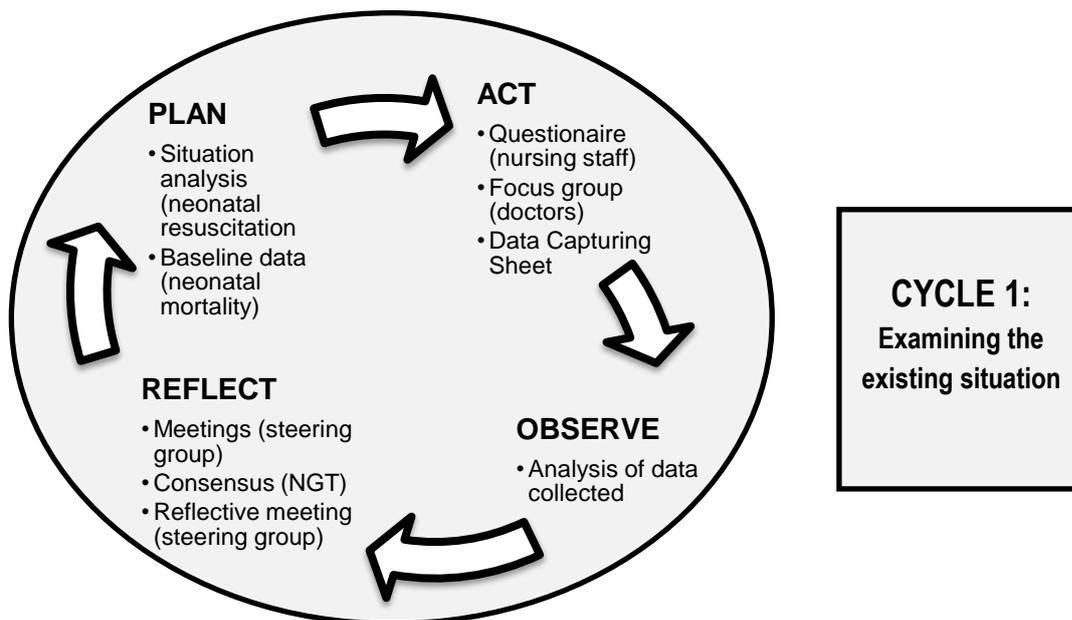


Figure 5.1: CYCLE 1- Examining the existing situation

5.5.1 Nominal group technique (NGT)

The nominal group technique discussion was based on the baseline data collected and the findings from the questionnaire, focus group and data capturing sheet; hence based on step one (PLAN), step two (ACT) and step three (OBSERVE) of CYCLE 1 (see Figure 5.1).

The nominal group technique discussion was developed by Delbecq and Van de Ven in 1968. Since then the nominal group technique has gained extensive acknowledgement and is currently widely applied in many health organisations. The nominal group technique is a group discussion during which a specific technique is used to reach consensus as a group as opposed to a single person using a technique to solve a problem or generate ideas (Delbecq et al. 1975:4, 7).

A 4-step process is followed during a nominal group technique discussion. This process prevents the dominance of certain participants and affords every member of the group the opportunity to participate. The nominal group technique discussion facilitates a group decision-making process when a multidisciplinary team with multiple perspectives needs to make decisions. Therefore, the views, ideas and contributions of a variety of people with different levels of training, knowledge, skills and talents can be used simultaneously. The outcome of a nominal group technique discussion is prioritised solutions (or also recommendations) which are representative of the whole group's preferences. Creative thinking and an increase in group productivity are facilitated thereby giving group members a feeling of empowerment because each of them feel they make a positive contribution towards bringing about change (Delbecq et al. 1975:9; Department of Health and Human Services CDC 2006:1; Dunham 1998:1-5; World Bank(c), Nominal group technique, 2007).

The nominal group technique discussion was chosen because of advantages such as its cost-effectiveness, time efficiency and easy implementation. The three most typical applications of a nominal group technique discussion is problem identification, the development of solutions, and establishing priorities (Potter et al. 2004:126). A nominal group technique discussion was therefore appropriate for doing research in this clinical environment because the aim of it was to establish priorities for the strategies and then to find solutions for the challenges that were experienced.

A nominal group technique discussion was held with the healthcare providers who met the inclusion criteria (see Chapter 1, section 1.10.3). They needed to work in the maternity section of the hospital and had to be passionate about neonates and neonatal resuscitation. It was important for senior and clinical leaders as well as staff from the three units to be present as being part of this nominal group technique discussion contributed towards ownership of the strategies. The 10 participants included the operational managers from the maternity section (labour ward, postnatal ward and NICU) the nursing services manager for the maternity section as well as the paediatrician, doctors and staff working in these sections; thus, representative of the whole population. The researcher facilitated the nominal group technique discussion as decided by the steering group. During the discussion challenges and issues that needed to be addressed by the strategies had to be prioritised and the discussion was based on the findings from the examination of the existing situation, namely, the data collected and analysed from the questionnaires and focus group.

Before conducting the nominal group technique discussion, the researcher had to prepare the meeting room, obtain supplies and prepare an opening statement. Delbecq et al. (1975:40-43) assert the participants must be welcomed in a warm manner and in the

opening statement the facilitator must emphasise that every participant and his or her contribution is important; their individual roles in the group must be clarified and the overall group objective discussed. The researcher made the arrangements for the meeting room and supplies since she would be facilitating the discussion. The researcher also handed out informed consent documents (see Annexure M) that were signed by the participants before the nominal group technique discussion began.

After the opening statement and welcoming the facilitator (the researcher as mentioned) gave a brief overview on how a nominal group technique (NGT) discussion works and the time limit that was set for the discussion. She explained and set the ground rules for the discussion to establish and ensure respectful group behaviour and cooperation. The ground rules for a nominal group technique discussion as set out by Delbecq et al. (1975:40-43) were explained:

- *the participants were asked to give their full participation as the success of this NGT depended on full and equal participation;*
- *the participants were made aware of the fact that all group members' opinions were important and that their ideas would form the basis of the strategies that were going to be implemented;*
- *They were also made aware of the overall aim of the NGT discussion. (The expected outcome for the NGT was to come up with prioritised solutions or recommendations for the challenges that were experienced in the maternity section of this hospital regarding neonatal resuscitation and its associated influencing factors).*
- *The participants were cautioned again that it was important for these solutions to be representative of the whole group's preferences.*

The aim of the nominal group technique discussion was to use the solutions and ideas generated by the group to come up with strategies to sustain a quality improvement initiative in neonatal resuscitation in this particular district hospital.

The key issues to consider included that the questions – which were the focus of the discussion – should be clear and stimulating in order for participants to make significant contributions (Potter et al. 2004:127-128). During this nominal group technique discussion the researcher made sure the key issues were addressed; she gave a brief background of the study and proceeded to discuss the findings of the situation analysis. The questions used were focused, simple, clear and incited a stimulating discussion.

Another key issue was the participants had to be representative of the profession because they were the ones with the power to implement the changes (Potter et al. 2004:127-128). This was adhered to as the nominal group technique discussion comprised of 10 senior and clinical leaders who worked in the maternity section of the hospital; they were all passionate about neonates and neonatal resuscitation and were representatives of the labour ward, postnatal ward as well as the NICU. The group consisted of the operational managers from each of these three units, the nursing services manager for the maternity section as well as the paediatrician, doctors and staff working in these sections

A further key issue mentioned by Potter et al. (2004:127-128) states the facilitator should be comfortable with the nominal group technique discussion in order to provide leadership. The researcher should have a clear understanding of the topic and the limitations of the nominal group technique discussion. In this case, the researcher was comfortable with conducting the nominal group technique discussion because she had done extensive reading on the topic.

Data collection should be supported by audiotape or a video recording (Potter et al. 2004:127-128). In this nominal group technique discussion the data were collected and supported by an audiotaped recording with the permission of the all the participants.

According to Potter et al. (2004:127-128) a nominal group technique discussion can be a time-consuming process. The participants were made aware of the time aspect and snacks and refreshments were provided. (The discussion lasted for 3 hours). Lastly, a nominal group technique discussion provides a lot of information but Potter et al. (2004:127-128) caution that just because consensus has been reached does not mean the correct answer has been found.

The results of the existing situation regarding neonatal resuscitation in the setting (as discussed earlier in this chapter in 5.2 and 5.3) were discussed with the 10 participants. Problems that were identified were the shortage of staff resources especially at night and over weekends; and the need for staff expertise because there was a loss of experienced staff thus resulting in a lack of expertise. The staff attitude was also identified as a problem. Staff attitude includes the staffs' behaviour and their feelings. The findings showed that the staff were feeling overwhelmed by the size of the hospital and the workload; they lacked confidence and felt demoralisation due to the fear of making mistakes. These staff issues had a direct impact on staff involvement in neonatal resuscitation.

Additionally, the need for formal and in-service training was identified by both the nursing staff and the doctors. Critical mistakes made during neonatal resuscitation were also

discussed. These mistakes, which had a negative impact on neonatal resuscitation, included aspects related to keeping open the neonates' airway, their breathing and circulation which are key aspects in neonatal resuscitation. Management of the equipment and stock lacked. Another big problem which directly impacted on neonatal mortality was the delay in transport for the transfer of critical ill neonates. Moreover, the ambulances were not equipped with the necessary and needed supplies or apparatus and some of the EMS personnel were incompetent as far as neonatal resuscitation was concerned. The culture and infrastructure of the organisation was also identified as problematic. Lastly, it was identified that protocols which impact on quality care needed to be revised, for example, the delayed patient transfer to the NICU. These problems had to be prioritised; after this prioritisation the 4-step process was followed.

The participants prioritised the problems in the following order (see Annexure R for the paper trail):

- *training*
- *lack of maintenance of equipment and stock*
- *staff attitude*
- *shortage of staff*
- *delay in transport*
- *protocols*
- *culture of the organisation.*

The group reached consensus on this priority list and decided that when the problems related to training, equipment, staff attitude, staff shortage, delay in transport and protocols had been successfully addressed, it might have a direct and positive influence on the infrastructure and culture of the organisation.

The 4-step process to be followed during the nominal group technique was discussed with the participants. The first step was to generate ideas. After they had been presented with the nominal question in written form and the researcher had also read it out aloud, the group members were requested to write down their ideas silently and independently in brief statements on post-it stickers. This facilitated adequate time for thinking and reflection and the participants benefited by remaining problem-orientated. Because they generated ideas silently, interruptions were avoided and status pressure from other group members was prevented (Delbecq et al. 1975:44). As instructed by these authors, the facilitator did not give or suggest answers to the question.

During the second step ideas forthcoming from the individual group members were recorded in a feedback session. The facilitator randomly collected the post-it stickers from the participants. The facilitator then randomly wrote all the ideas recorded by the participants on a flipchart visible to all. Every participant therefor had the opportunity to jot down ideas on their post-it stickers. This facilitated equal participation, depersonalisation, and increased group creativity. The written list served both as the minutes of the nominal group technique discussion and the working draft for later refinement. The goal of step 2 was to write down ideas on a flipchart in front of participants as quick as possible in brief phrases or statements. This list of ideas became the guide for further discussion (Delbecq et al. 1975:47). The researcher found that by doing it this way the participants had ownership and were empowered by being part of the solution.

The third step in the 4-step process was discussing the ideas written on the flipchart to determine each idea's clarity and level of importance. The benefits of discussing each idea are, according to Delbecq et al. (1975:52), avoidance of only focusing on a single idea; it provides opportunities for reasoning; ideas are clarified and, finally, discussing each idea eliminates any misunderstanding. During this phase it was important to balance the discussion to ensure that there was enough time to discuss all the ideas. During this part of the process the facilitator made sure the time was effectively managed because there was a lot to discuss.

The final step was to vote individually on the priority of each idea. Independent voting avoids influences and pressure from participants regarding status, personality and conformity. The participants were asked to select the five to seven most important items from the list of ideas and to rank these ideas according to priority from numbers one to five. The votes were recorded on the same flipchart (Delbecq et al. 1975:56-58).

Next, the preliminary ranking of the items according to the votes was discussed. This step (adding an additional step 5 to the original four steps) step can be added for the purpose of examining inconsistent voting patterns and providing an opportunity to discuss items which are perceived to have received too many of too few votes again. It is important to make it clear that this discussion is only for clarification purposes. This 3-step voting process of voting, discussion and re-voting offers an opportunity for more accurate findings (Delbecq et al. 1975:62-63). In this nominal group technique discussion re-voting had to take place most of the times after the discussion of the preliminary votes. These discussions were only for clarification purposes. Re-voting had to take place in some of the cases in order to reach consensus.

If step 5 is added then a sixth step follows which is the final voting. The final vote determines the outcome of the discussion and provides a conclusion and a sense of achievement and judgement from the group (Delbecq et al. 1975:63).

This process was followed with each of the problems starting with the highest priority one. Ideas for addressing challenges through strategies were generated during the nominal group technique discussion and validated through a literature control. This enhanced the validation of strategies before formulation and implementation thereof which took place as part of CYCLE 2. The problems addressed during the nominal group technique are discussed in order of priority.

5.5.1.1 Addressing the need for training in neonatal resuscitation

Firstly, the participants were asked to generate ideas on addressing the need for training at this district hospital. Ideas were generated and randomly recorded on 'n flipchart. The ideas included in-service training, workshops and formal training. It was suggested that drills where staff practise neonatal resuscitation on a mannequin would address training. Feedback on updates regarding neonatal resuscitation, supporting of new team members and mentoring of junior staff were also some of the ideas on how to address the need for training. The ideas were discussed for clarity and grouped together. A total of eight items were identified. The participants were asked to vote and prioritise the items from the most important to the least important. After consensus was reached these items were prioritised. The solutions suggested by the nominal group technique discussion to address the need for training are listed next (see Annexure R for the paper trail).

- *In-service training on neonatal resuscitation.*
- *Orientation of new staff regarding neonatal resuscitation.*
- *Mentoring and support of staff.*
- *Train-the-trainer.*
- *Mentoring and evaluation.*
- *Feedback and updates on new trends and guidelines in neonatal resuscitation.*
- *Drills (practising neonatal resuscitation on a mannequin).*
- *Staff orientation.*

Neonatal asphyxia is one of the leading causes of neonatal mortality and morbidity. Neonatal resuscitation is a well-known strategy which could decrease neonatal asphyxia. In order to resuscitate effectively healthcare workers should have the necessary knowledge and skills to

practice neonatal resuscitation. This could be acquired through neonatal resuscitation training. Without basic knowledge and the skill of neonatal resuscitation, mortality rates could increase (Gunay et al. 2013:477-478). The need for neonatal resuscitation training in the context of this research setting was identified. Given the high neonatal mortality rates in the setting it could aid in reducing the neonatal mortality, especially if due to asphyxia. A strategy addressing training in neonatal resuscitation was therefore the highest priority.

Simulation-based training has been implemented in the medical field to give trainees opportunities to practise their skills in realistic scenarios. Simulation-based training has many potential advantages which include improved clinical decision-making and skills, reductions in medical mistakes, improved confidence amongst staff, and in general improved teamwork (Surcouf et al. 2013:2). Part of the strategies would therefore include simulation-based training where staff is given an opportunity to practise neonatal resuscitation on a mannequin.

In a study done by Rovamo et al. (2013:465-470) the authors concluded that a one-day course in neonatal resuscitation training for staff working in a low risk delivery unit improved the resuscitation skills. They suggest regular and frequent hands-on training programmes and simulations are necessary to maintain adequate neonatal resuscitation skills. Therefore, one of the strategies addressing neonatal resuscitation training would be enforcing and support of training through train the trainer models and simulated practise drills on a mannequin.

According to Foster, Craven and Reid (2006:18-19), neonatal resuscitation is most of the times unpredictable and therefore anyone caring for a neonate should be able to resuscitate effectively. They assert training will increase the confidence and competence of the trainees regarding neonatal resuscitation. Foster et al. (2006) further identified an interactive approach and training small groups as a more effective training method. The strategy of implementing the Helping Babies Breathe (HBB) train the trainer model through small interactive groups might therefore be effective in improving the confidence and competence of the staff with regard to neonatal resuscitation. This would also aid towards achieving the vision and aim of the steering group who wanted all staff members working with neonates to be confident and competent in neonatal resuscitation. For successful neonatal resuscitation specific equipment and stock is needed.

5.5.1.2 Addressing the problems experienced with equipment and stock

The participants were asked to generate ideas on how problems with equipment and stock could be addressed. The forthcoming ideas included having a maintenance plan in place, in-service training on new equipment and, after the needs of staff were determined, the procurement of good quality equipment. Also following up on broken equipment and budgeting for repair and replacement of faulty equipment. After the discussion of each idea similar ideas were grouped together. Participants were asked to vote and this resulted in the prioritised solutions noted below (see Annexure R for the paper trail).

- *Determining the needs for the procurement of new equipment.*
- *In-service training of staff on operating and maintaining of equipment.*
- *Daily checking of equipment.*
- *Maintenance plan in place for maintenance of equipment.*
- *Give away stock that is not needed to wards which uses stock frequently to prevent unnecessary expiry of stock.*
- *Availability of backup stock.*

According to Nelson and Spector (2010:83), it is a well-known fact that neonatal resuscitation can prevent neonatal mortality but in order for healthcare workers to do so they need to have access to essential supplies needed for neonatal resuscitation. In a study they conducted on neonatal resuscitation capacity in Nepal, Nelson and Spector (2010) concluded the limited availability of resuscitation equipment may contribute to the high mortality rates, and the distribution of neonatal resuscitation equipment should be viewed as a critical priority. Certain essential equipment therefore contributes towards the prevention of complications and quality care with regard to neonatal resuscitation. The essential equipment they listed was based on the Essential Newborn Care Guidelines and included hand washing supplies, gloves, visible and posted resuscitation algorithms, a dedicated space for neonatal resuscitation, warming device, clean towels, suction, stethoscope, bag mask ventilation device, oxygen and some resuscitation medication such as adrenalin.

In the context of this study the lack of equipment and stock could also contribute towards neonatal mortality and therefore it was important to come up with a strategy which would address challenges regarding equipment and stock. Equipment and stock is part of the work environment. The lack of equipment and stock may also have a negative influence on staff attitude as it can cause staff to feel despondent. Staff attitude also play a role in the involvement of staff in neonatal resuscitation.

5.5.1.3 Addressing issues identified regarding staff attitude

Attitude seemed to be for some participants the highest priority, but consensus was reached among them and it was placed as the third priority. Ideas that were generated and recorded included the formulation of a task team to address attitude, customer care training and code of conduct. Adherence to the Batho Pele principles and encouraging teamwork as well as monthly climate meetings and feedback on how gaps can be identified were agreed among the participants as being crucial. Some ideas involved training to improve staff attitude because when knowledge and skills have been acquired, they would have increased confidence. Similar ideas were grouped together after the discussions and the participants voted. The prioritised solutions to address issues with staff attitude follow (see Annexure R for the paper trail).

- *A task team should be formulated to address issues regarding staff attitude.*
- *Improved communication.*
- *Customer care and code of conduct.*
- *Training.*
- *Debriefing sessions.*
- *Staff incentives.*
- *Staff allocation according to interest and skill.*

Effective communication and collaboration among staff are necessary to provide optimal care in neonatal intensive care (Brodsky et al. 2013:374). In a study done by Haworth and Crehan (2013:A71) relating to multidisciplinary newborn resuscitation training in Ethiopia, these authors concluded that in order to change the staffs' attitude towards neonatal resuscitation, it is vital to empower staff and trainers through training programmes. The authors add this can be achieved with minimum resources and equipment. Continuous quality improvement depends on setting standards, using evidence-based protocols as well as improving the attitudes of staff (Liljestrand 1999:880).

Ulrich, Lavandero, Woods and Early (2014:64-78) state evidence shows there is a relationship between a healthy work environment for nurses and patient outcomes. The authors assessed communication, collaboration, effective decision-making, appropriate staffing, recognition, leadership, the quality of patient care, physical and mental safety, moral distress and support for certification and continuing education as well as job satisfaction and career plans. This survey implied the work environment should be seen for what it is and opportunities should be created to improve on challenges experienced. According to Ulrich

et al. (2014:77-78), “opportunities for improvement require the commitment and true collaboration of organisations, nurse leaders and nurses who provide direct patient care.” They also indicate that “improvement begins with a realistic and holistic assessment that takes into account the culture of the employing organisation and/or work unit”.

In the context of this study staff attitude was identified as a priority with many factors influencing staff attitude, for example, teamwork, collaboration, work environment and communication. During training these factors can be addressed thus impacting on developing and enhancing the attitude of the staff. Staff attitude can also be negatively influenced by shortage of staff.

5.5.1.4 Addressing shortage of staff

Participants were asked to generate ideas on how shortage of staff could be addressed. Some of the ideas generated included using workload indicators for staffing needs, hiring staff with knowledge and meeting set requirements, and having a retention strategy as well as having of a budget each for the recruitment of staff and overtime. Other ideas included the placement of staff according to interest and skill and the utilisation of available staff effectively and maximally. The ideas were discussed and similar ideas were grouped together before voting took place. The prioritised solutions are set out below (see annexure R for the paper trail).

- *Utilisation of available staff.*
- *Placement according to skill and interest.*
- *Promotion of professional growth.*
- *Having a retention strategy.*
- *Budget each for recruitment of staff and overtime.*
- *Advertise to recruit.*
- *Hire staff.*
- *Incentives.*

Buchan and Aiken (2008:3262) found from the results of their study on solving nursing shortages the shortage of staff were multifaceted. According to their findings, staff shortage has an impact on quality care and patient outcomes in the hospital context. They highlight the main causes of staff shortage as the following: inadequate workforce planning and allocation, under supply of new staff, poor recruitment and retention, and the ineffective use of available nursing staff due to inappropriate skill mix and underutilisation. Furthermore, the

lack of incentive structures and career support also contributed towards shortages of staff. When looking at the above mentioned causes, the ideas generated by the nominal group technique discussion to address staff shortages were in line with these causes and could serve as possible solutions to the problem.

According to Archibald (2006:176), it is important to understand the job satisfaction of nurses in the NICUs; therefore, it is important to identify the factors contributing to their job satisfaction as this have direct implications for staff retention. She indicates that literature has shown that job satisfaction for nurses are influenced by staffing levels, inclusion in decision-making processes, respect by management, career opportunities, salaries and benefits as well as working conditions. She concludes that the knowledge of nurses' job satisfaction can provide workable frameworks for improvement of working conditions. This would therefore also have a direct influence on staff retention.

In the context of this study addressing issues regarding training, equipment and stock, staff attitude, staff shortages and so forth one would also address issues related to the work environment. If the work environment is improved it may have a positive effect on staff retention.

5.5.1.5. Addressing problems experienced with transport

Transport was viewed as more important by the participants working in the NICU as they were dealing directly with the transferral of critically ill neonates to other institutions. However, all participants came up with ideas on how to address problems regarding transport. The following solutions were prioritised (see Annexure R for the paper trail).

- *Establishment of a task team to address problems with transport.*
- *EMS/ambulance available for maternity and neonatal cases.*
- *Inform, follow up and improve communication.*
- *Having qualified EMS staff and well equipped ambulances available.*
- *Keeping statistics on neonatal mortality associated with delayed transport.*

Effective neonatal transport is crucial when the provision of effective neonatal care means a seriously ill neonate has to be transported to other facilities. Clinical deterioration and a loss of stability are always risks during transfer; thus, the transfer of sick neonates is related to higher neonatal mortality and for this reason the transport of neonatal patients requires trained staff and functioning, appropriate equipment (Goldsmid et al. 2012:304; 308)

In the context of this study it was important to address transport as one of the strategies as many challenges related to the transfer of neonates were identified. The effective transport of neonates to tertiary facilities can therefore have a direct impact on neonatal mortality. Having updated protocols regarding neonatal resuscitation may also have an impact on neonatal mortality and influence quality care.

5.5.1.6 Addressing protocols regarding neonatal resuscitation to benefit quality care

The participants were asked to generate ideas on how the hospital protocol could be changed to benefit quality care. Ideas were generated and recorded and consensus was reached on the prioritised solutions as listed (see Annexure R for the paper trail).

- *Establish a task team for formulation of protocols.*
- *Create an awareness of protocols.*
- *Protocols must be user-friendly.*

All of the prioritised solutions were used as the basis for the strategies that were developed in CYCLE 2. This process is presented and discussed in Chapter 6.

5.6 REFLECTION DURING CYCLE 1

Reflection during CYCLE 1 was done in the form of meetings held with the steering group. The minutes of the steering group meetings served as a paper trail for what had been discussed. At the end of CYCLE 1 a reflective meeting was held with the steering group. This group had the opportunity to write in their reflective journals.

5.6.1 Minutes of the meetings

Regular meetings were held between the researcher and the steering group members on a monthly basis (depending on the availability of group members). These meetings were held to reflect on and discuss what had been done and what still needed to be done in order for the research process to move forward. The minutes of these meetings served as a document trail of what had been done.

5.6.2 Reflective meetings

The researcher facilitated a meeting with the steering group and stakeholders. Feedback on the findings from the nurses' questionnaires, the focus group interview held with the doctors and the results of data capturing sheets were given, discussed and reflected upon. The researcher facilitated the meeting and asked the following three questions at the end of this reflective meeting.

- *What was your experience?*
- *What did the group learn – what worked and what did not work?*
- *What can be changed or done differently?*

Overall, the general impression relayed from the steering group was very positive. They were pleased about the initiation of this research study. They felt completing questionnaires and having a focus group created an acute awareness among all staff of neonatal resuscitation and the challenges experienced regarding its associated or influencing factors such as the lack of competent, knowledgeable and skilled staff and the dire need for equipment and the maintenance thereof.

The group learned about research and data collection methods. They indicated that some of the respondents experienced the questionnaire as complicated and that the researcher should consider simplifying it before collecting data in CYCLE 3. The researcher explained that the questionnaire was already simplified and that it was important to cover all the aspects related to the influencing factors and the practice of neonatal resuscitation in order to obtain sufficient baseline data. The questionnaire was also based on the NHS Sustainability Model and these aspects also had to be addressed in the questionnaire. Besides the questionnaire they group did not feel that anything should be changed or done differently.

5.6.3 Reflective journals

As previously mentioned part of reflection was for the researcher and the steering group to keep reflective journals. Journals were handed out to the steering group members. Guidelines on keeping journals and the advantages and disadvantages of keeping reflective journals were discussed with the steering group (see Chapter 4, section 4.9.3). The steering group members were reminded on a regular basis to make use of the reflective journals.

Unfortunately, these reminders did not have any effect. At the end of this study the steering group members only submitted a few reflective notes on the study as a whole.

The researcher's reflections on CYCLE 1 indicated there was an overload of patients in this district hospital and the healthcare providers working in the maternity section encountered many challenges which they had to deal with on a daily basis. These challenges caused staff members to feel despondent and negative towards their work environment. The challenges they were experiencing were discussed in detail in this chapter. Conversely, there were some staff members who were motivated to improve the quality of care to counteract the high neonatal mortality rates. The challenge was to keep these members motivated and to motivate others to join them in this huge task.

5.7 CONCLUSION

The aim of CYCLE 1 was to examine the existing situation regarding neonatal resuscitation. Data were collected to examine the existing situation regarding neonatal resuscitation from the perception of the nurses and the doctors. The findings of the data that were analysed were discussed in this chapter. Data capturing sheets were completed to serve as a baseline for neonatal mortality. The results from the existing situation were used as a basis for the nominal group technique discussion. The findings of the nominal group technique discussion were also discussed. This chapter concluded with the part on reflection. In the next chapter the formulation and implementation of the strategies are discussed.

CHAPTER 6: CYCLE 2 – FORMULATION AND IMPLEMENTATION OF STRATEGIES TO SUSTAIN A QUALITY IMPROVEMENT INITIATIVE IN NEONATAL RESUSCITATION

6.1 INTRODUCTION

In the previous chapter the existing situation in the maternity section of the district hospital was discussed as well as the findings from the nominal group technique (NGT) discussion. These findings were used as the baseline to develop the strategies (see Chapter 5, section 5.5). The development of the strategies to sustain a quality improvement initiative in neonatal resuscitation as well as the implementation thereof is now discussed. Chapter 6 ends with reflections on this second cycle of the research process.

The aim of CYCLE 2 was to answer the following research question: *“What strategies can be implemented to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng?”* See Figure 6.1 below for the outline of CYCLE 2.

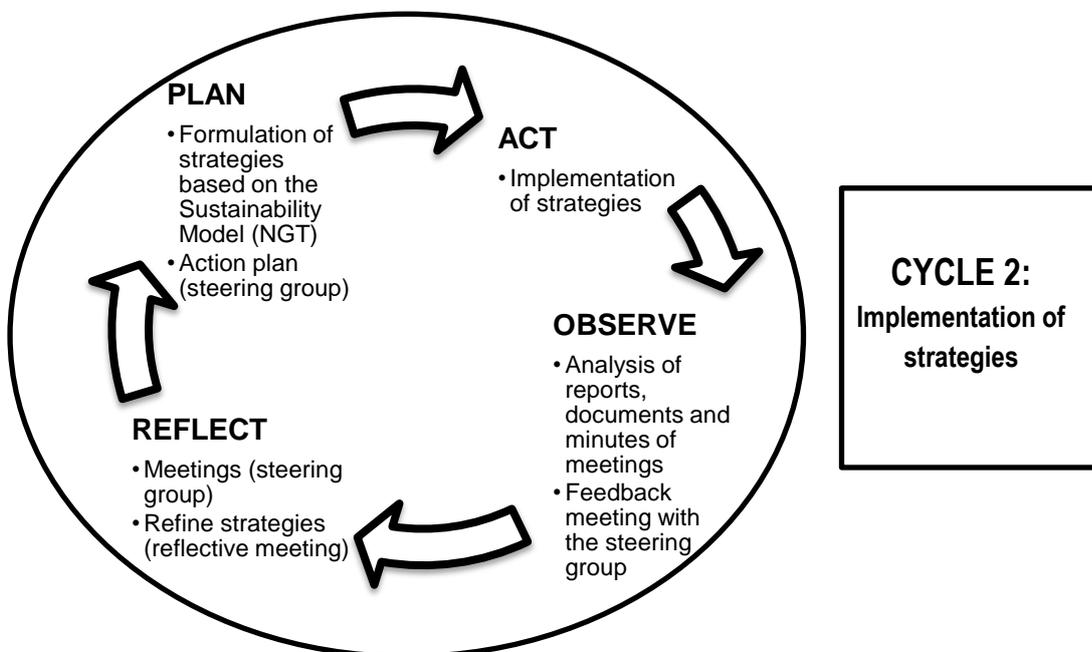


Figure 6.1: CYCLE 2 - Implementation of strategies

During the first step (PLAN) in CYCLE 2 strategies were formulated based on the findings from CYCLE 1 (Chapter 5), consensus on the formulation and prioritisation of strategies was reached by means of the nominal group technique discussion and a literature control was done. This chapter deals with the second step (ACT) of CYCLE 2 which concerns the implementation of the formulated strategies according to the action plan developed by the steering group as indicated in Table 6.1.

During the third step (OBSERVE) in CYCLE 2 the researcher originally intended to use the records, documents and minutes of the meetings for the analysis, but the documentation related to the implementation of strategies were not sufficient and the researcher had to rely on the reflections of the steering group and their feedback on the implementation of strategies. For the fourth step (REFLECT) in CYCLE 2 a reflective meeting was held with the steering group members on the implementation of the strategies and refinement of the strategies. Feedback and reflective meetings were continuously held to monitor the implementation progress and to further refine the strategies. Following is a discussion with regard to the realisation of CYCLE 2.

6.2 FORMULATION OF STRATEGIES TO SUSTAIN A QUALITY IMPROVEMENT INITIATIVE IN NEONATAL RESUSCITATION

To implement change in the maternity section of the district hospital, strategies to sustain a quality improvement initiative in neonatal resuscitation were formulated by the steering group. Chapter 5 dealt with establishing the current factors affecting neonatal resuscitation and neonatal mortality in the district hospital and then developing prioritised strategies to be implemented and monitored in an effort to improve the present situation. The strategies were based on the findings of CYCLE 1, the consensus reached during the nominal group technique discussion and a literature control. It was based on factors of the Sustainability Model as a theoretical framework (see Chapter 3, section 3.3.4 for the discussion of the model). The strategies addressed the practice of neonatal resuscitation, the process, staff and organisation.

After the formulation of strategies for a quality improvement initiative in neonatal resuscitation the strategies had been refined, the steering group had to decide on an action plan of when, where, how and by whom the strategies would be implemented. Furthermore, they had to decide on how often meetings would take place. The purpose of these meetings was to give feedback and reflect on what had been done and what still needed to be done.

They also had to decide on the format of recordkeeping of the implementation of the quality improvement initiative. The researcher acted as the facilitator in this process.

According to the consensus reached in the nominal group technique discussion, training in neonatal resuscitation was identified as the first and most significant priority. Training was followed by equipment and stock, staff attitude, the shortage of staff, transport and protocols. These six strategies were based on aspects of the NHS Sustainability Model and are thoroughly discussed below. (See Annexure P for the complete strategy document).

6.2.1 Strategies to address neonatal resuscitation training

To address training in the maternity section of the district hospital the three strategies developed by the steering group based on the results of the nominal group technique discussion related to creating neonatal resuscitation training opportunities, the placement and orientation of staff, and enforcing and support for training in neonatal resuscitation.

6.2.1.1 Creating neonatal resuscitation training opportunities

Training in neonatal resuscitation for the existing as well as any new staff was pivotal. Being knowledgeable and having the skill to do neonatal resuscitation would enhance healthcare workers' self-confidence and competence: having confidence in one's ability leads to feeling competent and vice versa. Thus, creating training opportunities for all the staff involved in the maternity section on the resuscitation of neonates would promote their neonatal caretaking skills which in turn would lead to a reduction in the neonatal mortality and morbidity rates.

Suggestions for creating training opportunities were in-service training, workshops and on-the-spot teaching. The workshops included training-the-trainer programmes such as the Helping Babies Breathe (HBB) programme, and attending Perinatal Problem Identification Program (PIPP) meetings where they can identify needs for training according to problems or challenges experienced. The HBB train-the-trainer programme and neonatal resuscitation training would be facilitated by the researcher. Other workshops would be organised by the management of the hospital and on-the-spot teaching would take place in each of the units.

6.2.1.2 Placement and orientation of staff

Placement and orientation of staff were identified as a necessity to address challenges experienced regarding neonatal resuscitation training – it especially related to keeping staff motivated and informed regarding existing and new guidelines. Staff members that needed additional training should be given the opportunity to attend training sessions.

It was considered as important to place staff according to their interests and specialities. Once new staff members had been placed they should be orientated by the operational managers or senior leaders regarding the neonatal resuscitation guidelines and protocols.

6.2.1.3 Enforcement and support for training in neonatal resuscitation

Enforcement and support for training was considered important with regard to the empowerment of staff and to establish motivation and confidence. Progress and development of staff members on their training in neonatal resuscitation also had to be acknowledged.

Suggestions for enforcement of training included refresher training sessions and weekly simulation practise with the mannequin to enhance healthcare workers' knowledge and skills on neonatal resuscitation by, for example, practising bag mask ventilation. A mannequin was available in each of the units and neonatal resuscitation practising could be done on a regular basis. These practise sessions would be facilitated and managed by HBB trainers and the operational managers in each of the units. All the healthcare providers working in these units would have the opportunity to practise neonatal resuscitation skills on these mannequins. The ideal would be to do these practise drills on a weekly basis. Furthermore, records should be kept to indicate which staff members practised on the mannequin.

The implementation of a mentoring and support programme was identified; support was provided through monitoring, evaluation and feedback and gaps identified were addressed.

6.2.2 Strategies to address the challenges with stock and equipment

To address the challenges regarding stock and equipment in the maternity section of the district hospital the five strategies developed (by the steering group based on the results of the nominal group technique discussion) were related to a needs assessment for equipment and the procurement of equipment, in-service training of staff on the use of new equipment,

equipment control, a maintenance plan for equipment, and stock control. The operational managers would be responsible for overseeing that these strategies were implemented.

6.2.2.1 Needs assessment regarding equipment and procurement of equipment

The needs of the staff and the units should be taken into consideration by the procurement department and management of the hospital before procuring equipment. The staff knows which equipment are needed because they work in the setting every day and knows the needs of the maternity section. The needs pertaining to equipment should therefore be discussed during ward meetings and a priority list should be compiled based on these needs assessments. The needs assessment should include which equipment is needed most and the priority thereof. For example, emergency equipment would be more important than equipment not associated with emergencies. The needs assessment should also include which equipment should be repaired and serviced first.

Service delivery should be improved and there should be a budget in place for the procurement of new equipment. It was suggested that good quality equipment that would last longer and produce good results should be purchased.

The purchase and repair of equipment should be prioritised according to the needs of the maternity section and its three units. There should be a budget for procurement and servicing of equipment. Quotes from different companies should be evaluated to determine what the best are. This process should be driven by hospital management.

6.2.2.2 In-service training of staff on use of equipment

Staff should receive in-service training on the use and maintenance of equipment to get the best results from the equipment, to prevent damage to equipment, and to provide quality care to patients. These in-service training opportunities should be created and managed by the operational managers and the service providers, when new equipment is delivered. Newly appointed staff should be trained by their peers on the use of equipment as part of their orientation.

6.2.2.3 Equipment control

Equipment control (for example, using an inventory and movement/borrowing book) was identified as important to indicate when and if new equipment should be replenished, keep

track of movement of equipment and available equipment, and to control loss of equipment. Daily checks of emergency equipment should be done to be prepared for emergencies. These daily checks also needed to include the resuscitation boxes containing emergency equipment and the stock needed for neonatal resuscitation. For the equipment control checks done on a weekly basis a checklist was needed. Nursing staff working in each of the units would be responsible for equipment control and, finally, operational managers would oversee the equipment control procedure to ensure its proper implementation.

6.2.2.4 Maintenance plan for servicing of equipment

Maintenance plans should be in place in to ensure that equipment will be in a good working order and condition. For example, a maintenance plan for equipment would keep track of the intervals when equipment should be serviced. Another purpose for having maintenance plans would be to identify when to replace and write off irreparable equipment. Each unit should have a maintenance request book, repair book and a condemning book for broken irreplaceable equipment. All staff members would be responsible for keeping these books updated, and implementation must be overseen by the operational managers. These books must be reviewed by management and the operational managers every three months to ensure continuity.

6.2.2.5 Stock control

A needs assessment should be done by the operational managers and the need for stock should be prioritised. Stock control is important to have enough stock available (minimum and maximum levels) and to prevent wastage, and be aware of expired or redundant stock. This should be done one a weekly basis by the pharmacy to ensure continuity and availability of stock.

Back-up stock should be available if units run out of stock. Units should also give away old stock before it expires. VA2 forms should be written to the supplier, for example, the pharmacy to redistribute medication before it expires.

6.2.3 Strategies to address staff attitude

To address staff attitude in the maternity section of the district hospital the three strategies developed by the steering group (based on the results of the nominal group technique

discussion) related to the establishment of a task team to address staff attitude, staff support regarding communication, training and emotional support systems as well as professional conduct.

6.2.3.1 Task team to address staff attitude

The hospital management would be responsible for establishing a task team with the goal to address the attitude of staff towards patients, the work and among themselves as colleagues. The staff should be assisted to deal with patients in a humane manner. By addressing their attitude the confidence of staff in their own abilities would be improved and enhanced. Teaching the Batho Pele principles (guidelines related patient rights) and ensuring that staff implemented these principles would achieve this.

The eight Batho Pele principles include consultation; service standards; access; courtesy; information; openness and transparency; redress, and value for money (Department of Public Service and Administration 1997). The National Patient Rights Charter (PRC) should also be adhered to. The PRC includes the following patient rights: a healthy and safe environment; participation in decision-making; access to healthcare; knowledge of health insurance; choice of health services; being treated by a named healthcare provider; confidentiality and privacy; informed consent; refusal of treatment; a second opinion; continuity of care, and complaints about health services (Health Profession Council of South Africa 2008).

Customer care training and patient satisfaction feedback could contribute towards increasing staff confidence. Customer care training is done by the customer care department of the hospital on a regular basis. Identifying the employee of the month and providing recognition through a certificate or incentive may further enhance confidence and positive attitudes. The management of the hospital in collaboration with the operational managers of the units should come up with a system and criteria to be implemented for the acknowledgement of staff.

6.2.3.2 Staff support

To enhance positive staff attitude the maternity staff needed to feel they were supported by the hospital management and operational managers. Such support from these two bodies would include communication, training, and having support systems in place, such as debriefing session, teambuilding and mentoring programmes.

- **Communication**

Communication was identified as important during the nominal group technique discussion. Effective communication between the management and the staff is essential in addressing issues of concern and problems encountered by the workforce on a daily basis. Staff should feel that they are supported by management and operational managers when challenges experienced and problems identified are discussed. If the staff feel their concerns communicated to management is heard it would help to facilitate more positive attitudes among them; the staff members would feel they are not alone and issues of concerns are addressed. Sufficient communication between staff members and management are therefore essential and all mechanisms of communication should be used. Suggestions included having a communication book each of the units, ward meetings, memos and circulars. Regular climate meetings should be held for staff to get to know their colleagues, promote teamwork and to motivate staff to meet the objectives of the unit and maternity department. Feedback should be given on progress made regarding the identified issues of concern and gaps in communication should be identified and addressed.

- **Training**

Hospital management should support staff in their training needs. If staff are given training opportunities and recognition for training (for example, attending workshops, in-service training and conferences as discussed in section 6.2.1.1.), their acquisition of knowledge and skills would contribute towards a positive attitude. Furthermore, the expectation was that training would motivate staff, promote the empowerment of staff, and enhance the confidence of staff in their nursing care abilities.

- **Emotional support systems for staff**

Support systems for staff should be in place in the form of debriefing sessions, mentoring and coaching, and teambuilding and teamwork. Management should assist the operational managers in establishing these support systems.

Debriefing sessions is expected to offer emotional support to staff when the latter can reflect on past mistakes and find ways to prevent the same mistakes in the future, learn coping mechanisms, and learn to create an environment conducive to positive thinking and happiness. A psychologist should be involved after traumatising incidents or neonatal

deaths. Debriefing sessions can be held by senior or clinical leaders and even the operational managers with the assistance of a psychologist if needed. These debriefing sessions should ideally take place after an unsuccessful neonatal resuscitation. Staff members that were present or affected by a failed resuscitation should be invited to attend the debriefing sessions.

Mentoring and coaching of junior staff by senior staff would contribute to positive attitudes and create opportunities where junior staff would not fear to ask questions and learn from their senior colleagues. Senior leaders should therefore be motivated to share their knowledge and skills with junior staff. This would contribute to the sustainability of knowledge and skills. It would also have a positive effect on team spirit and positive enhancement of the work environment.

Teambuilding and team work should be facilitated and managed by the operational managers in each of the units. Teambuilding and team work are expected to enhance the attitude of staff and facilitate the loyalty and a sense of belonging. It is expected that having teambuilding sessions would motivate staff to give their best and render quality care to patients in a positive way. Furthermore, it would also contribute to a positive work environment.

6.2.3.3 Professional conduct

The code of conduct should be the way of doing things to promote professionalism. Staff should adhere to the Batho Pele Principles and the PRC to ensure that customer care is satisfactory as well as to evaluate whether quality care is given to patients. Furthermore, staff must adhere to the code of conduct of the South African Nursing Council (SANC). This code of conduct should be enforced by hospital management and operational managers.

6.2.4 Strategies to address shortage of staff

To address the staff shortage in the maternity section of the district hospital four strategies were developed by the steering group based on the results of the nominal group technique discussion, namely, ensuring the optimal functioning of the available staff, having a retention strategy, having a budget for staff, and the recruitment of staff.

6.2.4.1 Ensure optimal functioning of available staff

The optimal functioning of the available staff should be in place to render quality care and to cover the ward in terms of patient care and nurse to patient ratio. Therefore, the staff should be utilised effectively and optimally through delegation, times for being off duty and leave plans. An overtime system should be introduced to cover the shortage of staff. Staff should also be placed according to interest and skill to keep them motivated and satisfied. This should be facilitated by management.

6.2.4.2 Retention strategy for staff that wants to resign

A retention plan or strategy should be in place to prevent the high staff turnover. The hospital management and operational managers should come up with a retention strategy that fit the culture of the hospital. Exit interviews on a one-on-one basis should be held to establish and understand the reasons why staff members resign. A retention strategy would also contribute towards attaining the trained staff members and developing loyalty. This should be enhanced by incentives and rewards for committed staff and be determined by performance management. The hospital management and operational managers should come up with criteria for the incentives and rewards. If the staff members are supported through training and development, it might increase their loyalty and motivations and enhance staff retention.

6.2.4.3 Budget for recruitment of staff and overtime

There should be a budget for permanent and temporary posts as well as overtime and incentives in place for appointing staff according to the needs of the maternity section. This would contribute towards decreasing the staff shortage as more staff would improve the continuity of care.

6.2.4.4 Recruitment of new staff

The recruitment of staff should augment rendering quality care. More staff would also motivate and boost staff morale. Vacant posts should be advertised and filled with staff that has the required qualification and can add to the knowledge and skills pool of the unit. Headhunting should be considered. The recruitment process should be faster. A needs assessment for recruitment of staff should therefore be done by the operational managers according to the workload indicators. This needs assessment should be done every quarter.

6.2.5 Strategies to address transport

To address transport for the transfer of patients to and from other institutions the three strategies developed by the steering group based on the results of the nominal group technique discussion related to the establishment of a task team to address concerns regarding transport, the availability of suitably equipped transport and competent EMS staff, and communication regarding transport.

6.2.5.1 Task team to address concerns regarding transport

A task team consisting of the district hospital management and the emergency services (EMS) management should be drawn up. The task team should address issues and challenges relating to emergency services and the provision of transport for neonatal patients to other facilities. Meetings between the management of the district hospital and the EMS should be held to address these issues and challenges. The goal of the task team should be to decrease neonatal mortality due to the challenges currently experienced with the transfer of patients to other facilities.

6.2.5.2 Availability of equipped transport and competent EMS staff

The EMS team should be able to render quality and adequate care to the patient being transferred and in accordance to the patient's needs. Therefore, sufficient and fully functional equipment and competent EMS staff should be available to ensure the safe transfer of patients. An ambulance or alternative vehicle (equipped with the necessary material and competent staff on board) should be available for and dedicated to the transport of maternal and neonatal emergencies.

6.2.5.3 Communication regarding transport

Communication between the referring hospital and the EMS services regarding transport and the transfer of patients should be improved. This can be achieved through having an 'Arrangement of transport' checklist on which all the necessary requirements are stipulated when telephoning to request a patient transfer. Regular follow-ups, record keeping and statistical reporting should be done. The EMS should improve their response time and incident reports should be written when a neonate dies due to challenges experienced that

relate to transfer by EMS services, for example, if a neonate dies while waiting for an ambulance to arrive.

6.2.6 Strategies to address protocols regarding neonatal resuscitation

To address protocols regarding neonatal resuscitation in the maternity section of the district hospital the two strategies developed pertained to the establishment of a task team to address protocols and having an awareness of protocols.

6.2.6.1 Task team to address protocols regarding neonatal resuscitation

A task team to address protocols regarding neonatal resuscitation in the maternity section of the district hospital should be established. They should review evidence-based practice regarding neonatal resuscitation and also ensure that the protocols (guidelines) were utilised and the objectives were met. This should be done to improve quality of care. The protocols should be easy to understand and should be referenced. Protocols should be revised and updated continuously by the operational managers in collaboration with the paediatrician. The adherence to implementation of protocols and audits should be monitored. Protocols regarding neonatal resuscitation should be comprehensive, transparent and user-friendly. Flowcharts should be visible in the neonatal resuscitation areas.

6.2.6.2 Awareness of protocols

Protocols and flowcharts should be visible in the neonatal resuscitation areas. Staff should be asked to read and sign that they understood the protocols. Staff should be reminded of these protocols on a regular basis to ensure continuous awareness thereof. This could be done by means of protocol discussion or displaying the protocols on the message board.

6.3 THE IMPLEMENTATION OF STRATEGIES

During the second step (ACT) in CYCLE 2 the strategies were implemented according to the action plan decided upon by the steering group. The steering group decided that the operational managers would be responsible for the implementation of the strategies associated with their units.

The strategies involving decisions that needed to be made by management, for example, the budget and appointment of staff, procurement of equipment as well as the challenges experienced with transport would be implemented by the hospital management, nursing services manager and all the other role players involved in these decisions. The steering group would also involve the doctors and nursing staff and, when appropriate, other departments such as procurement, maintenance, pharmacy, human resources, finances, EMS services and suppliers of emergency equipment and stock.

The strategies that were implemented were based on the challenges identified and prioritised during the nominal group technique discussion (see Chapter 5, section 5.5) and were related to training in neonatal resuscitation, equipment and stock, staff attitude, shortage of staff, transport for transfer of patients, and protocols.

The implementation of these strategies was no easy task; it depended on a lot of role players and different departments and their workload and priorities. To enhance the sustainability of the strategies it was important to follow up on the implementation thereof. A meeting was held with the operational managers during which they gave feedback regarding the implementation of strategies. This meeting was held approximately three months after the implementation of the strategies was initiated. In Table 6.1 the strategy, implementation as well as the feedback, monitoring and evaluation aspects are summarised.

Table 6.1: Summary of strategies implemented, feedback of implementation and monitoring and evaluation of strategies

STRATEGY	IMPLEMENTATION OF STRATEGIES	FEEDBACK ON IMPLEMENTATION OF STRATEGIES	MONITORING AND EVALUATION
1. STRATEGIES IMPLEMENTED REGARDING TRAINING			
1.1 Creating resuscitation training opportunities	<ul style="list-style-type: none"> ○ In service training ○ Workshops ○ On-the-spot teaching ○ Train-the-trainer HBB ○ PPIP meetings 	<ul style="list-style-type: none"> ○ Implemented by a private company. Training was on neonatal resuscitation and some of the nursing staff was able to attend. ○ Workshops on neonatal resuscitation and KMC ○ On the spot teaching is taking place ○ HBB programme has been implemented in all the units (facilitated by the researcher) ○ PPIP attended by operational managers 	<ul style="list-style-type: none"> ○ Employee performance ○ Attendance register ○ Reduction in mortality and morbidity
1.2 Placement and orientation of staff	<ul style="list-style-type: none"> ○ Placement according to need and speciality ○ Orientation of new staff 	<ul style="list-style-type: none"> ○ Staff placement according to need and speciality but not according to where they are interested to work ○ New staff is orientated regarding resuscitation guidelines 	<ul style="list-style-type: none"> ○ Performance management ○ In-service training
1.3 Enforcement and support for training of staff in neonatal resuscitation	<ul style="list-style-type: none"> ○ Training ○ Simulation on mannequins ○ Mentoring, support, monitoring and evaluation 	<ul style="list-style-type: none"> ○ Training received on neonatal resuscitation (HBB) ○ All three units received mannequins to practise neonatal resuscitation in simulation ○ Still a lack of mentoring, support and evaluation 	<ul style="list-style-type: none"> ○ Performance management

STRATEGY	IMPLEMENTATION OF STRATEGIES	FEEDBACK ON IMPLEMENTATION OF STRATEGIES	MONITORING AND EVALUATION
2. STRATEGIES IMPLEMENTED REGARDING EQUIPMENT AND STOCK			
2.1 Needs assessment regarding equipment and procurement of equipment	<ul style="list-style-type: none"> ○ Consult with staff to prioritise purchase and repair of equipment (needs assessment and equipment priority list) ○ Procurement of good quality equipment ○ Budget for procurement of new equipment ○ Evaluation of quotes for best equipment from different companies 	<ul style="list-style-type: none"> ○ Management consulted with staff regarding their needs for equipment. Limited involvement of staff in the priority list, but the priority list was compiled ○ Procurement of good quality equipment a challenge due to the government tender system ○ Challenges are experienced regarding the budget due to the big need for equipment throughout the hospital ○ Quotes for the best equipment cannot be done due to the government tender system 	<ul style="list-style-type: none"> ○ Minutes of equipment and budget meetings ○ Operational managers should follow up with procurement ○ List of procured equipment should be available. ○ Check list for availability of equipment
2.2 In-service training of staff on use of equipment	<ul style="list-style-type: none"> ○ In-service training on the use and maintenance of equipment ○ Training and development 	<ul style="list-style-type: none"> ○ Nursing staff received in-service training on new equipment; these training sessions were facilitated by the service providers 	<ul style="list-style-type: none"> ○ In-service training book ○ Attendance registers

STRATEGY	IMPLEMENTATION OF STRATEGIES	FEEDBACK ON IMPLEMENTATION OF STRATEGIES	MONITORING AND EVALUATION
2.3 Equipment control	<ul style="list-style-type: none"> ○ Inventory book ○ Movement (borrowing book) ○ Daily checklist done on emergency equipment 	<ul style="list-style-type: none"> ○ All three the units has an inventory book and a movement borrowing book which is used to keep track of their equipment; all the staff members are responsible for keeping these books update ○ Daily checks are done on the emergency equipment and recorded (nursing staff are responsible for these checks and it must be overseen by the operational managers) 	<ul style="list-style-type: none"> ○ Inventory book and borrowing book is up to date ○ Follow-ups done on equipment that were borrowed. ○ Daily checklist complete and emergency equipment in good working order and available
2.4 Maintenance plan for servicing of equipment	<ul style="list-style-type: none"> ○ Service plan and manual ○ Service, repair and replace broken equipment 	<ul style="list-style-type: none"> ○ All three units have a maintenance request book, repair book and condemning book (VA2) ○ No repairs have been done due to lack of finances 	<ul style="list-style-type: none"> ○ Proper functioning and fully maintained equipment
2.5 Stock control	<ul style="list-style-type: none"> ○ Back-up stock ○ Availability of emergency stock needed for resuscitation ○ Give away stock not used before it expires ○ Needs assessment and prioritising stock ○ Write VA2 to the pharmacy to redistribute medication before it expires ○ Stock taking to assess utilisation of stock 	<ul style="list-style-type: none"> ○ No space to keep back-up stock ○ Resuscitation boxes were placed in the three units containing all the necessary resuscitation emergency stock ○ Stock not used was distributed to other units in need of such stock ○ Needs assessment were done by the operational managers. ○ Pharmacy personnel evaluate the levels of stock and are responsible for the redistribution of medication. ○ Stock taking is done by the storeroom and pharmacy 	<ul style="list-style-type: none"> ○ No stock outs ○ No emergency order made ○ No overstocking done ○ No wastage of expired stock

STRATEGY	IMPLEMENTATION OF STRATEGIES	FEEDBACK ON IMPLEMENTATION OF STRATEGIES	MONITORING AND EVALUATION
3. STRATEGIES IMPLEMENTED REGARDING STAFF ATTITUDE			
3.1 Task team to address staff attitude	<ul style="list-style-type: none"> ○ Batho Pele principles should be implemented by staff ○ Patient Rights Charter (PRC) ○ Customer care training ○ Patient satisfaction ○ Employee of the month incentives and certificates 	<ul style="list-style-type: none"> ○ Staff aware of the Batho Pele principles and awareness are created in meetings and there are posters on the walls of the units ○ Staff is aware of the PRC; there are posters displayed on the walls of the unit ○ Customer care training has been done by the customer care department ○ Management must come up with criteria for the employee of the month and must decide on the incentives 	<ul style="list-style-type: none"> ○ Positive client satisfaction surveys ○ Less complaints ○ Performance management development system (PMDS)

STRATEGY	IMPLEMENTATION OF STRATEGIES	FEEDBACK ON IMPLEMENTATION OF STRATEGIES	MONITORING AND EVALUATION
<p>3.2 Staff support through communication, training and emotional support systems</p>	<ul style="list-style-type: none"> ○ Communication through communication book, ward meetings, memos, circulars, policies and standards ○ Support for training included recognition and incentives for training to motivate staff. Enabling staff to attend workshops, in-service training, conferences and seminars ○ Emotional support systems: (debriefing, psychologists, mentoring and coaching, delegation of work and performance management) ○ Team work and teambuilding 	<ul style="list-style-type: none"> ○ Ad hoc meetings are taking place to address challenges ○ Climate meetings are scheduled on a monthly basis by the operational managers ○ Staff must sign if they have read memos, circulars etc. ○ Staff is given opportunities to attend seminars, workshops etc. but is not always possible due to staff shortages and financial constraints ○ Lack of emotional support (emotional support can be enhanced by debriefing and M&M meetings as well as mentoring programmes) ○ Activities were planned but not realised; they are looking at alternatives 	<ul style="list-style-type: none"> ○ Minutes of meetings ○ Circulars read by staff and signed ○ Attendance registers ○ Motivated, self-confident staff with positive attitudes ○ Performance management development system (PMDS) ○ Developed coping mechanisms ○ Improved teamwork
<p>3.3 Professional conduct</p>	<ul style="list-style-type: none"> ○ Adherence to code of conduct SANC and PRC as well as Batho Pele principles 	<ul style="list-style-type: none"> ○ Staff has knowledge of what is expected from them according to the code of conduct from the South African Nursing Council (SANC) and Patient Rights Charter (PRC) as well as the Batho Pele principles 	<ul style="list-style-type: none"> ○ Professional and confident staff ○ Fewer customer complaints

STRATEGY	IMPLEMENTATION OF STRATEGIES	FEEDBACK ON IMPLEMENTATION OF STRATEGIES	MONITORING AND EVALUATION
4. STRATEGIES IMPLEMENTED TO ADDRESS SHORTAGE OF STAFF			
4.1 Ensure optimal functioning of available staff	<ul style="list-style-type: none"> ○ Using available staff effectively and optimally through delegation, off-duties and leave plans ○ Placement of staff according to interests and skills ○ Introducing an overtime system 	<ul style="list-style-type: none"> ○ Challenges are experienced due to shortage of staff ○ Staff placed according to skills but not interests ○ An overtime system is in place from inside the maternity section but not from the outside (no agency staff) 	<ul style="list-style-type: none"> ○ Enough staff available to render quality care to the patients ○ Enough staff to complete tasks on time
4.2 Retention strategy for staff that wants to resign	<ul style="list-style-type: none"> ○ Retention plan ○ One-on-one exit interviews ○ PMDS – incentives and rewards for committed staff ○ Support professional growth through training and development 	<ul style="list-style-type: none"> ○ One-on-one exit interviews are done by operational managers and nursing services manager ○ Staff is receiving performance management evaluations ○ Incentives and rewards not in place; management should come up with criteria for incentives for staff that develop themselves through training 	<ul style="list-style-type: none"> ○ Lower staff turnover ○ Motivated staff ○ Rewards and incentives to be given
4.3 Budget for recruitment of staff	<ul style="list-style-type: none"> ○ Budget in place for permanent and temporary posts as well as overtime and incentives ○ Annual meeting for budget planning regarding staff 	<ul style="list-style-type: none"> ○ Management are aware of the needs regarding staff and the budget needed to recruit new staff ○ Some vacant posts have been filled 	<ul style="list-style-type: none"> ○ Filling vacant posts ○ Decreased shortage of staff

STRATEGY	IMPLEMENTATION OF STRATEGIES	FEEDBACK ON IMPLEMENTATION OF STRATEGIES	MONITORING AND EVALUATION
4.4 Recruitment of new staff	<ul style="list-style-type: none"> ○ Staff should be recruited according to the needs assessment and the workload indicators ○ Staff planning to identify needs ○ Advertise to recruit new staff ○ Headhunting ○ Faster process for recruitment 	<ul style="list-style-type: none"> ○ There is a process for recruitment of staff and priorities have been set by the nursing services manager ○ The process of recruitment needs to be followed and it takes time 	<ul style="list-style-type: none"> ○ Quality care is rendered to patient ○ Decreased shortage of staff ○ Vacant posts filled ○ Planned services are rendered as needed
5 STRATEGIES IMPLEMENTED REGARDING TRANSPORT FOR TRANSFER OF PATIENTS			
5.1 Task team to address concerns regarding transport	<ul style="list-style-type: none"> ○ Meetings between management of the district hospital and EMS services 	<ul style="list-style-type: none"> ○ There has been improvement in transport ○ Meetings took place between management and the EMS services 	<ul style="list-style-type: none"> ○ Issues of concern is addressed and smooth operation from EMS ○ Available transport ○ Decreased neonatal mortality due to some of the challenges related to transfer of patients having been resolved

STRATEGY	IMPLEMENTATION OF STRATEGIES	FEEDBACK ON IMPLEMENTATION OF STRATEGIES	MONITORING AND EVALUATION
5.2 Availability of equipped transport and competent EMS staff	<ul style="list-style-type: none"> ○ Available ambulances or alternative transport (car) ○ Dedicated transport for maternal and neonatal emergencies ○ Appropriate and adequate equipment on ambulances ○ Trained EMS staff 	<ul style="list-style-type: none"> ○ There is a dedicated ambulance assigned for maternal emergencies and private ambulances are used for transport of critically ill neonates; the private ambulances are equipped and EMS staff is trained ○ Response time has decreased when they are making use of private ambulances 	<ul style="list-style-type: none"> ○ Less incident reports ○ Trained and equipped EMS
5.3 Communication regarding transport	<ul style="list-style-type: none"> ○ Arrangement of transport checklist ○ Follow-up ○ Record keeping ○ Statistical reporting ○ Incident reports 	<ul style="list-style-type: none"> ○ Doctors have a checklist that they use when they phone to arrange transport ○ Follow-up is done after arrangement of transport ○ NICU is keeping record of problems experienced and are writing incident reports when a neonate dies while waiting for an ambulance 	<ul style="list-style-type: none"> ○ Improved communication regarding transport ○ Less incident reports ○ Decreased response time
6 STRATEGIES IMPLEMENTED REGARDING PROTOCOLS			
6.1 Task team to address protocols regarding neonatal resuscitation	<ul style="list-style-type: none"> ○ Revise protocols ○ Oversee implementation and adherence to protocols ○ Ensure comprehensive, transparent and user-friendly protocols ○ Flowcharts should be available 	<ul style="list-style-type: none"> ○ Due to the fact that there were three different paediatricians in the past two years there are many protocols; the current paediatrician will decide on one. Protocols needs to be reviewed and updated ○ Flowcharts for neonatal resuscitation algorithms are available in the resuscitation areas 	<ul style="list-style-type: none"> ○ Auditing ○ Flowcharts will be available, seen and displayed

STRATEGY	IMPLEMENTATION OF STRATEGIES	FEEDBACK ON IMPLEMENTATION OF STRATEGIES	MONITORING AND EVALUATION
6.2 Awareness of protocols	<ul style="list-style-type: none"> ○ Visible copies of the protocols must be available, understood and signed 	<ul style="list-style-type: none"> ○ Flowcharts of the neonatal resuscitation programme algorithm and the HBB algorithm are on the walls in the resuscitation areas and attached to the handles of the resuscitation boxes 	<ul style="list-style-type: none"> ○ Protocols and flow charts available, seen and displayed

6.4 MONITORING AND FEEDBACK REGARDING THE IMPLEMENTATION OF STRATEGIES

During the third step (OBSERVE) in CYCLE 2 records, documentation and minutes of meetings regarding the strategies to sustain a quality improvement initiative neonatal resuscitation was used to observe the implementation and the initiation of change.

Feedback meetings were held to determine the progress on the implementation of strategies and what needed improvement. The operational managers and nursing service manager gave feedback on the strategies implemented (see Table 6.1.).

Due to the dynamics of action research, it was difficult to have a clear indication of exactly what had been implemented and what had been done because the record keeping of the implementations were very poor and there were many role players.

It was therefore necessary to keep on monitoring progress and giving feedback on the implementation of the strategies because some of them would take a long time to implement to the full extent.

The changes that occurred as a result of the implementation of the strategies to sustain a quality improvement initiative are discussed in detail in Chapter 7.

6.5 REFLECTION ON THE PROCESS OF IMPLEMENTATION OF STRATEGIES

During the third step (OBSERVE) in CYCLE 2 a meeting was held with the steering group to reflect on what had been effective and what had not been effective during the implementation of the strategies to sustain a quality improvement initiative in neonatal resuscitation. The same three questions that had been asked in the reflection phase of CYCLE 1 (see Chapter 5) were asked again and an opportunity was created to discuss and refine the strategies. The questions asked and the responses are presented next.

- *What was your experience of the implementation of the strategies?*

The steering group indicated the staffs' attitude improved as they were acquiring knowledge and the skills through the training. According to the steering group the feedback from staff were that they enjoyed the neonatal resuscitation training. The training caused staff then to

be encouraged to improve the neonatal mortality rates and to help reach the MDG 4. The implementation of strategies contributed to the procurement of equipment, for example, mobile suction machines. The operational manager of the NICU indicated that her interest in neonatal care had grown and that she loved the babies even more and wanted them to survive.

- *What did the group learn?*

Feedback on this question was that the steering group learned a lot about training. According to the steering group, the implementation of strategies was an eye opener in that they had learned much about research and the identification of problems related to neonatal resuscitation they experienced and finding solutions for them. A comment was made that the group had learned to appreciate and value research and they felt keen to learn more.

- *What can be changed or done differently?*

The steering group indicated they would not change anything but requested that the training in neonatal resuscitation should be continuous. They commented that, because it was an action research approach, it was a positive experience. They were all involved; it was a group effort where everything were discussed and agreed upon.

As previously mentioned the group was given the opportunity to refine the strategies. The following additional questions were asked.

- *Is there a strategy that needs refinement?*

The strategies that the steering group felt needed refinement and more attention concerned those regarding the procurement of equipment and staff.

Feedback from the steering group regarding the procurement of equipment was that the process was too slow and they felt they should have been given the opportunity to have more input in the prioritisation of the procurement of equipment. Some emergency equipment that was still needed included laryngoscope blades, neonatal McGill's forceps and radiant warmers. They identified there was also a lack of radiant warmers in the resuscitation areas leading to problems when neonates needed to be resuscitated and there was nowhere to put the neonates down for resuscitation.

Feedback regarding staff was that staff shortages still remained a challenge and the nurse-to-patient ratio was insufficient. Patient acuity especially in the NICU should be taken into account when the nurse-to-patient ratio is determined.

- *What were the positives of the strategy implemented?*

Feedback from the steering group regarding the positives was the resuscitation boxes containing emergency equipment and stock needed for neonatal resuscitation. They were positive that the equipment was in one place when needed.

With regard to training, the HBB programme training was very positive and the staff indicated that they enjoyed practising in simulation on the mannequins. The algorithms, vision and aim posters visible in the neonatal resuscitation areas were also perceived as a positive change. The steering group also indicated they had experienced that the staff members were more motivated and self-confident.

Another positive outcome was that there was a paediatrician on call available during the night in the hospital to assist staff in the NICU in treating neonates. This paediatrician can be reached telephonically to give guidance regarding the treatment of patients. This had made a significant change in their work experience.

The steering group further indicated the procurement of mobile suction machines and a mobile incubator was another very positive change as the mobile incubator was used to transport the neonates to the X-ray department. Previously they were not able to take X-rays because they did not have a mobile X-ray machine which could be used in the unit and they had no way of transporting these fragile neonates to the X-ray department. The mobile incubator was also used to transport neonates within the maternity section; especially from the theatre.

- *What were the negatives of the strategies implemented?*

The negatives regarding the implementation of strategies were the time constraints and the fact that, due to the lack of some resources (for example, financial and staff resources) some of the strategies could not be implemented to their full extent.

The researcher had the following reflections regarding the implementation of the strategies. Staff attitude is the most determining factor for the success of any quality improvement initiative. Due to all the challenges the staff members experienced and the workload they had to cope with, they needed to have an inner need to improve their working conditions and a positive attitude towards change and quality improvement. The researcher also realised that many role players were needed for the implementation of the strategies and if one link in the chain was not able to do her or his part, it had an influence on the whole implementation of the strategy.

Furthermore, the matron who was the driving force for some of the strategies that was beyond the control of the operation managers (such as the recruitment of staff and procurement of equipment) was on family responsibility leave and her absence impacted negatively on the implementation of the strategies. It was therefore the researcher's perception that the full impact of the strategies and the changes that occurred would only be seen in the months to come. Some of the improvements regarding neonatal resuscitation will take a long time because it is hampered by government processes, for example, the procurement of some equipment and recruitment of more staff. However, those strategies that could be implemented in the given timeframe with the given resources were implemented.

6.6 CONCLUSION

In this chapter the development and outline of the strategies were discussed. The strategies were developed in conjunction with the steering group and the staff working in the maternity section of the district hospital. They therefore had ownership of the strategies. Also, the strategies fit the goals and culture of the organisation. The strategies were implemented by the operational managers and the hospital management. Unfortunately, not all of the strategies were implemented to its full extent, but this study created an awareness in the maternity section of this hospital as well as on managerial level. However, the sustainability and potential changes regarding neonatal resuscitation and neonatal mortality relies on the full and continued implementation of these strategies. There is an awareness of neonatal mortality and neonatal resuscitation and its influencing factors such as staff, process and organisational factors among staff members. In the next chapter the changes that occurred as a result of the strategies being implemented are presented and discussed.

CHAPTER 7: CYCLE 3 – EVALUATION OF CHANGE AFTER IMPLEMENTATION OF THE STRATEGIES AND SUSTAINABILITY OF STRATEGIES

7.1 INTRODUCTION

In the previous chapter the implementation of the strategies were discussed. In this chapter the evaluation of the strategies that were implemented regarding a quality improvement initiative in neonatal resuscitation and the changes that occurred as a result of the implemented strategies are discussed. The probability of the sustainability of the strategies is also outlined.

CYCLE 3 aimed to answer two research questions: *“What were the changes that occurred as a result of the strategies for a quality improvement initiative in neonatal resuscitation that was implemented? How sustainable was the strategies implemented to sustain a quality improvement initiative?”* This was part of the action research process based on the Problem Resolving Action Research (PRAR) model (Piggot-Irvine 2009:3-7) as shown in Figure 7.1 below.

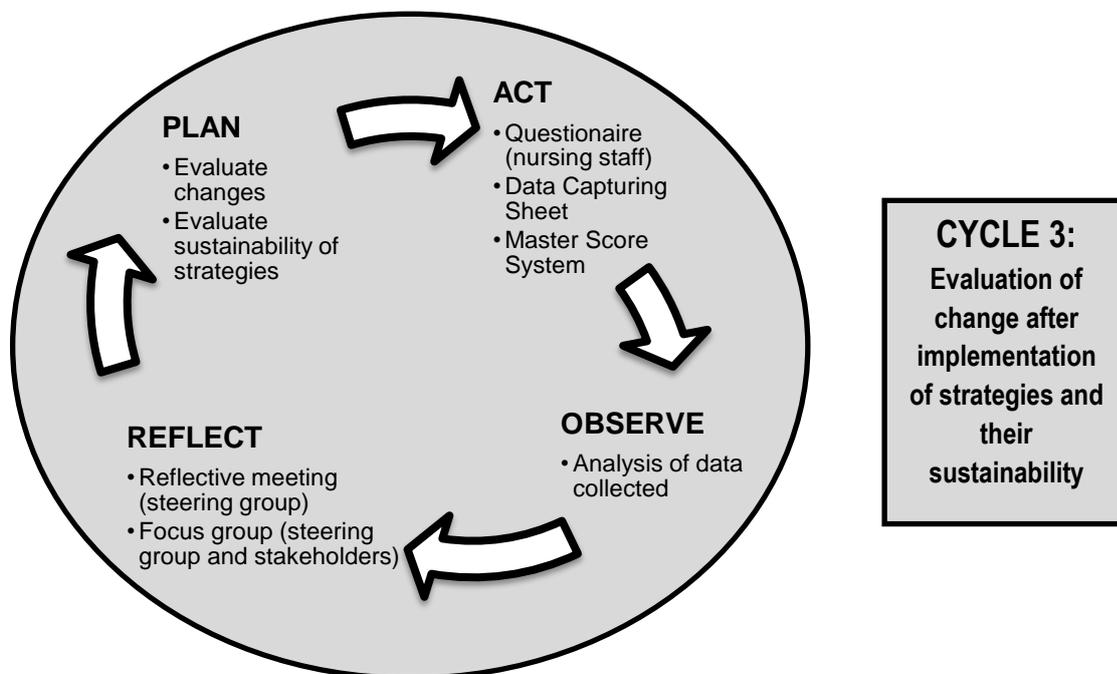


Figure 7.1: CYCLE 3 – Evaluation of change after implementation of strategies and their sustainability

During the first step (PLAN) in CYCLE 3 the evaluation reflected on changes that occurred as a result of the implementation of the strategies that centred not only on the factors (the process, staff and organisation) influencing neonatal resuscitation but, moreover, on the sustainability of these strategies (see Figure 7.1). Importantly, the evaluation focused on the positive changes as well as those changes that brought about further challenges. Thus, during evaluation the steering group and stakeholders (including nursing staff and doctors) had to decide which implemented strategies to continue with and what they would do differently with regards to each strategy that was implemented. The changes that occurred are discussed according to the specific strategy that was implemented and which, after implementation, brought about the particular change or challenge. Importantly though was to focus on neonatal mortality as the indicator of quality of care. Lastly, the NHS Master Score System was used to determine the probability of the sustainability of the strategies for each of the units as well as collectively for the maternity section of the hospital. The detail regarding the evaluation of this sustainability with the Master Score System is presented and discussed in section 7.4. (Also see Chapter 3, section 3.3.5 and Chapter 4, section 4.8.3.4).

7.2 REVISITING THE METHODOLOGY FOR CYCLE 3

For the purpose of the second step (ACT) in CYCLE 3 (see Figure 7.1) the same questionnaire (see Annexure I) and data capturing sheets (see Annexure J) as in CYCLE 1 was used to evaluate the changes that occurred as a result of the implementation of strategies, the sustainability thereof and to triangulate the data. These data collection techniques included a questionnaire, the data capturing sheet and the NHS Master Score System (see Annexure Q). The research methodology for these data collection techniques were discussed in Chapter 4. In CYCLE 3 the focus group was part of the fourth step (REFLECT) (see Figure 7.1).

The same questionnaire used in CYCLE 1 was used in CYCLE 3 (see Annexure I). The population and sample remained the same as for CYCLE 1 to allow comparisons. Seventy-one (71) questionnaires were handed out and 40 questionnaires (N=40) were returned. The response rate of the questionnaires was 56.3%. Given the small sample size the steering group and statistician were satisfied with this response rate.

In CYCLE 3 the NICU had the best response rate: 19 completed questionnaires out of 22 distributed questionnaires were returned (47.5%; n=19). The postnatal ward received 24 questionnaires but only returned 12 (30%; n=12) while 25 were handed out in the labour

ward with only nine being returned (22.5%; n=9). Table 7.1 illustrates the differences in the response rate between CYCLE 1 and CYCLE 3.

Table 7.1: Difference in response rates between CYCLE 1 and CYCLE 3

UNIT	RESPONSE RATE - CYCLE 1 (N=42)		RESPONSE RATE - CYCLE 3 (N=40)	
	n	%	n	%
NICU	n=16	38.1%	n=19	47.5%
Postnatal ward	n=12	28.6%	n=12	30%
Labour ward	n=14	33.3%	n=9	22.5%
TOTAL	N=42	100%	N=40	100%

In both cycles the NICU had the best response rate. More respondents from the NICU completed questionnaires in CYCLE 3. This could be due to the fact that the awareness and implementation of the strategies were perhaps more visible in the NICU; for example, most of the staff had attended the neonatal resuscitation training. The postnatal ward's response rate remained the same whereas the response rate of labour ward was less than in CYCLE 1. The reason for the latter was not clear and could not be explained.

The third step (OBSERVE) in CYCLE 3 reflected the data analysis (see Figure 7.1). The same data analysis techniques than in CYCLE 1 were used again. The quantitative data collected with the questionnaires were analysed by making use of descriptive and inferential statistics to describe and synthesise the data as explained in Polit and Beck (2008:665). Frequencies were done on the quantitative data collected from the sample as a whole. Frequencies for the NICU, postnatal ward and labour ward were also done separately to get a more realistic view on the changes that occurred as a result of the strategies that were implemented. The frequencies were interpreted with the assistance of the statistician to make sense of the changes that occurred in the maternity section of the district hospital.

The qualitative data retrieved from the open-ended questions on the questionnaire explained the changes that occurred as a result of the implementation of the strategies from a narrative angle. The qualitative data were analysed through open-coding, following the steps of Tesch as indicated by Creswell (2009:186) and discussed in Chapter 4, section 4.8.1.1.

The fourth step in CYCLE 3 was (REFLECT) (see Figure 7.1). Reflection regarding the changes that occurred as a result of the strategies that were implemented took place in the form of a focus group interview with the nursing staff, steering group and stakeholders

(including doctors) to determine what worked and what did not work. A reflective meeting was also held with only the steering group members during which their individual reflective notes were used to reflect on the action research process and changes that occurred. As previously mentioned in Chapter 4 (section 4.8.1.2), the focus group discussion was conducted to triangulate data and add to the data collected from the questionnaires (Koshy et al. 2011:111). The steering group attending the focus group identified other participants for attendance which included doctors and other midwives. The participants shared their experiences, perceptions, attitudes and their views with each other to generate further and new ideas as prescribed by Brink et al. (2009:152), Maree et al. (2010:90-92) and Polit and Beck (2008:394-395). (See discussion in Chapter 4, section 4.8.1.2).

The main questions asked during the focus group were (see Annexure O):

- *What is your opinion regarding the changes that occurred as a result of the strategies being implemented?*
- *Which strategies to sustain the quality improvement initiative in neonatal resuscitation worked? (Positives).*
- *Which strategies to sustain the quality improvement initiative in neonatal resuscitation did not work? (Negatives).*
- *Which strategies to sustain the quality improvement initiative in neonatal resuscitation should be continued with?*
- *What can be done differently?*

The purpose with the focus group interview was to evaluate the changes that occurred in the maternity section of the district hospital as a result of the strategies that were implemented to sustain a quality improvement initiative in neonatal resuscitation.

The ten participants' working experience ranged from having worked for only three months in the setting to 20 years. There were medical specialists, medical doctors and community service doctors as well as the operational managers of the three units, the matron of the maternity section, and a midwife who attended the focus group discussion. Three of the doctors attending the focus group had also attended the focus group interview conducted in CYCLE 1. The focus group discussion was held in a small boardroom in the district hospital. The scheduled time was in the morning (between 9h00 and 10h00) and light refreshments were provided.

Similar to the previous focus group interview held during CYCLE 1, it was important to establish trust. Fortunately, at this stage in the research process the researcher was known

to most of the attendees as well as what this study was all about. Participant information leaflets were handed out and the participants voluntarily signed the informed consent forms. The same neutral facilitator as in CYCLE 1 was used to facilitate the proceedings while the researcher acted as the assistant facilitator and was responsible for taking the field notes (see Chapter 5, section 5.3). The field notes were taken during the focus group interview to collect data on non-verbal cues observed, for example, the body language of participants. The researcher was therefore mostly a silent observer taking notes. The independent facilitator set the same ground rules as those that applied in the first focus group interview in CYCLE 1. This discussion was also audiotaped (the researcher obtained written and verbal consent from the participants for the audiotaping) and transcribed verbatim. The purpose of the study and that of the focus group interview was also explained to the participants before the facilitator began with the questions.

As advised by Kreuger and Casey (2009:38-41) and explained in Chapter 5, section 5.3, the same categories of questions used in the focus group interview in CYCLE 1 were used again in CYCLE 3. (See Annexure O for the interview schedule for this focus group). Probes were used by the facilitator to allow for full discussions of the questions. As the discussions continued, the facilitator summarised what was shared continuously to elicit other viewpoints and to make sure everybody understood the comments made and information shared. The facilitator identified the dominant group members and made sure she engaged the quieter ones in the discussions. They were included by being asked to add on to ideas, views, and observations. At the end of the focus group the co-facilitator (the researcher) gave a summary of what had been said during the focus group meeting. Member checking was therefore done at the conclusion of the focus group discussion.

The same data analysis techniques used for the focus group discussion in CYCLE 1 were used for the analysis of the qualitative data generated during this focus group interview; hence, open-coding in accordance with Tesch's steps of data analysis (Creswell 2009:186) (see Chapter 4, section 4.8.1.1). The data collected were coded into categories based on the strategies that were implemented and aspects of the NHS Sustainability Model.

The six main themes that emerged after the transcription were the same as the six strategies and addressed the following: training, equipment and stock, staff attitude, shortage of staff, transport and protocols. The data pertaining to each of these themes and categories (with sub-categories) were analysed accordingly.

The findings of both the quantitative data (questionnaire) and qualitative data (focus group interview) are discussed together to create a clearer picture of, firstly, the changes in the demographics and, secondly, the changes (positive and negative) that occurred after the

implementation of the strategies as regards neonatal resuscitation and its associated factors. As the discussion progresses, the number of the questions discussed from the questionnaire are indicated for referral to Annexure I. The layout is different to that of Chapter 5 as this chapter's layout is structured according to the strategies prioritised during the nominal group technique discussion (see Chapter 5, section 5.5). The reflections of the steering group were based on their reflective notes and the reflective meeting held with the steering group (held at the end of CYCLE 3 as part of REFLECTION) is also incorporated in the discussion of findings.

7.3 FINDINGS AND EVALUATIONS

The findings and evaluation of the strategies will be discussed according to the changes in demographics, the changes that occurred as a result of the implementation of strategies (see Chapter 6, section 6.3, Table 6.1) and the changes that occurred regarding neonatal mortality and neonatal mortality statistics.

7.3.1 CHANGES IN DEMOGRAPHICS

Demographic data were collected to give a thick description of the setting. Respondents (nursing staff) were asked to indicate the setting where they worked and the nursing category they were registered for at the South African Nursing Council (SANC) (see Questions 1 and 2, Annexure I). Of the 40 respondents (N=40) who completed the questionnaire, 47.5% (n=19) worked in the NICU, 30% (n=12) worked in the postnatal ward and 22.5% (n=9) indicated they worked in the labour ward.

Table 7.2 below illustrates the changes in the skills mix of the respondents as it related to the changes in the nursing categories between CYCLE 1 and CYCLE 3. These findings were based on the number of respondents who had completed and returned the questionnaires (CYCLE 1 [N=42]; CYCLE 3 [N=40]).

Table 7.2: Changes between CYCLE 1 and CYCLE 3 in the nursing categories from respondents who completed the questionnaire

NURSING CATEGORIES	CYCLE 1 (N=42)	CYCLE 3 (N=40)
Registered nurse (bridging course)	0%	2.6%
Registered nurse & midwife	41%	39.5%
Advanced midwife	15.4%	10.5%
Trained neonatal nurse	0%	2.6%
Trained paediatric nurse	2.6%	2.6%
Nursing auxiliaries	20.5%	15.8%
Enrolled nursing auxiliaries	20.5%	26.3%
TOTAL	100%	100%

From the findings it is clear that most of the staff participating in CYCLE 3 of this study were registered nurses and midwives. The findings also indicate there was a trained neonatal nurse appointed in the NICU. The skills mix, number of staff members and their experience play a significant role in rendering quality care. It is important to note that in this setting the staff turnover was very high which might have had an effect on the changes that occurred as a result of the strategies being implemented.

As mentioned in Chapter 5 (section 5.2.2.2), work experience can play a significant role in quality care. It was therefore important to determine the level of work experience of the staff working in the maternity section. Thirty-eight (38) out of the 40 respondents answered this question. Among the 38 (n=38) respondents the most years spent working in the maternity section were 20 and the least was less than one year (see Question 3, Annexure I). This was similar to the findings in CYCLE 1. There were therefore no significant changes with regard to the years of experience the staff had between CYCLE 1 and CYCLE 3. Figure 7.2 below illustrates the years of experience for each of the units in CYCLE 3.

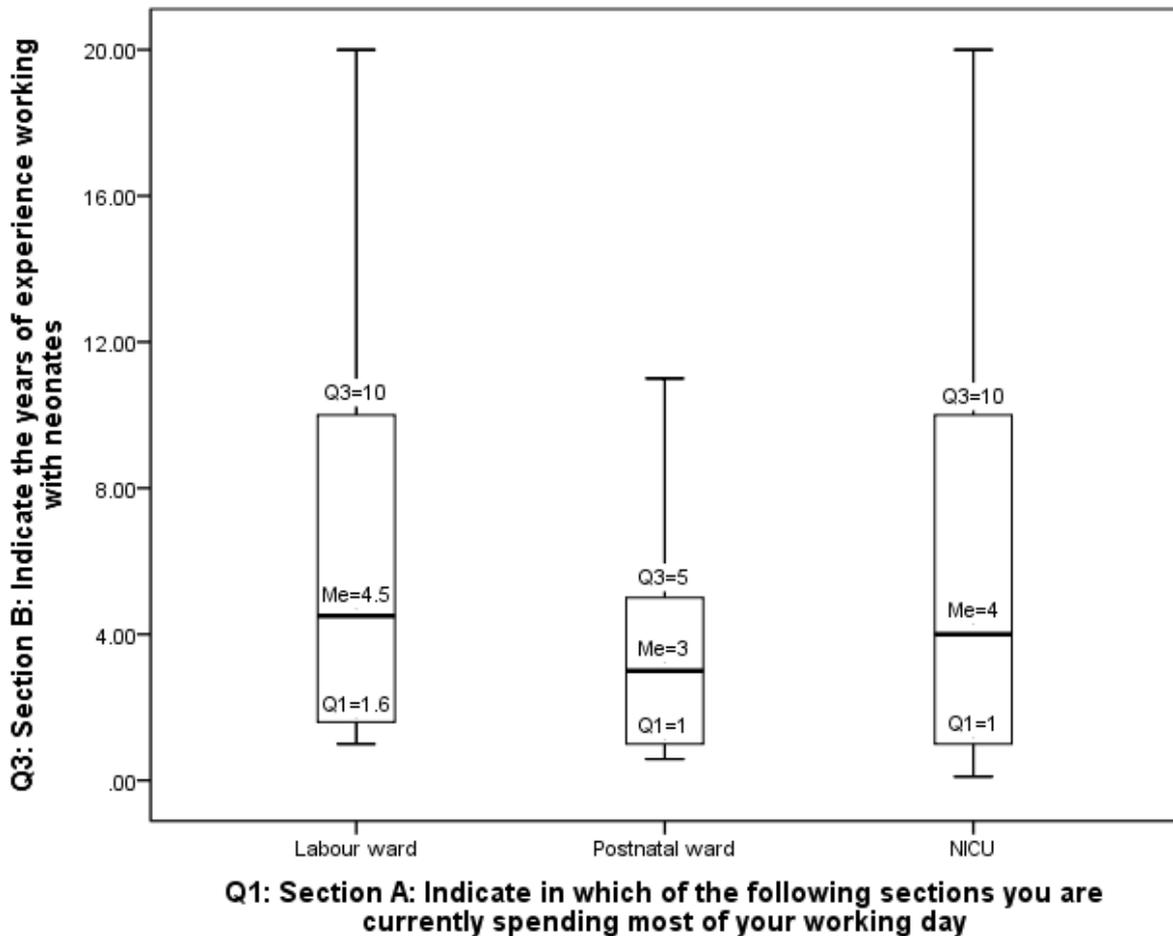


Figure 7.2: Years of work experience of respondents (n=38)

To evaluate whether any changes had occurred after the implementation of the strategies in this specific context of the study, it was important to identify the views of the respondents (nursing staff) regarding quality neonatal resuscitation. It was also of significance to reflect on what changes occurred (positive or negative) and, if negative, what could have been done differently to render the negative changes positive. The perspectives and views of the steering group and stakeholders (nursing staff and doctors) regarding the changes that resulted from the implementation of the strategies were needed to triangulate the data and give a thick description of the findings. The changes are discussed according to the strategies that were implemented.

7.3.2 THE CHANGES THAT OCCURRED AS A RESULT OF THE IMPLEMENTATION OF STRATEGIES

The strategies that were implemented addressed the six key priorities identified during the nominal group technique discussion in CYCLE 1 (see Chapter 5, section 5.5). These

strategies addressed the challenges identified during the situation analysis. They were addressing neonatal resuscitation training, equipment and stock, staff attitude, staff resources, transport and protocols (see Chapter 6).

The purpose of CYCLE 3 was to determine the overall changes that occurred as a result of the implementation of the above mentioned strategies. The findings are therefore not discussed separately according to the data collection techniques, but the changes that occurred are discussed according to the strategies that were implemented.

7.3.2.1 Strategies addressing neonatal resuscitation training

In CYCLE 1 (the situation analysis) a need for training specifically with regard to neonatal resuscitation was identified (see Chapter 5) because inconsistencies existed that related to the available staff training sessions on the one hand and the lack of staff training on the other hand; the staff were not involved in neonatal resuscitation because they lacked confidence in its application. The lack of involvement and lack of knowledge and skills on neonatal resuscitation was therefore identified as two of the main challenges. Furthermore, staff members were unable to attend training in neonatal resuscitation because of the lack of staff resources and financial constraints. Training in neonatal resuscitation was identified as the highest priority during consensus in the nominal group technique discussion (see Chapter 5).

In the strategy that addressed neonatal resuscitation training it was essential to create neonatal resuscitation training opportunities as the lack of knowledge and skills regarding neonatal resuscitation were identified as one of the main priorities and a key area where improvement was needed. It was not only important to create training opportunities, but the staff also had to feel motivated and positive about training. It was thus pivotal to place staff members according to their needs and specialities to optimise the knowledge and skills that they had obtained during neonatal resuscitation training. Most important was enforcing and supporting training in neonatal resuscitation. Staff had to be able to practise newly acquired skills on mannequins to enhance their skills. Training opportunities would promote the staff members' progress towards being more confident and competent to do neonatal resuscitation.

Neonatal training opportunities were created and almost everybody was able to attend training irrespective of their qualifications. According to Lee et al. (2011:15), the simple initial steps of immediate newborn assessment and stimulation which include warming, drying and

tactile stimulation can reduce intrapartum-related neonatal mortality by 10 % and these steps can be provided by a healthcare provider with minimal skills. The training consisted of an adjusted Helping Babies Breathe (HBB) programme (discussed in Chapter 2, sections 2.4.1.1. and 2.4.1.2) and was therefore adjusted to fit with the goals, culture and infrastructure of the maternity section in the district hospital. For example, cardiac compressions were added because the maternity section in the district hospital has the facilities and equipment for taking care of such neonates before transferral.

The main focus of this training was primarily on preparation for resuscitation; then on practising the correct skill of bag mask ventilation and cardiac compressions. During the neonatal resuscitation training aspects related to airway, breathing and circulation (which is part of neonatal resuscitation training) were addressed, but aspects of post-resuscitation care were also addressed briefly. These included checking blood glucose, observing for neurological abnormalities, and maintaining a normal temperature. The training sessions were low impact, high frequency training opportunities and did not take more than an hour. The reason for this was because of the shortage of staff. It was not possible for staff to spend the whole day away from work and in training. The staff shortage was also one of the reasons identified in CYCLE 1 why previous resuscitation training opportunities had failed – staff members were not able to attend because they could not leave their units unattended. The researcher facilitated the training as per request from the steering group.

According to the matron, 80-90% of the staff was trained although there were some staff members who missed out on the training opportunities and who felt there were not enough opportunities created. For example, due to the shortage of staff doctors were unable to attend training regarding neonatal resuscitation. However, in total 81 healthcare providers were trained, most of them were nursing staff (professional nurses, nursing auxiliaries and enrolled nursing auxiliaries) from the three maternity units. There was 12 training sessions; these training sessions were held over a two month period in the maternity section. Training sessions were done in groups of six to eight people. This gave everyone on duty that day an opportunity to attend training. That way it had a minimal influence on the workforce and quality of care. Staff from the theatre and the emergency room as well as students attended training although they were not part of the study sample. Twenty-four (24) nursing staff from the NICU, 17 from the labour ward and 12 from the postnatal ward received HBB training and had the opportunity to practise their new acquired knowledge and skills on a mannequin.

Furthermore, a train the trainer method of training was introduced. The operational managers of each of the three units as well as some of the midwives were trained on how to train their colleagues with the Helping Babies Breathe (HBB) programme. The maternity

section was provided with the study material and an HBB flipchart to use during the training session. Each of the three units was provided with a mannequin (sponsored by the researcher) on which to practise the clinical skills of neonatal resuscitation. This enhanced enforcing and support for neonatal resuscitation training. Each unit also received a laminated flowchart depicting HBB resuscitation; a laminated chart showing how ventilation can be improved and a flowchart of advanced neonatal resuscitation from the Neonatal Resuscitation Program (NRP) (see Chapter 2, Figures 2.1 and 2.2 for examples of the two flowcharts). These charts were put up on the walls in the resuscitation areas. Some were also attached to the resuscitation boxes. Examples of correct bag mask ventilation and how to do cardiac compressions were also attached to the handles of the resuscitation boxes for staff to refer to when resuscitating. (The resuscitation boxes are discussed as part of the strategy regarding equipment and stock in the next section of this chapter).

The respondents identified areas which needed further improvements (see Questions 5 and 6, Annexure I). To achieve ongoing quality care in neonatal resuscitation, training was identified as a factor that still needed improvement. This included in-service training of the doctors and nursing staff on neonatal resuscitation, attending workshops and practising neonatal resuscitation simulation on mannequins. Unfortunately, the spread of this training strategy was not the same throughout all three the units. It seems as if more staff members from the NICU attended the training and less from the other two units. On the other hand, the labour ward staff took time to set up a practise station with the mannequin therefore giving staff members the opportunity to practise their skills. The communication regarding the implementation of some of the strategies was not optimal. As previously mentioned, all three units were provided with mannequins to practise neonatal resuscitation on a regular basis. Neonatal resuscitation training opportunities were available for all staff including the night staff because the strategies needed to be sustainable. However, it seem as if there were still staff members unaware of the training opportunities and the mannequins as indicated by the comments below from the qualitative aspect of the *questionnaire* (see Question 5, Annexure I).

- *“To have more staff or enough staff in the ward especially neonatal trained.”*
- *“To ensure frequent neonatal resuscitation workshops are being held.”*
- *“Practise more on the mannequin to drill neonatal resuscitation to acquire skill.”*
- *“Continuous resuscitation should be done in the ward. Doctors [have] to attend workshop so that they can manage resuscitation. Doll [mannequin] to be used to practise neonatal resuscitation.”*
- *“Every nurse working in maternity ward day nurses and night nurses should attend neonatal resuscitation training.”*

Staff trained as trainers were able to give training to others according to their own discretion and time because they had the training material and the mannequins. Practise stations and training were done by them but was informal with no record keeping. It seems as if the spread of this HBB strategy (trainers training their fellow colleagues) was limited. It needed to be rolled out more and should be encouraged by management.

Previously all the respondents working in the maternity section of the district hospital had different kinds of training at different times on neonatal resuscitation. The obvious outcome was that some staff attended workshops while others had never been trained (see Question 8, Annexure I). After the implementation of the strategy addressing neonatal resuscitation training, the findings from the qualitative aspects of the questionnaire in CYCLE 3 indicated that staff had either been trained, attended a workshop or done the Helping Babies Breathe (HBB) training. Staff members, especially those from the NICU, indicated they had attended the HBB training with the mannequin and that it had been a positive experience.

Knowledge and skills to practise neonatal resuscitation competently and confidently are acquired through training. It was therefore also important to determine what kind of training the respondents received. The following were some of the comments from the open-ended part of this question (see Question 8, Annexure I). Respondents who completed the *questionnaire* were asked to briefly describe the neonatal training they had received.

- *“Daily initiation of resuscitation in unit therefore this gives me confidence. I qualified as a neonatal nurse therefore I am empowered. Workshops are done in the hospital and other institutions to keep abreast [of] the present or new development. I received training/workshop in the unit on a mannequin. The skills is [are] being passed to subordinates and juniors.”*
- *“Basic neonatal resuscitation whereby of my baby’s skin colour is blue, take the chin up but do not hyper extend it using an ambubag and look for chest movement.”*
- *“Drying of the neonate, stimulation, suctioning, chest [cardiac] compressions, administering of a drip, administering of oxygen, intubation.”*
- *“Clearing the airway, when to suction and [how to] hold the suction, when to start with chest compression while ventilating, which drugs to administer and when to administer fluids. How to put up a line [intravenous access] ... how to intubate [and] keeping the baby warm while doing this [resuscitation].”*
- *“Helping Babies Breathe neonatal resuscitation.”*

From the above comments it is clear that some of the respondents attended HBB training and some attended more advanced neonatal resuscitation training. It is important to receive neonatal resuscitation training on a regular basis to sustain the knowledge and skills acquired by initial training. Therefore, regular training opportunities in the form of refresher courses and simulations to practise on a mannequin should be available. Moreover, it is

important for nursing staff to be updated on the new trends and guidelines for neonatal resuscitation as these are usually based on the latest research.

As in CYCLE 1 nursing staff were asked again in CYCLE 3 if they considered themselves updated regarding the new trends/guidelines in neonatal resuscitation (see Question 9, Annexure I). In CYCLE 3 only 35 of the 40 respondents replied to this question. Table 7.3 illustrates the frequency distributions for this question by comparing the perceptions of respondents from the maternity section regarding their knowledge of new trends and guidelines in neonatal resuscitation of CYCLES 1 and 3 (CYCLE1 [N=42]; CYCLE 3 [N=40]).

Table 7.3: Frequency distribution: comparison between CYCLE 1 and CYCLE 3 regarding respondents' perceptions on their knowledge regarding new trends and guidelines in neonatal resuscitation in each of the three units

HOW UPDATED DO YOU CONSIDER YOURSELF REGARDING THE NEW TRENDS AND GUIDELINES IN NEONATAL RESUSCITATION?	LABOUR WARD				POSTNATAL WARD				NICU			
	CYCLE 1 (n=12)		CYCLE 3 (n=5)		CYCLE 1 (n=11)		CYCLE 3 (n=11)		CYCLE 1 (n=16)		CYCLE 3 (n=19)	
	f	%	f	%	f	%	f	%	f	%	f	%
Knowledgeable (know what it entails or expert knowledge)	8	66.7%	5	100%	3	27.3%	4	36.4%	11	68.7%	16	84.2%
Not knowledgeable (only heard about it or not at all)	4	33.3%	0	0	8	72.8%	7	63.7%	5	31.3%	3	15.8%
TOTAL	12	100%	5	100%	11	100%	11	100%	16	100%	19	100%

From the findings above it can be concluded that the NICU showed improvement regarding respondents perceiving themselves to be “Knowledgeable (know what it entails or expert knowledge)” regarding the new trends and guidelines in neonatal resuscitation; staff from the labour ward also showed an improvement. The data for the labour ward were not significant as only five respondents from this unit completed this question.

Figure 7.3 illustrates the results of the changes that occurred in the maternity section with regard to the respondents (nursing staff) perceiving themselves as knowledgeable about new trends and guidelines in neonatal resuscitation (CYCLE1 [N=42]; CYCLE 3 [N=40]).

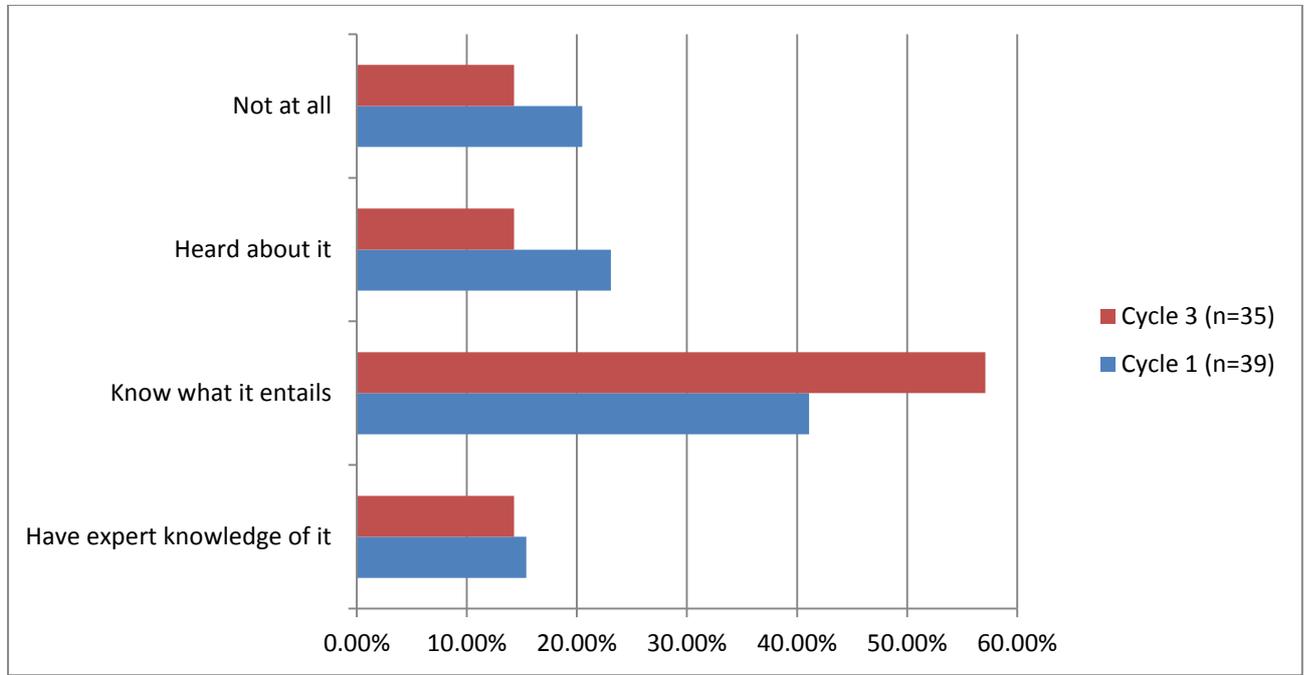


Figure 7.3: Changes in percentage between CYCLE 1 and CYCLE 3 of respondents that considered themselves updated about the new trends/guidelines in neonatal resuscitation

According to Figure 7.3, the majority of respondents from the maternity section perceived themselves as knowledgeable because they knew what the new trends/guidelines entail. Few had not heard about it and even less was not aware about it. Some of the comments made in the qualitative part of the same question (*questionnaire*) by participants who perceived themselves as knowledgeable were as follows:

- *“Neonatal resuscitation done on a doll. I was also part of the occasions in the ward where we resuscitated the neonate in the ward.”*
- *“I was taught how to assess breathing, when to start ventilation with room air, give oxygen and to connect to pulse oxymeter, check colour and heart rate, bag with oxygen connected 5-10l/m, start chest compression 3:1.”*
- *“I do neonatal resuscitation always if a baby crashes during my presence. I can use Neopuffs to resuscitate. I can put a baby on SiPAP machine. I initiate the process while waiting for the doctor to resuscitate. Protocols are available to help me initiating the process of resuscitation.”*

- “Able to resuscitate in terms of ambu bagging the baby, giving oxygen per Neopuffs in terms of PIP and PEEP in accordance with age and weight. Chest compressions and resuscitation drugs e.g. aminophylline and adrenalin.”
- “After training I received I think I will be able to resuscitate neonates should the need arise.”

Through training new knowledge and skills are acquired; the expectation is thus that the outcome of training will be competence. The *questionnaire* contained the question: *Do you feel competent in basic neonatal resuscitation?* (see Question 43, Annexure I). Of the 40 respondents in CYCLE 3 this question was answered by 36. In Table 7.4 the frequency distribution between the respondents in CYCLE 1 and those in CYCLE 3 who perceived themselves as competent in basic neonatal resuscitation is shown (CYCLE1 [N=42]; CYCLE 3 [N=40]).

Table 7.4: Comparison between CYCLE 1 and CYCLE 3 in frequency distribution of respondents that perceived themselves as competent in basic neonatal resuscitation

DO YOU FEEL COMPETENT IN BASIC NEONATAL RESUSCITATION?	LABOUR WARD				POSTNATAL WARD				NICU			
	CYCLE 1 (n=12)		CYCLE 3 (n=9)		CYCLE 1 (n=11)		CYCLE 3 (n=8)		CYCLE 1 (n=16)		CYCLE 3 (n=19)	
	f	%	f	%	f	%	f	%	f	%	f	%
Yes	6	50%	8	88.9%	3	27.3%	3	37.5%	5	31.3%	14	73.7%
Uncertain	2	16.7%	1	11.1%	1	9.1%	4	50%	8	50%	3	15.8%
No	4	33.3%	0	0	7	63.6%	1	12.5%	3	18.8%	2	10.5%
TOTAL	12	100%	9	100%	11	100%	8	100%	16	100%	19	100%

The results show there was an improvement in the perceptions of the respondents from all three units that their competence had improved. Table 7.4 indicates a 42.2% improvement of the respondents from the NICU perceiving themselves as competent and a 38.9% improvement in respondents from the labour ward who perceived themselves as competent. In the postnatal ward there was only a 10.2% improvement of participants perceiving themselves as competent. Perceptions of competence can relate to knowledge, skills and training. The respondents’ perceptions of their own competence could have been influenced by the strategy addressing training because training also addresses competence levels.

Figure 7.4 illustrates the changes in the respondents' (nursing staffs') perception of their competence in basic neonatal resuscitation in the maternity section (CYCLE1 [N=42]; CYCLE 3 [N=40]).

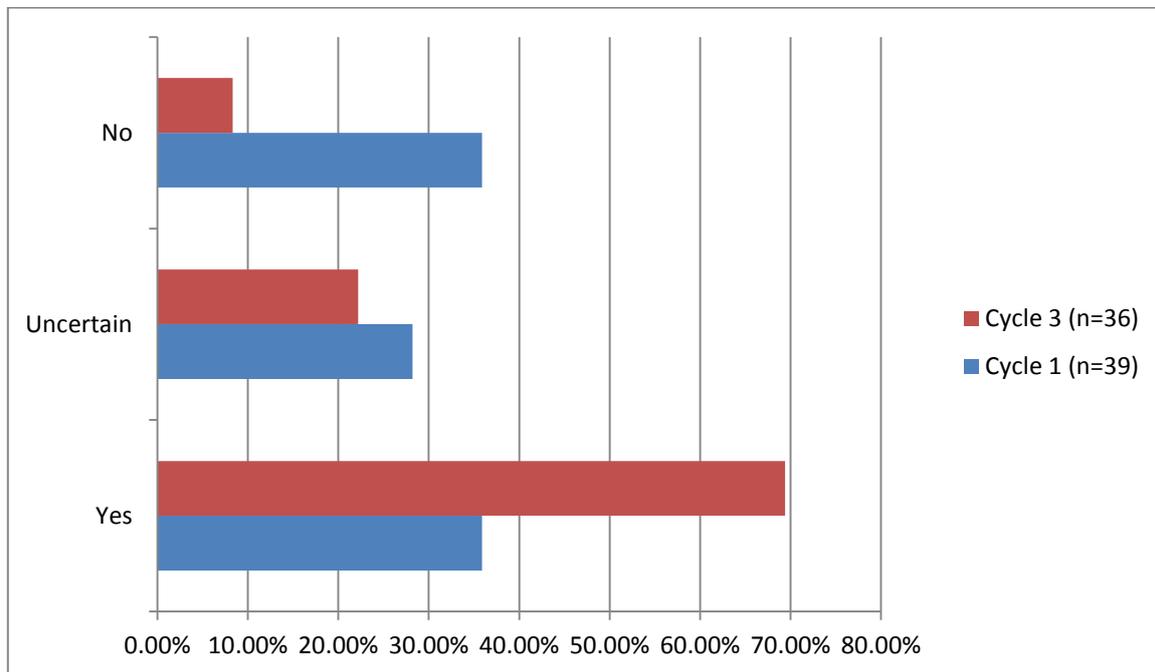


Figure 7.4: Percentage changes between CYCLE 1 and CYCLE 3 of the respondents' perceptions of their competence in neonatal resuscitation

From the findings it is clear that 69.7% (n=36) of the respondents in the maternity section in CYCLE 3 considered themselves as competent compared to 35.9% (n=39) in CYCLE 1. This may be due to the training which empowered the nursing staff to feel more confident in the ability to perform neonatal resuscitation.

The following are some of the comments made in the qualitative aspect of the question (*questionnaire*) regarding feeling competent:

- *"I am empowered with skills to do it. I can use present/available equipment to give the best I can e.g. Neopuff and SiPAP."*
- *"Due to practise and in-service training that we have I do feel competent and also because I am hands on [involved in neonatal resuscitation]."*
- *"Follow the ABCD – clear airway, stabilize breathing, chest compressions and if needed some drugs."*
- *"I did attend a basic resuscitation course at Medunsa two years ago for three days ... we do drills [practising neonatal resuscitation on a mannequin] in the unit."*

The findings indicate 73.7% (n=19) of the staff in the NICU considered themselves to be competent regarding neonatal resuscitation. Interestingly, although only 21 permanent

nursing staff members were allocated to the NICU, there was 24 nursing staff from this unit who indicated they had attended training. It can be assumed that visiting community service nurses had also attended the training.

In CYCLE 3 the same hypotheses as in CYCLE 1 were tested. The *alternative hypothesis* (H_A1) was that nurses who are knowledgeable about the new trends and guidelines in neonatal resuscitation should feel competent in basic neonatal resuscitation. The *null hypothesis* (H_01) was that there was no association between nurses who were knowledgeable regarding the new trends and guidelines in neonatal resuscitation and feeling competent in basic neonatal resuscitation.

Inferential statistics were used again in CYCLE 3 to draw inferences from some of the data. The hypotheses were tested by drawing up cross-tabulation/contingency tables and applying the Chi-square test and the Fischer's exact test. These two tests were used to test for independence or association between two categories. The sample size was very small and therefore most of the time the Fischer's exact test was used to interpret the p-value. The level of significance was 0.05. If the p-value was less (<) than 0.05 the H_0 would be rejected in favour of the H_A . Therefore, the H_A would be valid indicating an association between the two categories. If the p-value was more (>) than 0.05, the H_0 would not be rejected in favour of the H_A and the H_0 would be valid – meaning that there was no statistically significant association between the two categories and that the changes might have been attributed to other influencing factors.

Because of the small sample size the categories were reduced from a 4x4 to a 2x2 contingency table. These categories were allocated with a name to make the interpretation and the reporting of the findings more understandable. Chi-square tests could not be done for some of the cross tabulations because at least one variable in each two-way table upon which measures of association were computed, was a constant. The detailed discussion on data analysis from the questionnaire was discussed in Chapter 4, section 4.8.1.1.

The categories that were cross-tabulated were knowledgeable and not knowledgeable regarding the new trends and guidelines of neonatal resuscitation against feeling competent or not competent in basic neonatal resuscitation (see Questions 9 and 43, Annexure I). A total of 32 respondents out of 40 answered this question. The p-value was 0.032 (<0.05). The H_0 was therefore rejected in favour of the H_A indicating that there was a statistical significant association between being knowledgeable regarding the new trends and guidelines in neonatal resuscitation and feeling competent in neonatal resuscitation. The finding was therefore that staff considering themselves as knowledgeable perceived themselves as feeling competent in neonatal resuscitation.

Likewise, all the other hypotheses (to be discussed later on in Table 7.5 and Table 7.6) were tested. Where applicable the Chi-square test was used, but most of the time, due to the small sample size, the Fischer’s exact test and only 2x2 contingency tables were used to cross-tabulate two categories.

In order to perform neonatal resuscitation there are certain guidelines that need to be in place and need to be followed. The practise of neonatal resuscitation includes prevention and early identification of risk factors (see Questions 23, 24 and 25, Annexure I). Of the 40 respondents 39 answered these questions. Figure 7.5 reflects the average in percentage of the importance of prevention and early identification perceived by the respondents in the labour ward, postnatal ward and NICU respectively.

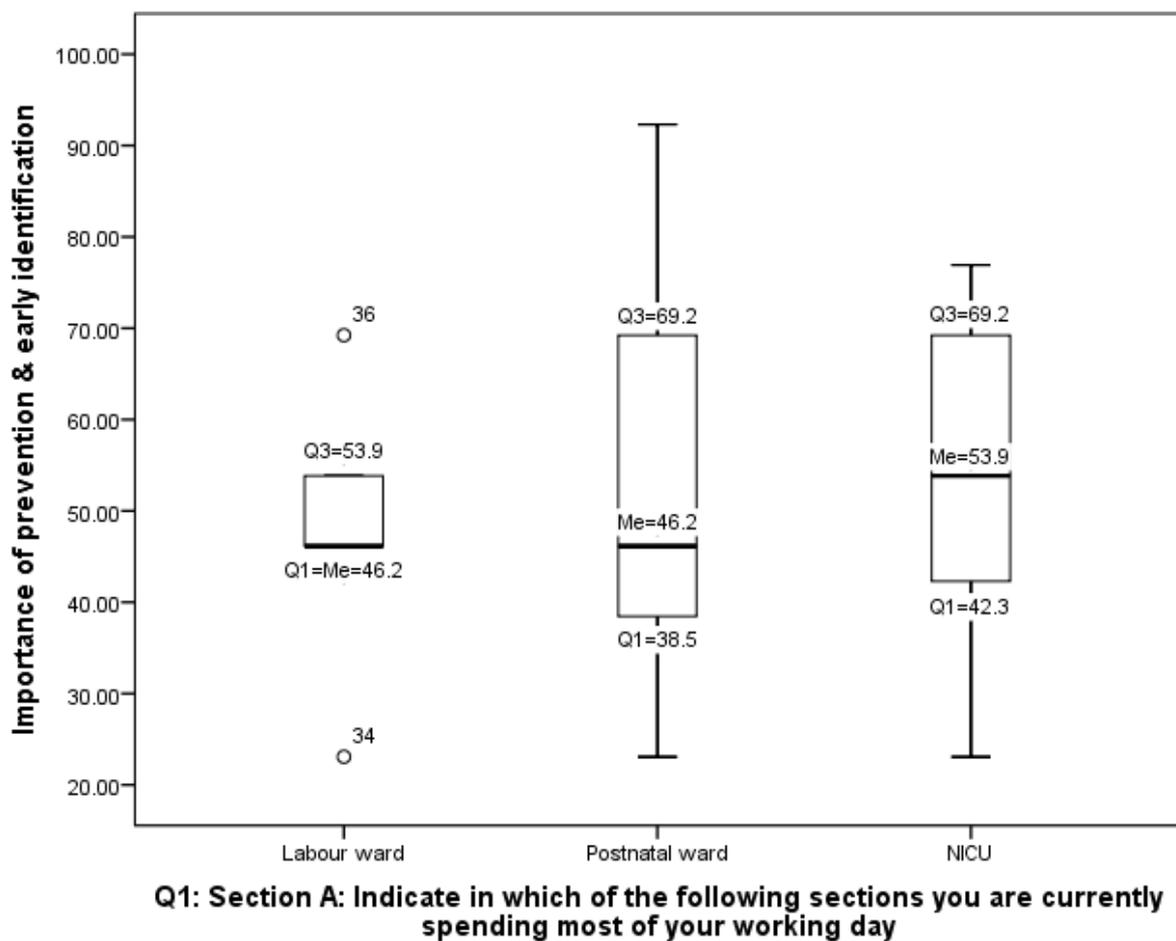


Figure 7.5: The average in percentage for the prevention and early identification of risk factors regarding neonatal resuscitation as indicated by the respondents from labour ward, postnatal ward and NICU respectively (n=39)

The findings signify there was no significant improvement. The focus of the neonatal resuscitation training was specific to bag mask ventilation and cardiac compressions. Due to

time constraints it was important to start with basic neonatal resuscitation and lifesaving skills. This could be the reason why there was no significant improvement regarding prevention and identification of risk factors.

Quality neonatal resuscitation depends on effective and sufficient neonatal resuscitation which requires adherence to certain principles and guidelines where neonatal resuscitation is concerned. The *hypothesis* was that nursing staff who perceived themselves as being knowledgeable regarding neonatal resuscitation should be able to know the critical aspects of neonatal resuscitation as well as which steps to follow during resuscitation (see Questions 26 to 39, Annexure I).

The *alternative hypothesis* (H_A2) was that nurses who perceived themselves as knowledgeable regarding neonatal resuscitation should answer, 'head in sniffing position'. The H_0 was that there was no association between perceived as knowledgeable and answering head in sniffing position. The p-value was 0.280 (>0.05), therefore, the H_0 was not rejected in favour of the H_A – indicating that there was not a statistical significant association between being knowledgeable and answering, 'head in sniffing position'.

Likewise, nurses perceiving themselves as knowledgeable regarding the new trends and guidelines for neonatal resuscitation and answering 'tight seal over nose and mouth'; 'tempo of ventilation of 40-60 per minute'; 'observing for chest rise'; 'commencing cardiac compression when heart rate is under 60 beats per minute' and then 'sustaining a tempo of 120-160 compressions per minute with a depth of 1/3 -1/2'. These are all examples of critical aspects of neonatal resuscitation (see Questions 26 to 39, Annexure I) which nurses should know. In some of the cross-tabulations the Chi-square tests could not be done because one of the variables was a constant, indicating that the respondents who completed the questionnaire answered that specific critical aspect regarding neonatal resuscitation correctly. This would indicate they had learned that specific piece of information or skill which is a lifesaving aspect of neonatal resuscitation. Table 7.5 illustrates these results.

Table 7.5: p-values for cross-tabulations of critical aspects of neonatal resuscitation against respondents perceiving themselves as being knowledgeable

VARIABLE A	VARIABLE B	P-VALUE	CONCLUSION
Knowledgeable	Tight seal over the nose and mouth	No Chi-square test could be done because variable B was a constant	All the respondents who answered this question answered it correctly
Knowledgeable	40-60 breaths per minute	p-value: 0.217 (>0.05)	Not a statistical significant association between A and B
Knowledgeable	Chest rise	No Chi-square test could be done because variable B was a constant	All the respondents who answered this question answered it correctly
Knowledgeable	Heart rate under 60 beats per minute	p-value: 0.155 (>0.05)	Not a statistical significant association between A and B
Knowledgeable	120-160 per minute	p-value: 1.000 (>0.05)	Not a statistical significant association between A and B
Knowledgeable	1/3-1/2 depth of compression	No Chi-square test could be done because variable B was a constant	All the respondents who answered this question answered it correctly

The same applied for feeling competent and being aware of the critical aspects of neonatal resuscitation as reflected in Table 7.6 (see Questions 26 to 39 and Question 43, Annexure I). It can be argued that when one feels competent about basic neonatal resuscitation one would be aware of the critical aspects of neonatal resuscitation as they are vital for the successfulness of neonatal resuscitation and reducing neonatal mortality and morbidity.

Table 7.6: p-values for cross-tabulations of critical aspects regarding neonatal resuscitation and feeling competent

VARIABLE A	VARIABLE B	P-VALUE	CONCLUSION
Feeling competent	Head in the sniffing position	p-value: 0.308 (>0.05)	Not a statistical significant association between A and B
Feeling competent	Tight seal over nose and mouth	No Chi-square test could be done because variable B was a constant	All the respondents who answered this question answered it correctly
Feeling competent	40-60 per minute	No Chi-square test could be done because variable B was a constant	All the respondents who answered this question answered it correctly
Feeling competent	Chest rise	No Chi-square test could be done because variable B was a constant	All the respondents who answered this question answered it correctly
Feeling competent	Heart rate under 60 beats per minute	p-value: 1.000 (>0.05)	Not a statistical significant association between A and B
Feeling competent	120-160 beats per minute	p-value:0.316 (>0.05)	Not a statistical significant association between A and B
Feeling competent	Depth of compression 1/3-1/2	No Chi-square test could be done because variable B was a constant	All the respondents who answered this question answered it correctly

The findings indicate there was improvement with regard to some of the critical aspects of neonatal resuscitation. These included a tight seal over nose and mouth during bag mask ventilation; ventilation rate of 40-60 per minute; looking for chest rise during bag mask ventilation as indicator of effective ventilation, and the preferred depth of cardiac compressions 1/3 to 1/2.

Furthermore, the same applied to the nurses' perception that they felt competent. When one perceives oneself to feel competent in neonatal resuscitation, one is expected to know the critical aspects related to the topic. These critical aspects are very important if one wants to make sure that the neonatal resuscitation practised is successful.

More staff in the NICU attended training. This was evidenced by the fact that less critical mistakes were made on the *questionnaires* relating to the aspects of the practise of neonatal

resuscitation. To indicate these changes, cross-tabulations were done on the same questions; therefore, cross-tabulating the critical aspect with being knowledgeable and feeling competent respectively, but for the NICU only. From these results it was clear that there was significant improvement regarding the critical aspects of neonatal resuscitation. No Chi-square tests could be done because variable A was a constant for almost all the questions except for commencement of chest compressions when the heart rate is less than 60 beats per minute. Table 7.7 below illustrates these results.

Table 7.7: Cross-tabulations for the NICU on the critical aspects regarding neonatal resuscitation and being knowledgeable and competent

VARIABLE A	VARIABLE B	P-VALUE	CONCLUSION
Knowledgeable	Head in sniffing position	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Knowledgeable	Tight seal over nose and mouth	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Knowledgeable	40-60 breaths per minute	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Knowledgeable	Chest rise	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Knowledgeable	120-160 per minute	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Knowledgeable	1/3-1/2 depth of compression	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Knowledgeable	Heart rate <60 beats per minute	p-value: 0.200 (>0.05)	Not a statistical significant association between A and B

VARIABLE A	VARIABLE B	P-VALUE	CONCLUSION
Competent	Head in sniffing position	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Competent	Tight seal over nose and mouth	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Competent	40-60 breaths per minute	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Competent	Chest rise	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Competent	120-160 per minute	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Competent	1/3-1/2 depth of compression	No Chi-square test because variable B was a constant	All the respondents who answered this question answered it correctly
Competent	Heart rate <60 beats per minute	p-value: 0.200 (>0.05)	Not a statistical significant association between A and B

Unfortunately, the same improvement was not seen in the postnatal and labour ward. For example, only nine of the 25 questionnaires handed out in the labour ward were completed and returned. From these it seemed that the respondents who had completed the questionnaires did not attend the training because they still made some gross critical mistakes.

To enforce and support neonatal resuscitation training mannequins were provided to each unit (labour ward, postnatal ward and NICU) in the maternity section as previously mentioned. Practising on a mannequin enforces and supports the knowledge of and having

the skill to resuscitate a neonatal. As done in CYCLE 1, respondents were asked again in CYCLE 3 (see Question 41, Annexure I) to indicate how often they practised neonatal resuscitation on a mannequin. Of the 40 respondents, 32 answered this question. Table 7.8 illustrates the frequency distribution when comparing CYCLE 1 and CYCLE 3 with regard to practising neonatal resuscitation on a mannequin (CYCLE1 [N=42]; CYCLE 3 [N=40]).

Table 7.8: Frequency distribution: comparison between CYCLE 1 and CYCLE 3 regarding respondents' perceptions on the frequency of practising neonatal resuscitation on a mannequin

HOW OFTEN DO YOU PRACTISE NEONATAL RESUSCITATION ON A MANNEQUIN?	LABOUR WARD				POSTNATAL WARD				NICU			
	CYCLE 1 (n=10)		CYCLE 3 (n=7)		CYCLE 1 (n=11)		CYCLE 3 (n=7)		CYCLE 1 (n=16)		CYCLE 3 (n=18)	
	f	%	f	%	f	%	f	%	f	%	f	%
Weekly	1	10%	1	14.3%	0	0	0	0	0	0	2	11.1%
Monthly	0	0	5	71.4%	0	0	1	14.3%	0	0	12	66.7%
Once every 3-6 months	2	20%	0	0	0	0	1	14.3%	0	0	1	5.6%
Yearly	0	0	1	14.3%	0	0	2	28.6%	0	0	1	5.6%
Never	6	60%	0	0	11	100%	3	42.9%	16	100%	2	11.1%
Other	1	10%	0	0	0	0	0	0	0	0	0	0
TOTAL	10	100%	7	100%	11	100%	7	100%	16	100%	18	100%

From the comparative findings in Table 7.8 it is clear there was improvement in opportunities for staff to practise neonatal resuscitation on a mannequin. Again, in the NICU, where most of the staff was trained, the results were significant. In CYCLE 1 all (100%) of the respondents indicated they had “Never” had the opportunity to practise neonatal resuscitation on a mannequin whereas in CYCLE 3 it was indicated by 66.7% of the respondents from the NICU that they had practised neonatal resuscitation “Monthly” on a mannequin. The respondents from the labour ward also showed improvement as 71.4% indicated they practised neonatal resuscitation on a monthly basis and only 14.3% indicated they practised neonatal resuscitation on a mannequin “Weekly” and a further 14.3% indicated that they practised neonatal resuscitation “Yearly”.

Figure 7.6 indicates the findings in CYCLE 1 and CYCLE 3 with regard to practising neonatal resuscitation on a mannequin in the maternity section. Respondents were asked how often they practised resuscitation on a mannequin (CYCLE1 [N=42]; CYCLE 3 [N=40]).

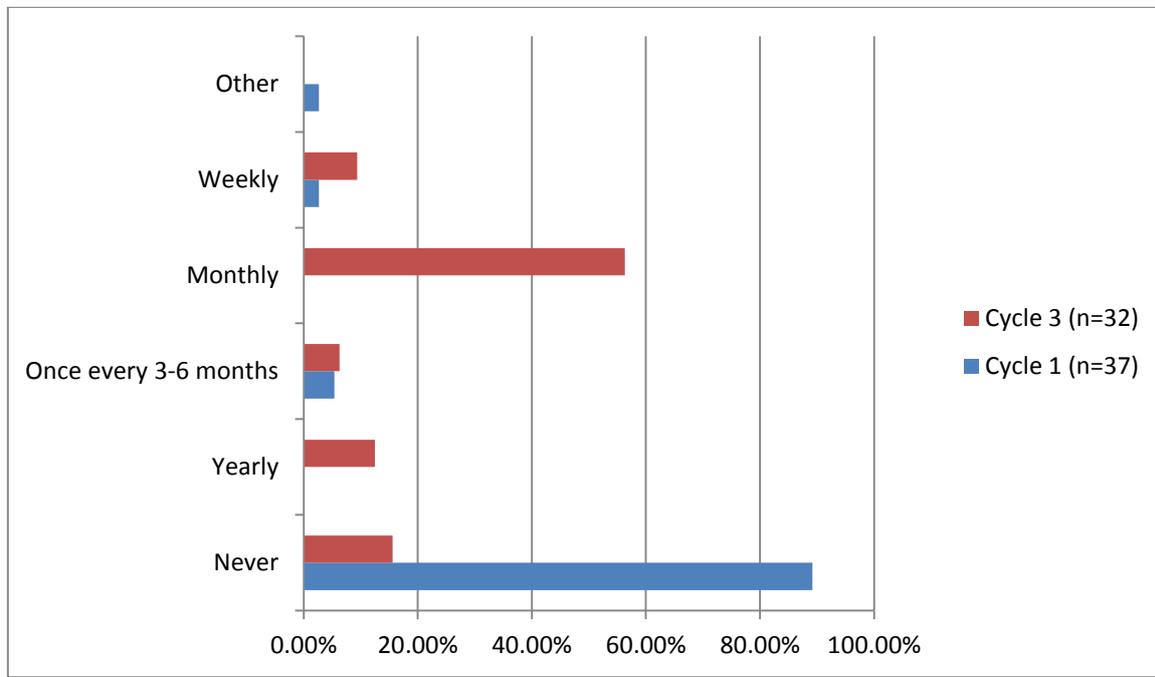


Figure 7.6: The changes in percentage between CYCLE 1 and CYCLE 3 regarding practising neonatal resuscitation on a mannequin

From the findings above it is clear that in CYCLE 1 most respondents from the maternity section (89.2 %; n=33) “Never” had the opportunity to practise neonatal resuscitation on a mannequin. After the implementation of the strategies the percentage of respondents who “Never” had the opportunity decreased to 15.4 % (n=5) and those who had a “Monthly” opportunity to practise on a mannequin increased to 56.3% (n=18) in CYCLE 3.

As previously mentioned (section 7.2) the findings from both the questionnaire and the focus group are discussed simultaneously to give a clear picture and thick description of the changes that occurred after the implementation of strategies. Clearly, the clinicians must be given an opportunity to practise neonatal resuscitation. Participants in the focus group indicated the availability of the mannequin helped them to practise neonatal resuscitation hands-on. These participants also shared the neonatal resuscitation training contributed towards increased confidence in them and also among the staff. The staff seemed to feel positive regarding the training and the mannequin assisted to ensure ongoing training opportunities. Furthermore, they indicated the training gave the staff the opportunity to

develop their knowledge and skill which motivated them to learn how to resuscitate a neonate. Importantly, the staff's lack of confidence was noted and identified as a challenge in the previous focus group in CYCLE 1 (see Chapter 5). The neonatal resuscitation training contributed towards staff gaining confidence and knowledge and skills in rendering quality care through professional conduct. Doctors participating in this focus group (CYCLE 3) shared that they perceived the nursing staff to be experienced whereas in the first focus group (CYCLE 1) the doctors had some negative feelings as far as the competence of the staff was concerned. It was also noticed by one participant that the training created awareness in that the maternity section needed some essential equipment for neonatal resuscitation purposes. Because of their newly acquired confidence and knowledge, the operational manager from the postnatal ward were motivated to convince management a saturation monitor was essential for the postnatal ward; a saturation monitor was subsequently obtained for this ward.

Participants made the following comments during the *focus group* regarding enforcing and support for training in neonatal resuscitation:

- *“Mannequins makes it easier for us to practise [neonatal resuscitation] at any given time ... Once you are trained but you don't practise obviously you will lose the skill since we have the mannequins we need to [practise] ... the challenge is sometimes they [doctors] are not available especially doctors, cause they also have other areas [wards] to attend to.”* (Participant 3).
- *“... staff has been trained and as I have observed it makes people to have confidence, you know to do the basic resuscitation.”* (Participant 4).
- *“... so with this training they will keep on developing themselves and see themselves somewhere ... as clinicians we must learn to do things repeatedly, because you can't be trained on resuscitation and not practising to resuscitate.”* (Participant 10).
- *“I think the training it was a positive factor because after the training we were able to motivate and move around some of the equipment ... so after the training it was also discovered that we also need that saturation monitor ... the positives is that the staff gained confidence they don't panic and when a baby is discovered to be ehhh ... to have changed condition they know the steps to take ...”* (Participant 9).
- *“You can see the sisters are competent ... there is positives in the unit and even the confidence among sisters especially when dealing with babies. Even in labour ward they do quickly they act according to everything [physical condition of the newborn] ... on when the baby is not well and everything when you get there they have covered almost all the basics hands-on. So I think it shows that they've learned something.”* (Participant 1).
- *“... they are well experienced actually ... Here the nurses are very well trained and you don't panic they are there they helping you they know almost everything.”* (Participant 7).

From the management's side a participant in the *focus group* suggested that neonatal resuscitation practise drills and demonstrations should be done on a weekly basis:

- “... *they* [staff from the maternity section] *have mannequins that they are using* [to practise neonatal resuscitation] *and my expectation is that every week there is a demonstration* [regarding neonatal resuscitation] *for you know training people ...*” (Participant 10).

A quality improvement initiative in neonatal resuscitation specifically focusing on training and acquiring knowledge and skills can influence the daily work life of staff and influence neonatal mortality. Below are some comments made by respondents in the qualitative aspect of the *questionnaire* (see Question 7, Annexure I):

- “*Training should be continuous to all staff members to be able to resuscitate always.*”
- “*Continuous workshop will make everyone to be confident in resuscitation procession* [process].”
- “*It will make daily duties worker friendly as all members of the unit will take part in resuscitating to help as they will have the knowledge of what is happening and what steps to take. This will save more lives and make to achieve my objectives and goals of caring for neonates.*”
- “*There will be less mortality and more babies would be saved, and also daily duties will be carried out effectively.*”
- “*It will benefit our daily work life because we will have healthy neonates with no complications.*”
- “*It will build one's confidence and enhance more knowledge about neonatal resuscitation.*”

However, it was vital to train everyone working in the maternity section of the district hospital and caring for a neonate on how to do basic neonatal resuscitation. The theme that kept on recurring from the participants was that they wanted the training to be a continuous process. Because of the high staff turnover, staff training had to be done on an ongoing basis to include all staff members at all levels all the time. Management also indicated they wanted the training to be continued in order to sustain the strategy regarding neonatal resuscitation training. Below are some comments made by the participants in the *focus group* regarding the training opportunities:

- “*I think everybody, almost everybody's got a chance to practise* [neonatal resuscitation of the mannequin].” (Participant 2).

- *“... and with the fact things that we have that we can use for training which can be ongoing which are the mannequins together with the Jim Box [resuscitation toolbox containing the necessary resuscitation equipment] also.” (Participant 4).*
- *“I didn’t think it is enough because I’ve been in maternity for fifteen months now, but I’ve never been trained on neonatal resuscitation.” (Participant 5).*
- *“... training obviously it should be a continuous process.” (Participant 3).*
- *“We all understand that clinicians are trained on basic management of conditions so I think a doctor or a nurse must be able to resuscitate a baby ... the basic things before you do the big things. They must have knowledge on how and where to start and the aim of this study was to train all doctors that are allocated in the maternity section but because of shortage [of doctors] were unable to train them because they are always held up at their own units during that time of the training ... When coming to resuscitation I think they will continue with training. I think I will demand an attendance register each week so that I’m sure that this is done continuously and how many people and everybody is [are] ... trained, because we need to train 100% of the staff.” (Participant 10).*

An important aspect of training is to keep staff motivated. It is thus vital for healthcare providers (nursing staff and doctors) to be placed according to their skills and in their area of interest. When healthcare providers are placed in a certain area where they do not feel competent, it can compromise the quality of care. Having competence and confidence in what they do or has been trained to do is essential for achieving the best possible outcome for the patient; therefore, in this context to improve the quality care for critically ill neonates. Hence, as desired by the participants, training needed to be a continuous process (sustainable) and all new staff also had to be orientated regarding the practise of neonatal resuscitation. In this regard, the participants made the following comments during the *focus group* regarding placement and orientation of staff:

- *“... I if even if I got trained but if I spend two months of three months not working in that area I am trained for I forget ... I mean to recall doesn’t come quickly it takes time ... You can have all the equipments ... but sometimes you need also people who are competent ... training must be continued with doctors and nurses, new doctors and nurses are coming and going out so that training must be there always” (Participant 1).*
- *“But when they admit somebody [nurse or doctor], appoint somebody let’s start orientating that somebody. We must be fast ... we must take initiative ... we must be vigilant so that we don’t find ourselves with this person a month not being trained on neonatal resuscitation because she may get ill while she was supposed to be with this very junior one and what is going to happen to the baby?” (Participant 10).*

From the reflections of the steering group during the reflective meeting in CYCLE 3 it was clear that the neonatal resuscitation training contributed towards maternity staff having a positive attitude, and staff involvement increased during neonatal resuscitation. Furthermore, it contributed towards the staff feeling more confident and competent to practise neonatal resuscitation. The knowledge and skills of the staff improved, especially because they had the opportunity to practise on the mannequins. During the reflective meeting the steering group agreed that improvement was visible in the bag mask ventilation as well as with the goal set by the HBB algorithm (the Golden Minute) to establish breathing within one minute after birth. According to the operational manager of the labour ward, the training contributed towards the reduction of neonates with birth asphyxia that needed to be transferred to the NICU. This fact was also confirmed by the NICU. There was also an improvement in neonatal care and the management of neonates. Staff members are more aware of any changes in a neonate's condition. This was explained by the reflections of the professional nurse from the NICU which confirmed they admitted less cold and gasping babies. It was reflected that learning resulted in the overall behavioural changes of staff in that they were more positive, prepared and alert. According to the reflections of the steering group, the quality of resuscitation had also improved and neonates were more stable when admitted in the NICU.

The following conclusions and suggestions for the future can be made from the findings. It is clear that not all of the staff members working in the maternity section of the district hospital were trained. As mentioned, all healthcare providers (doctors and nursing staff) caring for neonates in the maternity section of this district hospital should be trained in basic neonatal resuscitation as it will have a positive effect on neonatal mortality. This correlates with the statement of Musafili et al. (2013:e34) that effective resuscitation requires knowledge and skills and a preparedness to use these during neonatal resuscitation, and therefore training of healthcare providers plays a pivotal role in improving neonatal survival. These neonatal resuscitation training opportunities should be available for day and night staff as well as all healthcare providers irrespective of their qualification or nursing category. According to Ersdal and Singhal (2013:377), a single healthcare provider can make a difference between the life and death of a neonate irrespective of their qualifications; therefore, it is important to make the training programme simple and flexible enough to encounter the variability of their knowledge and skills.

The suggestion would be to ensure the train-the-trainer for the adjusted (addition of cardiac compressions) HBB programme is fully implemented and operational in the maternity section. Each of the HBB trainers should take responsibility to train as many staff as often as possible in their respective units. When following the HBB train-the-trainer model in a

training programme, potential facilitators are selected and trained to deliver a standardised educational programme in neonatal resuscitation and they also need to take responsibility for training facilitators and other healthcare providers within their facility or community (Singhal et al. 2012:91). According to Ersdal and Singhal (2013:377), there is a need for a consistent programme targeting ongoing training and local mentoring in order to have an impact on clinical management and patient outcomes. Once this is established, it can be rolled out to other sections of the district hospital such as the emergency room and theatre. It can even be rolled out to the surrounding clinics which are transferring their patients to this specific hospital. This would have the potential to create a snowball effect which can spread into the community and have a positive effect on neonatal mortality. Mothers can be trained on basic resuscitation of their neonates as part of the discharge information. Continued training could contribute towards the sustainability of the quality improvement initiative regarding neonatal resuscitation. According to Wall et al. (2009:s55), family members can provide essential first steps in neonatal resuscitation such as drying, warming, stimulation and airway positioning. This could potentially avert 10% of intrapartum-related neonatal deaths if a non-breathing neonate is dried and stimulated immediately after birth. Even the EMS staff can be trained on how to do basic neonatal resuscitation.

The researcher's reflections revealed a need existed to train professional nurses, midwives and doctors in advanced neonatal resuscitation with the focus specifically on the administration of oxygen, medication, fluids, and so forth as well as intubation and post-resuscitation care. Post-resuscitation care can improve the survival and long-term outcomes of neonates who received neonatal resuscitation (Wall et al. 2009:s55). During the training, the prevention and identification of risk factors should additionally be addressed. Training all nursing staff in basic neonatal nursing care is also called for as it will improve the quality of care and enhance the prevention of neonatal resuscitation. For example, the maintenance of temperature can play a significant role in prevention of neonatal resuscitation and neonatal mortality. Cost-effective interventions such as prevention of hypothermia can reduce the number of deaths in resource limited settings (Lloyd & de Witt 2013:1).

Creating training opportunities for neonatal resuscitation is important if all the nursing staff is to be kept updated on new trends and guidelines. Training will further ensure they have the necessary knowledge and skills to perform basic neonatal resuscitation thereby enforcing and supporting the training regarding neonatal resuscitation. The critical aspects of neonatal resuscitation are essential for the successfulness of the resuscitation and decreasing neonatal resuscitation. These should be practised as often as possible on the mannequins provided. In order to be competent in neonatal resuscitation theoretical knowledge as well as practical hands-on skill is needed. These skills should be practised regularly to enhance the

retention thereof (Kaczorowski et al. 1998:705). According to Anderson and Warren (2011:59), the practising of skills – such as those required for neonatal resuscitation – in simulation is a highly effective strategy for acquiring and retaining the skills required for competence, and it can also improve patient outcome. This correlates with Mosley and Shaw's (2013:4) advice that neonatal resuscitation practise drills in simulation should be introduced to the daily work schedule, and that the use of in-house mock simulations on a weekly basis might aid in the retention of knowledge and skills. The authors suggest it could be seen as a booster session. The sustainability of the quality improvement initiative can be enhanced by creating neonatal resuscitation training opportunities and the enforcement and support of the training through neonatal resuscitation practise drills and booster sessions.

Training should be continuous and in the form of refresher courses, in-service training, on-the-spot teaching, workshops and formal training sessions. This may enhance the sustainability of knowledge and skills regarding neonatal resuscitation. According to Skidmore and Urquhart (2001:31), training related to neonatal resuscitation should be central to continuous and ongoing teaching of all healthcare providers involved in obstetric care because it improves tested knowledge and skills; however, in-service refresher courses should be offered at least biannually. Refresher trainings and monitoring practise are advised after the HBB training to ensure knowledge and skill retention and timely performance within the Golden Minute (Goudar et al. 2013:e350; Musafili et al. 2013:e37). According to Ersdal et al. (2013:1426), repeated trainings are important especially if done in a safe simulated environment. Therefore, refresher courses and practising neonatal resuscitation skills in simulation may contribute towards knowledge and skill retention as well as the sustainability of the quality improvement initiative. New staff should thus also be orientated and staff should be placed according to their interests and skills to augment quality care in neonatal resuscitation.

For the strategy addressing neonatal resuscitation training to be sustainable, the healthcare providers working in the maternity section of this hospital should have a positive attitude towards training. If they improve their knowledge and skills they will be more involved in neonatal resuscitation which in turn will allow them to learn even more. They should feel motivated by an inner need to acquire the necessary knowledge and skills regarding neonatal resuscitation by themselves. This reflection signifies the factors described by Khomeiran et al. (2006:69) that influence nurses' development and competence. Two of the influencing factors are related to personal characteristics and motivation. Personal characteristics are the curiosity and readiness to improve knowledge and skills and the involvement in work-related activities. Motivation was also identified as an important element of competence development. The steering group also reflected that they experienced staff to

be more competent and having a more positive attitude after the neonatal resuscitation training. There is evidence that training in neonatal resuscitation can improve the knowledge, skills and attitudes of healthcare providers (Carlo et al. 2009:504). According to Cowan, Norman and Coopamah (2005:361), the requirements of nursing practice is the application of a combination of knowledge, performance, skills, values and attitudes.

Training gives one the necessary knowledge, skills and confidence to practise neonatal resuscitation, but the quality and outcome of the resuscitation also depends on the availability of certain essential equipment and stock needed during such emergencies. This corresponds with Ersdal and Singhal's (2013:337) assertion that when a certain level of competency in neonatal resuscitation has been reached, staff also needs the resources and support to enable them to use their skills optimally when the need arises.

7.3.2.2 Strategies addressing equipment and stock

The lack of equipment and resources and lack of maintenance of equipment was identified as a challenge in CYCLE 1 (see Chapter 5). Staff also experienced challenges with regard to the allocation of emergency equipment during neonatal resuscitation therefore compromising the outcome of the resuscitation (see Chapter 5, section 5.2 and 5.3). One of the key priorities identified in the nominal group technique discussion was therefore addressing challenges related to equipment and stock.

The strategy to address equipment and stock was developed and focused on a needs assessment regarding equipment and the procurement of equipment. Part of the strategy was that staff should receive in-service training on the use of equipment to ensure fully functional and maintained equipment. Likewise, the equipment should also have a maintenance plan for service of equipment and the equipment should be controlled in the sense that the units should keep track of the equipment that is available, lent out or borrowed. Stock used during emergency and neonatal resuscitation should also be replaced when used and be available whenever needed.

As part of the quality improvement initiative and the strategy regarding equipment and stock resuscitation boxes were provided to each of the units. These boxes were toolboxes containing the necessary emergency equipment and stock needed for neonatal resuscitation. The idea behind providing resuscitation toolboxes was for the three units (labour ward, postnatal ward and NICU) to each have their own mobile emergency equipment and stock kept together in one box. If and when needed to perform neonatal resuscitation, everything would be on hand and immediately available and accessible. In the

previous focus group (CYCLE 1) the main theme that emerged regarding equipment was the staff had to look for emergency equipment (see Chapter 5, section 5.3). The solution to this problem was therefore to provide resuscitation toolboxes for the three units to prevent sharing which compromised neonatal morbidity and mortality. Although the boxes were not complete and essential equipment was missing (for example laryngoscopes and laryngoscope blades, McGill's forceps), the staff were satisfied and positive about having some basic essential equipment. As mentioned in the previous section, reference cards were also attached to the handles. These cards included flowcharts and examples of correct bag mask ventilation and cardiac compressions.

Reflections from the steering group regarding the implementation of strategies during the reflective meeting included a needs assessment with regard to the procurement of equipment was essential. Unfortunately, according to the reflections, the procurement processes were slow due to the government's tender processes. The staff also received in-service training on the use of new equipment and the maintenance thereof. All three units (labour ward, postnatal ward and NICU) made use of an inventory book and a movement book (indicating which equipment was borrowed). All three units also did daily checks on the emergency trolley and resuscitation boxes thereby ensuring that the equipment and stock available were also ready to be used during emergencies such as neonatal resuscitation. Furthermore, the three units each had a maintenance book in place whereby they requested repairs, the servicing of equipment as well as noting down condemned broken equipment.

During the focus group discussion the participants indicated there was an initial lack of equipment resources to care for premature babies. Subsequently, appropriate equipment was provided, for example, some ICU beds and machines needed for an NICU. After the occurrence of a critical incident, it was identified that the hospital was lacking equipment to care for premature babies. The procurement of the specific equipment was done just when the study began. However, more awareness was created about further equipment needed and some were also procured during the course of the study. For example, mobile suction machines and a mobile incubator which could be used in the hospital to transport neonate from the theatre or labour ward to the NICU or taking a neonate from the NICU for certain procedures such as X-rays.

Some of the positive comments made by the participants during the *focus group* regarding the need for and procurement of equipment were the following:

- *"I love the Jim Box [resuscitation toolbox] because its handy we can run around to where the emergency is happening, not bring the baby where the Jim Box is ... So*

after the training it was also discovered that we also need a saturation monitor.” (Participant 9).

- *“We have kept the box in the Kangaroo Mother Care [KMC unit] so that if you have to start resuscitation there you have almost everything that is necessary for basic resuscitation ... so new additions would be that mobile box [resuscitation toolbox] and then at least we did receive a mobile incubator which can be used to transfer babies from labour ward to our unit [NICU] or if we have to transfer babies from labour ward to our unit or if we have to take a baby somewhere for ... whatever procedure.”* (Participant 4).
- *“... but after that incident we were provided with machines that’s when we’ve had a ... neonatal ICU, a four-bedded neonatal ICU ... But up to so far I think we have almost the required eh equipment that we need we are left with a few things ...”* (Participant 10).
- *“Yeah positive factor and also each piece of equipment because when you order and you try to motivate sometimes you are not like listened to but the equipment that he is talking about we ordered new ones but whilst waiting to purchase them they managed to get others from other institutions [referring to radiant warmers that were received from another hospital to be used in labour ward and theatre]”. (Participant 3).*

In the qualitative aspect of the questionnaire (see Question 13, Annexure I) respondents indicated they had a well-equipped emergency trolley and they had received some equipment they needed. The equipment included radiant warmers, SiPAP machines and Neopuffs to assist in caring for neonates during and after neonatal resuscitation. Below are some of the comments made by respondents who completed the *questionnaire*:

- *“Emergency trolley that is well-equipped with working equipment’s.”*
- *“Emergency equipment available in unit although not enough, for example there is only one radiant warmer which will present a problem if more than one baby needs to be resuscitated.”*

As in CYCLE 1 respondents were asked whether there were adequate facilities and equipment available to do neonatal resuscitation. Overall 38 (n=38) of the 40 (N=40) respondents answered this question (see Question 13, Annexure I). Table 7.9 illustrates the frequency distributions comparing the perceptions of respondents regarding the availability of adequate facilities and equipment to do neonatal resuscitation in each of the three units (CYCLE1 [N=42]; CYCLE 3 [N=40]).

Table 7.9: Frequency distribution: comparison of CYCLE 1 and CYCLE 3 regarding respondents' perceptions regarding the availability of adequate equipment and facilities to do neonatal resuscitation

ARE THERE ADEQUATE FACILITIES AND EQUIPMENT AVAILABLE TO DO NEONATAL RESUSCITATION IF NEEDED?	LABOUR WARD				POSTNATAL WARD				NICU			
	CYCLE 1 (n=13)		CYCLE 3 (n=9)		CYCLE 1 (n=11)		CYCLE 3 (n=10)		CYCLE 1 (n=15)		CYCLE 3 (n=19)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Never	1	7.7%	0	0	1	9.1%	4	40%	1	6.7%	2	10.5%
Seldom	3	23.1%	3	33.3%	3	27.3%	0	0	1	6.7%	1	5.3%
Sometimes	2	15.4%	3	33.3%	3	27.3%	5	50%	7	46.7%	9	47.4%
Often	4	30.8%	1	11.1%	2	18.2%	1	10%	5	33.3%	4	21.1%
Always	3	23.1%	2	22.2%	2	18.2%	0	0	1	6.7%	3	15.8%
TOTAL	13	100%	9	100%	11	100%	10	100%	15	100%	19	100%

From the findings shown in Table 7.9 it can be concluded that there was an overall positive response from the participants' perceptions in CYCLE 3 (compared to the responses from CYCLE 1) indicating facilities and equipment were "Sometimes" adequately available in all three units for neonatal resuscitation. However, the ideal would be for facilities and equipment to be "Always" adequately available in all three units.

Next, Figure 7.7 illustrates the changes with regard to the respondents' perceptions of the same question regarding the availability of adequate facilities and equipment for neonatal resuscitation in the maternity section (see Question 13, Annexure I) (CYCLE1 [N=42]; CYCLE 3 [N=40]).

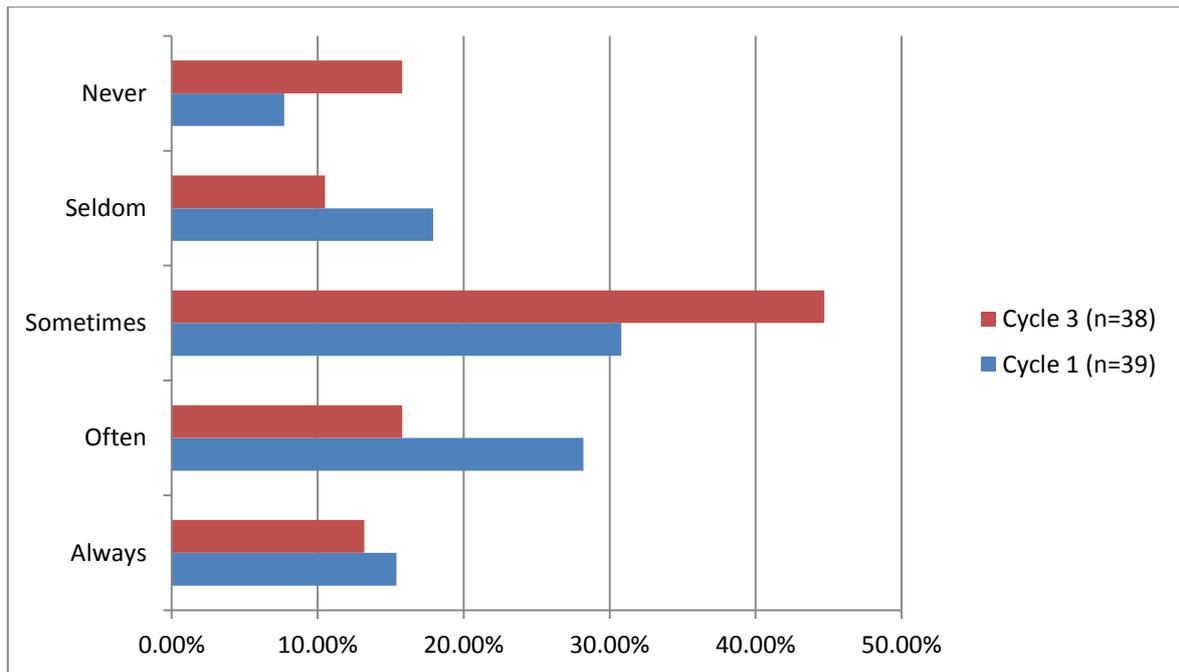


Figure 7.7: Changes in percentage between CYCLE 1 and CYCLE 3 regarding the adequacy of facilities and equipment to do neonatal resuscitation

From the findings it can be concluded that more than 40% (n=17) of respondents from the maternity section in CYCLE 3 indicated they felt that “Sometimes” adequate facilities and equipment were not available. The reflections of the steering group after the implementation of the strategies were that the aforementioned equipment had been received, but there was still a definite need for some other lifesaving equipment (such as laryngoscopes and McGill’s forceps) essential during neonatal resuscitation. These equipment needs were also highlighted during the focus group as well as in the qualitative aspects of the questionnaire.

The qualitative aspect of Question 13 (see *questionnaire*, Annexure I) indicated clearly a need still existed for additional equipment such as radiant warmers. It furthermore emphasised equipment should also be maintained and serviced as mentioned in the following quotes:

- *“Procurement of extra equipment e.g. radiant warmer (6 in unit and one resuscitation machine).”*
- *“To have more overhead radiant warmers in the unit for effective resuscitation of babies.”*
- *“CPAP machines must be serviced at 6 months interval to keep them working always.”*
- *“To have ventilator so that if the baby does not cope on SiPAP [it] can go onto the ventilator.”*

- *“Changes can be made by ensuring correct, adequate and appropriate equipment required.”*

Unfortunately there were still some important and essential lifesaving equipment needed such as laryngoscope blades and small McGill’s forceps. The process of procuring this equipment is, however, very slow. The procurement process is a lengthy and slow process while the lack of financial resources further aggravated this problem. A further problem was inexperienced supply chain management, but it was addressed by appointing knowledgeable staff. For the procurement of essential lifesaving equipment the specific needs of the three individual units (labour ward, postnatal ward and NICU) had to be taken into consideration and these specific needs had to be the first priority. The lack of some equipment was an aspect that could not be controlled; but management gave the assurance it would also be made available as soon as possible. It had been ordered and follow-up was done on a regular basis.

Below are some comments made by participants in the *focus group* about the challenges still experienced regarding the need for and procurement of equipment in the maternity section.

- *“We still would like to have a resuscitation machine or ... extra cosy cots [radiant warmer], because that is still a challenge when we have to resuscitate ... because if there is one sick baby already on the warmer then when we have to resuscitate another baby who can crash [clinical deterioration of a neonate consequently in need of neonatal resuscitation] that becomes a problem, because we have to do it [neonatal resuscitation] now on open air because we can’t resuscitate inside an incubator. And we did request for extra equipment and we are hoping to be able to be helped with those, because they are lifesaving equipment ... in the equipment also much as I’ve talked about the cosy cots [radiant warmer] we also have a problem with McGill’s forceps and an introducer for the neonate, they are ... the ones [equipment] that we are using are not for the babies and some doctors struggle in using them because they are too big. So like sister have said they’ve been ordered and follow-up made and we are still waiting but in the meantime we really need them because they are lifesaving instruments.” (Participant 4).*
- *“I still feel we are still lacking some [equipment] and which to me are essential like the laryngoscope blades, the smaller sizes we still don’t have and currently we are still having a problem of suction. We only have the smallest size then when we have babies who have meconium we struggle [with endotracheal intubation or suctioning under direct vision], but we made follow up with stores, they are promising although up to today ... we didn’t receive anything ... I would say the blades [laryngoscope blades], because when you resuscitate if you have to intubate especially the smaller babies you need a smaller size of blade ... But currently we*

are only having the size 1 the 0 and 00 we don't have and we ordered 1 and it's been months now like I would call procurement almost every week and sometimes they sound like they are irritated but maybe the problem is to me it's ... an essential equipment.” (Participant 3).

- *“... regarding the ... resources we know government. Because people will keep on saying there up there in management don't do anything we don't have monies [money/financial resources] in our pockets ... It's a process when you want to buy something. Ours is just to nag and push, and you know nag until you get something ... yes process is a system but at what level now? You will find that the ordering papers are still on the table ... we didn't have experienced people in the supply chain management. So we are still appointing people who are knowledgeable and experienced but there is a lot of improvement.” (Participant 10).*

In-service training of staff on the use of equipment is essential to ensure they are familiar with it and can use it. It is important for them to also ensure the optimal functioning of the equipment to provide quality care. The hospital received equipment essential for the functioning of an NICU after an incident where five neonates died due to prematurity. No lifesaving equipment such as SiPAP machines was available at the time. Staff members were trained on how to use the equipment. The next comment was made by a participant in the *focus group* regarding in-service training of staff:

- *“So we were given all the machines that were needed for a neonatal ICU and we started training people on how to use them [the equipment].” (Participant 10).*

Equipment should be controlled and accounted for to make sure they are always available when needed. Based on the strategy, equipment control was important to determine the loss of equipment as well as to keep track of the movement and availability of the equipment. Moreover, it was important for the equipment to be maintained and serviced to ensure it functioned optimally. Participants also commented on this aspect during the *focus group*:

- *“... you get equipments and later find that they [are] no longer working. Nobody cares about them [equipment] and that thing. So I think equipment must be there and equipment must be checked. As you know I'm sure for every equipment ... there is recommendation as to when it should be checked [serviced].” (Participant 1).*
- *“.... equipment yes we need to have maintenance plan and stick to the plan then in that way we will be able to sustain the strategy of equipment.” (Participant 3).*

The reflections of the steering group during the reflective meeting included mentioning the need for good quality emergency equipment. The researcher also observed frustrations were experienced by the steering group concerning the procurement process of equipment. Due

to the fact that it is lifesaving emergency equipment, the procurement process should be evaluated and procurement should be followed up. However, it was reflected by members of the steering group that some of the equipment, for example, the saturation monitor in the postnatal ward, improved the confidence of the nurses working there. If a change in a neonate's condition is observed, it can be confirmed with the saturation monitor. Because a saturation monitor was available and it functioned properly, the staff could act with speed and confidence. The steering group also reflected on the new blood gas machine made available and expressed the need for staff to be trained on the use of the machine and interpretation of blood gas analysis. Furthermore, they identified the need for a ventilator in the NICU to stabilise and manage ventilated neonates before transfer to tertiary institutions.

It can be concluded from the findings that there was positive improvement regarding the procurement of equipment, but essential lifesaving equipment was still needed. Management should focus on procuring this equipment as acquiring of the additional equipment would improve quality neonatal resuscitation significantly. This correlates with the Every Newborn Action Plan (WHO/UNICEF:2014:26) in which one of the proposed actions to improve the quality of newborn care is to ensure that maternity facilities have appropriate infrastructure and are adequately equipped to provide care for newborns. Unfortunately, the procurement of equipment is a lengthy process and influenced by a lot of factors which was outside the scope of this study. Since the beginning of this study awareness was created regarding specifically which equipment was needed. The problems with the procurement of some essential emergency equipment are troublesome because equipment such as laryngoscope blades and McGill's forceps are both needed for intubation. This type of equipment can make a difference between the life and death of a neonate. Certain equipment is therefore needed to improve quality care. Thus, there were some positive changes regarding the procurement of equipment, but there was still room for improvement.

However, staff should be able to know how to use and maintain equipment and therefore it is very important to provide in-service training to them on new equipment. To sustain the strategy regarding equipment it is critical to control, maintain and service it. Of further importance is to keep track of the equipment and stock as there is no sense in having equipment and then not maintaining it.

Suggestions for future changes included ensuring a proper needs assessment is done as to which equipment is needed in the maternity section. The opinions of the operational managers should not be taken lightly as they are the ones who know exactly what is needed in their unit. Lifesaving equipment such as laryngoscope blades and McGill's forceps should be the first priority when procuring essential equipment. At this hospital the problem would

arise when a neonate needs to be intubated. First of all they do not have laryngoscope blades or McGill's forceps which is essential during intubation. Having these types of equipment is on the essential equipment list for level 1 hospitals as outlined in the NaPeMMCo report (NaPeMMCo 2011:201-203). According to recommendations made in the NaPeMMCo report (2011:102), all hospitals should have the required basic equipment available during the resuscitation of neonates and postnatal care for sick and low birth weight neonates.

The Recommended Standards for Essential Newborn Care (2012:17) stipulates district hospital should have at least one radiant warmer for each high care bed. Currently there are four high care beds in the NICU. The ideal would be to have four open radiant warmer beds in the four-bed ICU part of the NICU so that a bed is always available for the resuscitation of a neonate because it is vital for warmth to be provided during resuscitation. Furthermore, according to the Recommended Standards for Essential Newborn Care (2012:9), a third of the beds in the NICU in a district hospital should be allocated to high care beds; in this setting there were only four high care beds and the ideal would be to have 11 high care beds. To improve the quality of care the facilities and equipment need to be upgraded according to the requirements of the Standards for Essential Newborn Care and the NaPeMMCo report.

The South African Government should therefore ensure that level 1 (district) hospitals receive all the necessary equipment. According to the NaPeMMCo report (NaPeMMCo 2011:89-90), two-thirds of district hospitals does not have the required critical equipment for resuscitation of neonates. Furthermore, the aforementioned report also indicates that critically ill neonates require essential monitoring. A warning is included in the NaPeMMCo report stating without the necessary equipment, the high mortality rates might not be reduced due to avoidable and modifiable causes in the district hospital.

It is the researchers opinion that each district hospital should be evaluated individually according to the amount and type of neonatal patients they care for. For example, this hospital serves 32 clinics in a rural area in Gauteng and a lot of premature babies are treated there. They therefore need equipment which will enable them to render quality care to their patients; particularly because the neonatal mortality rate is so high in district hospitals. Therefore, extra measures should be taken by the hospital management and healthcare workers alike to make sure they have the necessary lifesaving equipment to perform neonatal resuscitation. For example, due to the fact that in this district hospital the nursing staff and other healthcare personnel had to wait for beds to become available in other hospitals; they also needed to wait for the ambulance to arrive. A ventilator was a

matter of urgency because they had to care for these critically ill neonates until they could be transferred. Not having this type of equipment available compromises the outcome of the neonates.

From the reflections of the steering group it was observed that the hospital had had a blood gas machine available in the emergency room since October 2014. The implementation and use of this blood gas machine was unfortunately not optimal. There is therefore a dire need for training on how to interpret the blood gas results and adjust the SiPAP accordingly. This blood gas machine can make a significant contribution towards quality care; improving the outcome of neonates and reducing neonatal mortality. A thorough need assessment has to be done to identify which equipment and what stock are still needed as this has a direct influence on the quality of care and the outcome of neonatal resuscitation.

Equipment and the availability of stock not only affect quality of care, specifically where neonatal resuscitation is concerned, but it also affects the staff morale and attitude. If the essential and much needed equipment to render quality care is not available or not functioning properly or if the nursing staff does not know how to operate it and maintain it, their attitude towards their work environment might not be favourable; they may feel hopeless and frustrated because they cannot help a suffering neonate without equipment, stock and training.

7.3.2.3 Strategies addressing staff attitude

In CYCLE 1 staff attitude was identified as an area with many challenges (see Chapter 5). The challenges experienced regarding staff attitude were due to their lack of knowledge which led to the lack of self-confidence and staff involvement with regard to neonatal resuscitation. Staff members were reluctant to get involved during neonatal resuscitation and therefore it had an overall influence on the quality care and staff behaviour especially regarding neonatal resuscitation.

Staff attitude in the context of this study referred to their attitude towards the patients (neonates and women in labour), the work environment and colleagues. The strategy addressing staff attitude focused on establishing a task team to address challenges regarding staff attitude. The strategy also focused on staff support which included aspects related to communication, the recognition and incentives for staff who attend training, and support systems. Support systems included debriefing support from management, addressing concerns, mentoring and coaching as well as teambuilding and teamwork. It is also important for staff to have a positive conducive to professional conduct. Staff should

adhere to the code of conduct and Batho Pele principles. Therefore, the staff members need to conduct their duties in a professional manner and they need to have confidence in their ability to render quality care.

A team addressing staff attitude was mandated from the Minister of Health's offices as one of six key priorities (Department of Health, Quality improvement guide 2012:6). Although the minister's mandate was addressed to another team, the team of staff in the current study also had an influence on the changes regarding staff attitude. An additional task team was not established, but people who were responsible for addressing staff attitude were appointed by management in each of the units.

Below are some comments made during the *focus group* with regard to addressing staff attitude in this district hospital:

- *"We have one of the six priorities. I think and the first one is staff attitude. So it's ... like always addressed."* (Participant 3).
- *"There is a group dealing with attitude even in the ward there are people responsible for attitude."* (Participant 10).

Staff should also be confident in their knowledge and skills regarding nursing care abilities. Staff gained confidence from the acquisition of the knowledge and skills they required as a result of the training and therefore they had confidence to render quality care through professional conduct. The recognition of training also contributed towards a positive staff attitude. Participants indicated that before staff members were trained, they had been reluctant to participate in neonatal resuscitation; after training, however, they had the knowledge and skills to resuscitate and other staff members came to assist them. The lack of staff involvement in neonatal resuscitation was identified as a problem in the previous focus group (CYCLE 1). But there was definite improvement with regard to staff involvement as reflected in CYCLE 3 which was attributed to the positive influence of staff attitude. Recurring themes emerged in the comments made by the participants in the *focus group* with regard to staff attitude, confidence and staff involvement:

- *"Because now I am confident I don't visit wards more often now. Because I see you know confident people ... I've seen a great improvement and then people are you know are so ... has have 'oomph' [have energy] of you know working because you know they know that they are now becoming confident of what they are doing."* (Participant 10).
- *"The positives is [are] that the staff gained confidence they don't panic and when a baby is discovered to be ... to have changed condition they know the steps to take like the incident that happened over the weekend. The report that we've got was that"*

they ... they would come and they just know what they ... they were doing.” (Participant 9).

- *“There is ... is positive in the unit and even the confidence among the sisters especially dealing with the babies.”* (Participant 1).
- *“Before people knew, you know had the skill of resuscitation whenever you were calling them ‘Please come and help me in the ICU’ ... people wouldn’t come because they were afraid of what am I going to do when I arrive there. But when people are knowledgeable you know when we call they come ... you know they respond much quicker that before because they are confident, they know what is going to happen there.”* (Participant 4).

Sufficient and effective communication in a hospital is very important. Communication between nursing staff, their senior and clinical leaders and management should be clear especially if it pertains to quality neonatal resuscitation. The respondents in CYCLES 1 and 3 were asked the same question regarding effectively communicating information about neonatal resuscitation, feedback, and communication during resuscitation (see Questions 17 and 18, Annexure I). Respondents were asked the following questions: *Is feedback and communication during and after neonatal resuscitation adequate? Is information regarding neonatal resuscitation communicated effectively?* Communication was also addressed as part of staff support in the strategy that addressed staff attitude. Figure 7.8 illustrates the results and the changes that occurred regarding the communication of information. (CYCLE1 [N=42]; CYCLE 3 [N=40]).

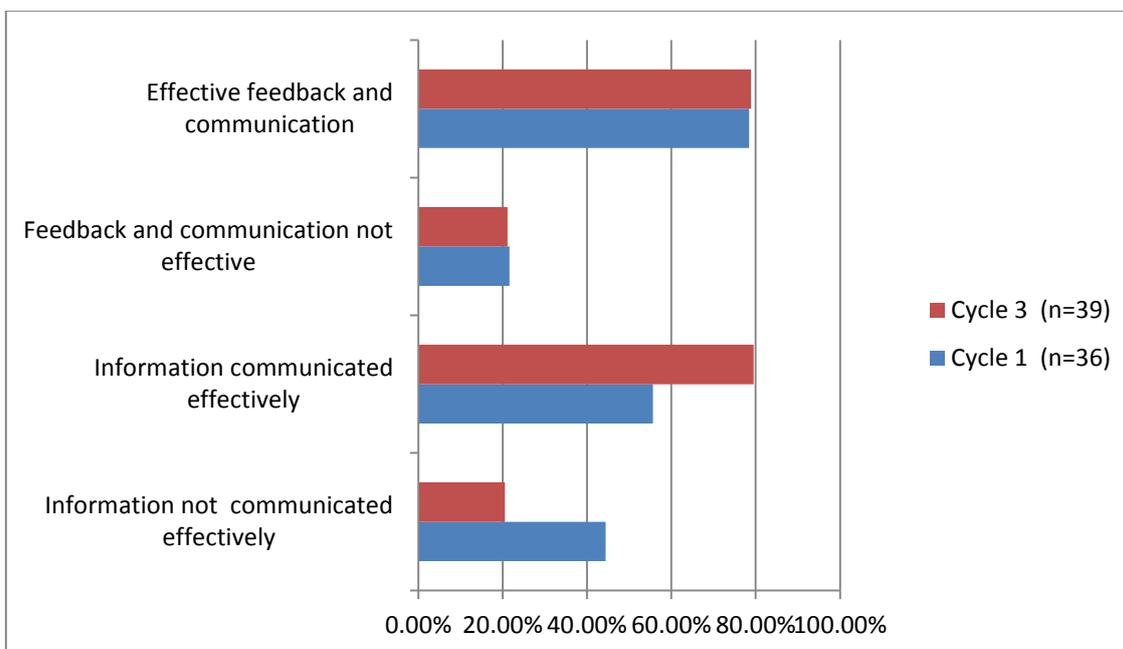


Figure 7.8: The changes in percentage between CYCLE 1 and CYCLE 3 regarding the communication of information with regards to neonatal resuscitation

These results indicated the communication of information with regard to neonatal resuscitation improved from CYCLE 1 to CYCLE 3 and almost 80% (n=39) of the respondents who completed the questionnaire had a positive view. Below are some of the comments made in the qualitative aspects of these questions in the *questionnaire*.

- “Because we communicate always during and after resuscitation and the sister in charge of high care calls us for help.”
- “Adequate feedback is given and communication is very good between the staff members.”
- “We discuss our weak point and how to improve in neonatal resuscitation.”
- “People attending workshops gives feedback, the challenge becomes actually practising and achieving the desired skills, those who are passionate will benefit from the feedback.”
- “After training always we try and explain to other staff members what we have been doing and also try to demonstrate.”

There were recurrent themes related to the fact that communication during and after neonatal resuscitation training was taking place. According to the respondents information after workshops and training on neonatal resuscitation was communicated effectively.

Effective communication is important but it is also important for healthcare providers to have and work towards the same goal. Therefore, a vision and aim and protocol guide staff to improve quality care. Respondents were asked if a vision and aim regarding neonatal resuscitation were in place. (See Questions 20 and 21, Annexure I). Figure 7.9 below illustrates the changes in these results. (CYCLE1 [N=42]; CYCLE 3 [N=40]).

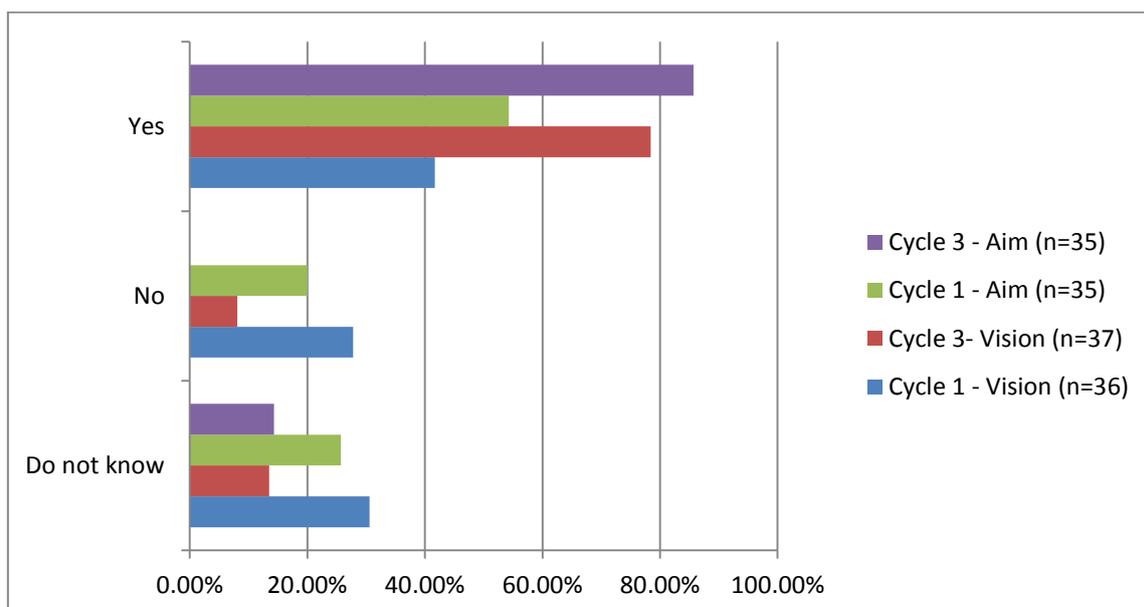


Figure 7.9: The changes in percentage between Cycle 1 and Cycle 3 regarding the availability of a vision and aim for neonatal resuscitation.

From the above results it can be concluded that more respondents were aware of the vision and aim regarding neonatal resuscitation.

Previously, the staff also had a blaming attitude and this contributed to subsequent meetings being held to address the challenges the staff experienced on a daily basis, for example, with regard to equipment and staff shortage and so forth. The fact that these challenges were addressed by management also contributed towards the staff feeling supported as indicated by this participant in the *focus group*.

- *“... they sort of blaming somebody you know they will say they ... they didn't have what ... they didn't have what ... an attitude were a contributory factor to the whole thing. But subsequent meetings that we attended this were addressed and operational managers made sure that this is corrected in their unit.”*
(Participant 10).

It also seemed as if management was trying to keep the staff positive and preventing them from feeling demoralised by the delayed processes of the system. Management also pledged their support with regard to addressing challenges experienced by the staff working in the maternity section of the district hospital, but only if these challenges were reported. This is illustrated in the comment below made by a participant during the *focus group*.

- *“I don't tell them the ordering papers are still on the table I just reassure them, because I don't want them to be demoralised ... We must all understand that government systems are the ones that fails us. But as a manager I can't condemn their act because I'm also government. I need to do something about what is happening ... I'm pledging my support to all of you, but only when things are reported. Because if we don't report things and just heard them in the meeting I disassociate myself from such because 'akhiri' [do you agree] I was not informed I don't know. But I'm pledging to support every one of you only if when I'm informed about what the challenge is.”* (Participant 10).

Staff support in the form of communication and support systems is also important and staff should feel management supports them regarding the challenges they experience. Some of these challenges were addressed but there were still some that needed attention such as admitting sick neonates directly in the labour ward instead of the NICU, for example, as indicated by comments made by participants during the *focus group*:

- *“I wanted to add just the issue of ... ehh patient coming from ... from outside going straight to labour ward it's better to go straight to paed's [paediatric unit] but I know it is going to be a problem so I think if they can sort out also ... cause they need to wait to be seen and admitted by the doctor whereas they if they were*

going straight to neonatal unit they will be seen by nurses who are only dealing with babies” (Participant 6).

- “I understand the concern of [R6] of ... sick babies coming to the unit [labour ward]. It was ... we know our babies needs to be attended to quickly and we understand the challenge, but I’m sure that also need to be addressed. Really, cause [because] I was also concerned about it I tried to talk about it then I stopped ... so hence we would wish that sick babies especially those who are from the health centres who has been seen by midwives should be sent straight to neonatal unit.” (Participant 3).

The staff also indicated aspects regarding staff involvement and reflection on neonatal resuscitation, for example, attending mortality and morbidity meetings and debriefing after resuscitation (see Questions 44 and 45, Annexure I) still needed improvement. Figure 7.10 illustrates the changes with regard to reflections between CYCLE 1 and CYCLE 3 (CYCLE1 [N=42]; CYCLE 3 [N=40]).

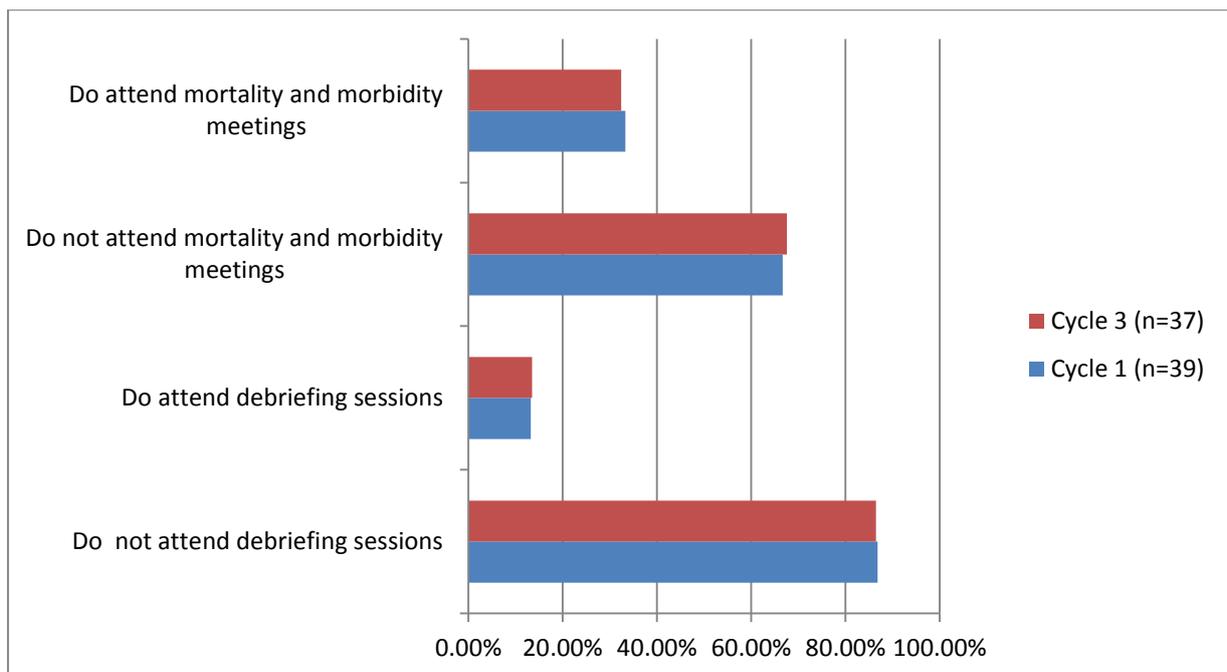


Figure 7.10: Changes in percentage between CYCLE 1 and CYCLE 3 regarding reflection on neonatal resuscitation (including mortality and morbidity meetings and debriefing sessions)

From these results it was clear there had been no improvement with regard to reflection after neonatal resuscitation. Communication in the form of mortality and morbidity meetings are also important and respondents indicated they felt such meetings should be held again. The purpose of these meetings was to improve the quality care and address challenges; furthermore, it contributed towards the correct management of patients. Mortality and morbidity meetings can also serve as debriefing when cases are discussed where neonatal

resuscitation failed. In the *focus group* a participant reflected on the effectiveness of these meetings as follows:

- *“Another negative is we used to have meetings [mortality and morbidity meetings] between us and the neonate people, but we stopped having these meetings. Because we were discussing what went wrong to some of the babies ... so it was really helpful for us to improve on our management.”* (Participant 2).

Staff should be supported by management to retain and motivate staff and prevent them from resigning. Recurrent themes emerged on staff attitude which is influenced by many aspects. To have a positive attitude, the climate of the working environment is important and it is influenced by aspects such as training and the availability of equipment and staff resources. If staff cannot work due to the lack of the equipment needed, they will feel demoralised because they will not be able to render quality care. Staff members also felt overworked. Training further contributed to the staff having a positive attitude and feeling they worked in an environment that was conducive to learning with management who supported them. Participants in the *focus group* indicated that staff attitude was influenced by various factors and the following comments were made in this regard:

- *“So, also management side must also be addressed they must take these problems further and they must also have good attitude toward ... their staff ... I think everything come back to ... sometimes to ... lack of staff. I think that is what I'm thinking the attitudes and everything. I think it all start because of people being overwork ... overworked. This place is busy we don't have enough people [healthcare providers] so my strategy was ... would be to start beefing up the staff, then trainings and everything would be nice people would have good attitude, the working environment is conducive.”* (Participant 1).
- *“... on staff attitude ... it cannot be taken in isolation for a person to have a positive attitude. The climate of the place; the person is working, you know, the process of equipments and also staff and training ... like we say that it needs all of this that we have discussed here. You have to have equipment to have a positive attitude; there must be people in order to have a positive attitude. Transport people must respond so that we have a positive attitude.”* (Participant 4).

To establish a positive staff attitude, all of the staff should have the same goal when working as a team. Aspects in this regard were also identified as factors contributing towards effective neonatal resuscitation by respondents who completed the *questionnaire* as indicated in the following comments:

- *“All teams work together.”*

- *“To work as a team e.g. when there is an emergency call for help.”*
- *“Have the same goal.”*
- *“Team work from the ward staff [nursing staff] when the need for neonatal resuscitation arises.”*

To ensure quality care there should be teamwork and a team spirit among the staff and issues should be addressed immediately. Being mature about communication is necessary to boost the morale between doctors and nurses; having good listening skills is important according to one of the participants from the focus group. There has to be a positive attitude between the doctors and nurses because the patient has to be the focal point and professional conduct among healthcare providers is pivotal to render quality care. One of the participants in the *focus group* suggested that inexperienced doctors should be guided by experienced nurses regarding interventions for neonatal care. Below are some comments made by participants in the *focus group* related to teamwork and team spirit:

- *“... it's also a main ... main contributing factor towards our shortage of staff. I think there its different attitudes, the attitude is affecting us, as.as the staff as to how my boss is talking to me or how everything we know sometimes we it ... makes people to lose interest in you know ... it makes people like they ... no longer enjoy being there and some decide to leave because of things like that. So I think that thing must ... must be taken seriously. In my opinion I think this is how we lose most doctors. It's from our ... I think it is the attitude yeah.” (Participant 1).*
- *“Another important thing it's ... teamwork, the team spirit that we have in the unit, because if one is not cooperative or the other one is blaming you know. I don't know how to put it, but this worries me ... you know attitude goes a long way ... we need to be very matured for us to be able to communicate with our colleagues so that the moral of the unit between doctors and nurses is boosted... I am saying that we need to strengthen teamwork ... team spirit... They can't do anything because they know that this is going to assist the child but because she is not allowed to prescribe anything a doctor must be called and this doctor must be guided by ... this experienced nurse. So that whatever interventions that she's going to come up with they are based on the knowledge.” (Participant 10).*

As regards professional conduct, participants indicated nurses are expected to have a positive attitude no matter what and it should be a priority when caring for patients; thereby adhering to the Batho Pele principles and the National Patient Right's Charter. Some of the comments made by the participants in the *focus group* included:

- *“But all in all we have to carry it on, because a nurse is expected to have a positive attitude no matter what we still have to, you know, learn that also that to*

know that it is basic priority in attending to people and the Batho Pele principles.”
(Participant 4).

- *“And communicate more. Let’s communicate when the doctor is called [and] he is available to come to see the child he must respond positively ... because you must think of this ... when you argue with this sister or argue with this doctor at the centre is this patient in waiting. So people must be able to prioritise their duties and their thinking.”* (Participant 10).

It seemed as if the training had contributed towards improved self-confidence among staff members and this had a positive influence on their attitude and in rendering quality care. This was also confirmed during the reflective meeting held with the steering group. They reflected the training and the quality improvement initiative had a positive effect on the attitude and confidence of staff. Pertaining to teamwork, some positive reflections were made regarding the improvement in teamwork among the three units as well as with their operational manager. The maternity section started operating as a team. The collaboration between the doctors and the nursing staff had also improved significantly according to their reflections. Communication among the units improved as well as in the work relationships of staff members. The steering group had more confidence in each other; they also had ownership in the quality improvement initiative as they felt they were part of the decision-making process. This had a positive influence on their attitude. The attitude of staff towards neonatal resuscitation changed to a ‘practise makes perfect attitude’.

It is the researcher’s reflection that staff attitude should be central to any quality improvement initiative, because without a positive staff attitude no quality improvement initiative can be implemented or sustained successfully. According to Vakola and Nikolaou (2005:160, 169-171), organisational change challenges the way things are done and individuals who are stressed demonstrate decreased commitment; they are thus reluctant to implement or accept organisational change. Stress in the work environment can also influence the motivation and morale of staff, decrease involvement, and may lead to high staff turnover, low job satisfaction and poor quality care. These authors further state positive staff attitudes are vital in achieving organisational change. Therefore, staff attitude plays a pivotal role in the implementation and sustainability of quality improvement initiatives. According to Klopper et al. (2012:685-695), negative attitudes of nurses can be attributed to their work environment, in other words, a positive work environment is needed to foster positive staff attitude. There is an association between the work environment, job satisfaction and burnout, and, according to Klopper et al. (2012), positive work environments play a key role in staff and patient outcomes. Therefore, it can be concluded that those staff that have a

positive attitude towards their work environment will go the extra mile to ensure and improve quality care.

It can also be concluded that the support of staff in the form of effective communication and staff support systems are important factors for improving staff attitude. Effective communication reduces resistance to change (Vikola & Nikolaou 2005:170). Interdisciplinary collaboration and sufficient communication is pivotal for quality care. Collaboration among healthcare providers creates a positive work environment, decreases costs, improves job satisfaction, and promotes quality care. Furthermore, collaboration decreases patient mortality and morbidity (McCaffrey et al. 2011:293). It seemed as if there was improved communication between management and staff and that challenges were identified in meetings and addressed accordingly. Training should be recognised as empowering and should motivate staff to go for more training.

Furthermore, there was still a need for debriefing and meetings like mortality and morbidity meetings where cases and statistics are discussed. According to Higginson et al. (2012:1), mortality and morbidity meetings can improve the accountability of mortality data and enhance quality care. Professional learning can take place during these meetings, but they should be facilitated by a standardised mortality review process; therefore, these meetings should be structured to obtain the maximum benefits. Mortality and morbidity meetings are useful for assessing the quality of care and patient safety in practice (Ksouri et al. 2010:148). Structured debriefing sessions can be used as an educational strategy to improve knowledge and skills (Couper et al. 2013:1521). According to Leone and Finer (2005:e181), team debriefing after complex resuscitation can assist in identifying and improving on the problems experienced during the neonatal resuscitation and this could contribute towards the improvement of quality care.

Senior staff should also mentor and coach junior staff. From the comments made by the participants it can further be concluded a sense of teamwork and team spirit prevailed among staff which is a positive contributory factor towards quality neonatal resuscitation. According to McCaffrey et al. (2011:294), evidence indicates inter-professional collaboration between healthcare providers is important to ensure quality clinical outcomes. Neonatal resuscitation is a team activity and effective teamwork is necessary for quality neonatal resuscitation (Thomas et al. 2007:409).

Professional conduct is a key aspect with regard to quality care and attitude towards fellow staff members and patients. The Batho Pele principles and code of conduct is the benchmark for professionalism and quality care. Professional conduct is further enhanced by confidence in staff as far as their knowledge and skills are concerned. The training regarding

neonatal resuscitation resulted in staff feeling more confident and this had a positive effect on staff attitude.

Suggestions for the future would be to keep on addressing staff attitude. Staff attitude is a key factor which influences quality care. Staff attitude are influenced by the work environment and the daily experiences that one has in the workplace. This is outlined by Duffield et al. (2010:23-310) who explain that a positive work environment in which the nurse manager plays a pivotal role will enhance job satisfaction and staff retention. The work environment is influenced by many factors such as the role of management, relationships with colleagues, patient acuity, the availability of equipment, and the physical environment. Positive feedback and recognition of staff have a positive influence on the staff's morale and attitude in that it creates a positive work environment; when staff members feel positive, the staff turnover is decreased and organisational commitment is increased. Therefore, many factors are influenced by staff attitude; conversely, staff attitude itself also influences.

According to the Every Newborn Action Plan (WHO/UNICEF 2014:25), staff shortages, facilities lacking equipment, and the low remuneration of staff lead to poor motivation and low quality care. The motivation of staff plays a vital role in quality care. This plan further suggests approaches such as coaching, mentoring, accreditation, and continued education should be applied in order to motivate staff and enable quality care. Staff attitude can therefore also be directly linked to quality care and to staff turnover which will be discussed in the next section.

As mentioned above, staff attitude is influenced by many factors of which one is the shortage of staff. The shortage of staff also has an influence on quality care and quality neonatal resuscitation.

7.3.2.4 Strategies addressing shortage of staff

The lack of staff resources was identified as a challenge in CYCLE 1. The lack of staff resources also led to staff feeling overworked and demoralised. Furthermore, it created ethical issues with regard to patient care. Therefore, there was a specific strategy in place addressing the lack of staff resources.

The strategy to address staff shortage included aspects related to ensure the optimal functioning of available staff to render quality care. One of the strategies regarding addressing the shortage of staff was a retention strategy for staff that wants to resign. This was part of the strategy because of the high staff turnover. In addition, having a budget for

the recruitment of staff and overtime in the maternity section was necessary. The recruitment of new staff was also an important part of the strategy. There had to be enough staff to render quality care as well as for the efficient and effective utilisation of staff.

In CYCLE 3 staff shortage was identified as a factor which needed improvement. These were recurrent themes from all three the units and indicated in the qualitative aspects of the questionnaire (see Question 5, Annexure I). The recurring themes correlated with the findings from CYCLE 1 (see Chapter 5, section 5.2.2 and section 5.3.1.2). This indicated the same challenges regarding staff resources were experienced in both cycles. Below are some of the comments made by respondents in the qualitative aspects of the *questionnaire* regarding which factors needed to be improved.

- *“To have more staff or enough staff in the ward especially neonatal trained.”*
- *“Specialist paediatrician to conduct ongoing active resuscitation and more staff to participate.”*
- *“A doctor to be available at all times, cause [because] most of the time a doctor is busy somewhere when needed.”*
- *“More staff in the unit especially during the night because there is only one professional nurse in opposite rotation, to have one professional nurse in the NICU at all times.”*
- *“The issue of obstetricians expected to resuscitate neonate’s needs to change. Sometimes the obstetrician is in theatre especially during working hours. Paediatrician should come to labour ward and assist with resuscitation.”*

Unfortunately, the lack of staff remained a challenge in all three the units. All of the 40 respondents answered this question. The question asked was: ‘*Are there adequate staffing available to do neonatal resuscitation if needed?*’ Table 7.10 illustrates the frequency distribution comparing the respondents’ perceptions regarding the availability of staff to do neonatal resuscitation in the three units (CYCLE1 [N=42]; CYCLE 3 [N=40]).

Table 7.10: Frequency distribution: Comparison between CYCLE 1 and CYCLE 3 regarding respondents' perception on availability of staff during neonatal resuscitation in the three different units

ARE THERE ADEQUATE STAFFING AVAILABLE TO DO NEONATAL RESUSCITATION IF NEEDED?	LABOUR WARD				POSTNATAL WARD				NICU			
	CYCLE 1 (n=13)		CYCLE 3 (n=9)		CYCLE 1 (n=10)		CYCLE 3 (n=12)		CYCLE 1 (n=15)		CYCLE 3 (n=19)	
	f	%	f	%	f	%	f	%	f	%	f	%
Yes	7	53.8%	4	44.4%	4	40%	5	41.7%	1	6.7%	2	10.5%
No	6	46.2%	5	55.6%	6	60%	7	58.3%	14	93.3%	17	89.5%
TOTAL	13	100%	9	100%	10	100%	12	100%	15	100%	19	100%

From the findings in each of the three units it is clear there was still the perception that a shortage of staff was experienced in all three the units. In both CYCLE 1 and CYCLE 3 most of the respondents in the NICU reported there was a lack of staff.

Figure 7.11 illustrates the findings from the same question (Question 14) on the questionnaire (see Annexure I) in the maternity section (CYCLE1 [N=42]; CYCLE 3 [N=40]).

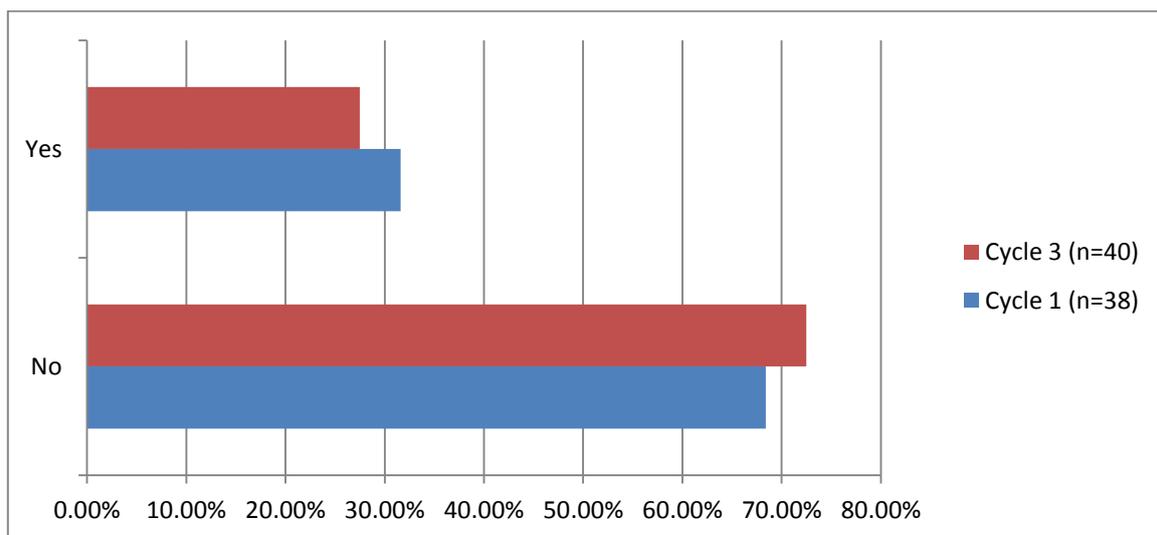


Figure 7.11: Changes in percentage between CYCLE 1 and CYCLE 3 with regard to the availability of staff for neonatal resuscitation

From these results it is clear that staff shortages are still perceived as a challenge in the maternity section of this district hospital. In the qualitative aspect of this question there were recurrent themes of lack of staff during the night, the fact that there is only one professional nurse allocated in the NICU especially during night duty. The lack of availability of a paediatrician 24 hours a day is also problematic. The following comments are with regard to staff resources in the maternity section of the hospital and made in the qualitative aspects of the *questionnaire*.

- *“During the day enough staff to assist with resuscitation. Night duty staff are experiencing challenges as they are only four in number. This differ according to days e.g. when staff members is sick and off, on sick leave.”*
- *“During the night nurses are four and not enough when resuscitating. Not enough trained nurses.”*
- *“We are usually short staffed the sister usually allocated alone in the high care and also runs the ward.”*
- *“No paediatrician to help with resuscitation especially in theatre.”*
- *“No paediatrician available for 24 hours.”*

From the above comments it was clear a shortage of staff was experienced, especially night staff. When looking at the nursing categories as per the data received from the matron of the maternity section, the following differences regarding nursing categories can be identified. Table 7.11 indicates these results.

Table 7.11: The changes with regard to nursing categories and number of permanent staff in each of the three units

UNIT	NURSING CATEGORIES	2013	2014
Labour ward	Professional nurses and midwives	19	21
	Enrolled nurses	6	4
	Enrolled nursing auxiliaries	0	0
	TOTAL	25	25
Postnatal	Professional nurses and midwives	13	14
	Enrolled nurses	4	4
	Enrolled nursing auxiliaries	7	6
	TOTAL	24	24
NICU	Professional nurses and midwives	8	9
	Enrolled nurses	6	6
	Enrolled nursing auxiliaries	6	6
	TOTAL	20	21

From the results reflected in Table 7.11 it is obvious that there were no big differences in the number of permanent staff in each of the three units. In total, the labour ward recruited two professional nurses but had two less auxiliary nurses; the postnatal unit had the same number of staff and the NICU appointed one more professional nurse. The nurse-to-patient ratio in this district hospital was very low. Table 7.12 shows the examples thereof for each of the three units.

Table 7.12: Nurse-to-patient ratio for day and night shifts in the three different units of the maternity section

UNIT	NURSING CATEGORY	DAY STAFF	NIGHT STAFF	AVERAGE NUMBER OF PATIENTS PER DAY AND NIGHT	NURSE-TO-PATIENT RATIO (DAY)	NURSE-TO-PATIENT RATIO (NIGHT)																						
Labour ward	Professional nurses/midwives	4	4	On average 20 deliveries during the day and 20 during the night (excluding the patients seen during clinics hours)	1:4 (deliveries)	1:4 (deliveries)																						
	Nursing auxiliaries	1	1				Postnatal ward	Professional nurses/midwives	3	2	Between 80 – 100 patients but on average 64 patients (excluding clinic days)	1:12.8 patients when working on an average of 64 patients	1:16 patients when working on an average of 64 patients	Nursing auxiliaries	1	1	Enrolled nursing auxiliaries	1	1	NICU	Professional nurses/midwives	2	1	Between 32 – 42 patients but on average 30 – 35. (excluding the 12 KMC beds) and irrespective of the acuity of the patients	1:7 patients when working on an average of 35 patients.	1:11 patients when working on an average of 35 patients.	Nursing auxiliaries	1
Postnatal ward	Professional nurses/midwives	3	2	Between 80 – 100 patients but on average 64 patients (excluding clinic days)	1:12.8 patients when working on an average of 64 patients	1:16 patients when working on an average of 64 patients																						
	Nursing auxiliaries	1	1																									
	Enrolled nursing auxiliaries	1	1																									
NICU	Professional nurses/midwives	2	1	Between 32 – 42 patients but on average 30 – 35. (excluding the 12 KMC beds) and irrespective of the acuity of the patients	1:7 patients when working on an average of 35 patients.	1:11 patients when working on an average of 35 patients.																						
	Nursing auxiliaries	1	1																									
	Enrolled nursing auxiliaries	2	1																									

The nurse-to-patient ratio was very low; more so in the NICU and especially at night. Neonates require intensive care, but particularly the ones in the 4-bed ICU. According to the reflections of the steering group, only one professional nurse was on duty in the NICU. She had to take charge of the whole unit and had to care for all the neonates in the NICU. Due to

the staff shortages, the staff members who attended the training were taught how to resuscitate on their own while waiting for assistance from colleagues.

Recurring themes emerged, namely, the need for staff expertise (senior and clinical leader), especially when the need for neonatal resuscitation arises. Senior leaders (matrons and operational managers) play an integral part in the management of the maternity section and its units in this specific hospital. They are the ones that need to address challenges regarding training, equipment, staff as well as staff attitude. Therefore, their role and involvement and how the nursing staff perceive their involvement is very important. This was the reason why the nursing staff were asked to reflect on their role regarding improvement in quality neonatal resuscitation (see Question 15, Annexure I). The following were responses made by respondents who completed the *questionnaire*:

- *“Matrons facilitate training, protocols, SANC regulation for empowerment.”*
- *“Unit manager are doing more administrations work than being a mentor and coach.”*
- *“The matron is always there for us when we have a problem, she come and resolve the problem herself.”*
- *“Unit manager report to the matrons about everything that is needed in the unit and the matron try to improve working conditions.”*
- *“In most cases our senior leaders (matron and unit manager) are not with us during most of the resuscitation only the leading sister and doctor take part in resuscitation.”*
- *“Advocate the supply of proper equipment when available to make resuscitations effective.”*
- *“The unit manager can only order resources and availability depends on the supply chain management.”*

In the feedback from the nursing staff it was indicated similar themes of which training was mostly mentioned. Senior leaders arranged for training and motivated staff members to attend. They also tried to and did address challenges regarding equipment and how to improve working conditions. With regard to the practice of neonatal resuscitation itself, they were not often involved. Comparing the results of CYCLE 1 and CYCLE 3 on this question it seemed that senior leaders were more involved and the staff felt they tried their utmost to address the challenges identified.

Not only senior leaders but also clinical leaders play a significant role in rendering quality care, especially with regard to neonatal resuscitation. The nursing staff was asked about the role the clinical leaders (doctors and shift leaders) play in improving neonatal resuscitation (see Question 16, Annexure I). The following comments were made by some of the respondents who completed the *questionnaire*:

- *“It is better during the day in the weekdays when they [doctors] are available to help. During the nights and weekends there is a problem as we are governed by anaesthetist and at time we need paediatricians to handle often the very sensitive issues.”*
- *“When there is resuscitation needed doctors are available and there has never been a time when resuscitation is being done and a doctor took more than 10 minutes to come and assist.”*
- *“When they [senior leaders] are available during resuscitation they teach whoever is assisting.”*
- *“They [senior leaders] play an important role because they do expect equipment to be in place when called for resuscitation.”*
- *“Even doctors and shift leaders must attend to neonatal resuscitation [training] as they are part of the team. All team members should have one goal”*

Clearly, some respondents perceived the involvement and role of the clinical leaders as positive and some as negative according to their individual experiences. There was a shortage of doctors and specifically during the night and over weekends there was a lack of expertise which influenced the quality of neonatal resuscitation.

The problem areas identified in the previous focus group in CYCLE 1 regarding the lack of night staff and the lack of clinical specialist had not been solved as mentioned by the participants in this focus group. There was a lack of doctors on call in the NICU. When neonates were admitted from outside clinics to the labour ward, there was no doctor available. Another problem was that, because of the unavailability of doctors, specialised treatment such as Survanta could not be given to the neonates. If a doctor is not available to diagnose and prescribe treatment for a neonate or infant, there is a delay in quality care. Due to the shortage of staff, the doctors could not fit in the time to attend training on neonatal resuscitation. Participants in the *focus group* made the following comments regarding the lack of staff resources:

- *“... the problem with not having a doctor who is on call in the neonatal ICU ... So I realise it before another thing is that a patient is coming from outside from the clinics that are also [full], they are brought to labour ward ... to ... find that the doctor [who] also may be around [or] may not be around in theatre so those things give you a problems so I think it's more of staffing if they can improve it ... Yeah for 24 hours there is no one ... especially at night.” (Participant 6).*
- *“What is negative is that it is not there in the unit because there are procedures that need him to be there by ... a baby is to be given Survanta or Curosurf. A doctor who is not working with babies they can't ... it will be better if he is around because that is also an emergency procedure and that needs to be done within 12 hours of birth in a neonate ... the fact when a midwife is transferring a baby*

she is not transferring to another midwife it must be to a doctor. Hence, staffing of a doctor who is always there, in the neonatal unit, so that when you admit that baby even if it goes to ... professional nurse we are still stuck. You are still going to need a doctor to attend to the baby. So if that problem of staffing can be attended to maybe we could ... you know improve on that problem.” (Participant 4).

- *“... but you know what is the problem ... the problem is staff shortage.” (Participant 2).*
- *“But because of shortage were unable to train ...” (Participant 10).*
- *“I wish something needs to be done really, because the ... fact of the matter is when the baby is in labour ward and there is no doctor, and the same midwife who needs to attend to the other pregnant women will be stuck with the baby who is sick and you can’t leave the baby. You know ... it’s becomes very difficult. So hence we would wish that sick babies, especially those who are from the health centres who have been seen by midwives, should be sent straight to neonatal unit were there are nurses who are only dealing with sick babies. As compared to midwives in labour ward who needs to look ... take care of pregnant women and also a sick baby.” (Participant 3).*

According to participants attending the focus group, the staff members who are available should be used efficiently and optimally to render quality care to the best of their abilities; particularly so when there are staff shortages. There should be clinical specialist available because this hospital cares for ill and premature neonates and these patients need specialised care by professionals with the necessary knowledge and skills. Furthermore, it seemed as if doctors were not placed according to their interest and skill. But, it is important for doctors to be placed according to their skill; they must be able to work in units were they can use their knowledge and skills to render quality care. This also keeps the doctors motivated. The following comments below were made by the participants in the *focus group* regarding ensuring the optimal functioning of available staff.

- *“... there is a paediatrician who is allocated on the doctors call roster, what is positive is the ... she can ... he or she can be contacted if there is a problem in our unit [NICU] ... doctors do. They phone and gives an opinion on what to do with the baby and then they will contact the tertiary hospitals following the phoning and obtaining their opinion ... Allocation of doctors in ... the hospital as general you find that there are doctors who are working with babies but when they are on call they are on call in casualty and in prem unit or in the neonatal unit there comes a doctor who is not working with babies, so there I also see it as a negative thing. For example, there will be Dr R and Dr Y. Dr Y who is working with babies will be on call in casualties and Dr R who is not with the babies ... it’s just an example ... will be the one*

coming into the unit so somewhere on the allocation from the doctors side it ... this thing is negatively affecting ... the strategies for neonatal resuscitation.” (Participant 4).

- *“But they come here and expecting to work in paedes [paediatric ward] and they end up working in adults and they are not competent, and they also get stuck as much we get stuck in paedes [paediatric ward] ... at least they must try after hours ... there are more hours after hours than during the hours so they must allocate people who work in paedes [paediatric ward] to just do call for the paedes [paediatric ward] and I think it will be much better to improve ... the problem is staffing that’s all.” (Participant 1).*
- *“We do have a shortage of doctors and the one that they have been raising more often of doctors working in allocated in paedes [paediatric ward] and allocated somewhere else. You know I’ve fought with Dr X several time but he said, ‘Mam my pocket, if even if I can take my hands out there will be no doctors in my pocket ... but isn’t it we are looking at the bigger picture ... I understand that they are concerned but at management you are looking at the bigger picture. You ... see areas were you feel but if I take this and patch and match with this one maybe something though the other side is suffering ... But the little or the minimal staff that we have ... is it being utilised I like this words ... efficiently and effectively.” (Participant 10).*
- *“Maybe he wants to say to put people where they interested is not possible ... because we are having 32 units and you can’t put people were they want and disadvantage another unit.” (Participant 9).*

Another challenge the participants experienced was the high turnover of staff, which also created difficulties with training. The staff was trained on neonatal resuscitation and then resigned; therefore, the high turnover of staff also created difficulties as far as consistency in rendering quality care was concerned. The resignation of staff is, however, not under the control of management because people are resigning for better working conditions and perhaps to earn more money. Below are some comments made by participants in the *focus group* regarding high staff turnover.

- *“I was also going to mention staffing because we have a challenge of high turnover in the institution ... if you train people and they leave and you get new people, especially in higher numbers, it becomes a challenge for you to stabilise the unit.” (Participant 3).*
- *“Because as she said about turnover there is [are] a lot of new members in our units, you know it is out of our control. Even management we can’t say people must not go. If one said that no he stayed here for a long time he needs to go for greener pastures if there his earning some more you can’t stop him.” (Participant 10).*

In conclusion, regarding the changes that occurred as a result of the implementation of the strategy that addressed staff shortage it was clear there was still a shortage of staff in this maternity section. However, the shortage of staff is a problem in the public health sector of

South Africa due to various reasons. According to Coetzee et al. (2013:164), it is estimated there is a shortage of 30 000 professional nurses in the public health sector of South Africa. The authors indicate the main reasons for this shortage is remuneration, availability of medical supplies, workplace infrastructure, prospects for professional advancement, workload, and concerns regarding personal safety such as contracting life-threatening diseases at work. Unfortunately, the lack of staff and high staff turnover was something out of the control of the steering group and even the management of the staff. The work environment and job satisfaction of healthcare providers should be conducive to professional practice and is an integral part of nurse retention (Kangas, Kee & McKee-Waddle 1999:33). According to the Countdown to 2015 Decade Report (WHO/UNICEF 2010:38), commitments should be made to ensure adequate numbers of skilled healthcare providers in every district by prioritising training, distribution and retention.

Suggestions for future changes should include recruiting staff according to the needs of the maternity section. Especially in a busy district hospital like this one there should be skilled and knowledgeable staff placed according to interest and skills. This would enhance the quality care in neonatal resuscitation as well as quality nursing care. Caring for neonates is a specialised field which cannot be compared to adults or paediatric patients. Trained neonatal nurses should be appointed with at least one on each shift during the day and, importantly, during the night shift. Equal numbers of staff should be allocated in the NICU for the day and night shifts. According to the suggested staffing norms for nurses working in a NICU in the NaPeMMCo report (NaPeMMCo 2011:200), the ideal nurse-to-patient ratio for an NICU of a level 1 district hospital is 1:4, although 1:6 is also acceptable. At the time of this study the ratios for nurse to patients were 1:7 during the day and 1:11 during the night. This shortage of staff, even more so during the night, was a growing concern considering quality of care and the effect it may have on neonatal mortality and morbidity.

Proposed actions made in the Every Newborn Action Plan (WHO/UNICEF 2014:26) suggest staffing levels for each facility that provides maternal and newborn care should be planned in such a way that staff are available on a continuous basis, 24 hours a day, 7 days a week. From the findings it was concluded there was also a shortage of doctors which had a direct influence on quality care as nurses were not allowed to prescribe treatments. Therefore, a need existed for specialists to be on call for 24 hours a day. However, it would then also be imperative that protocols regarding *neonatal care* as well as protocols regarding *neonatal resuscitation* for the purpose of this study should be available to serve as a guideline for doctors uncertain of the treatment of neonates. The changes regarding protocols are discussed in section 7.3.2.6.

The only current solution would be to try and utilise the minimal staff that are available effectively and efficiently. This correlates with recommendation made in the NaPeMMCo report (NaPeMMCo 2011:101) whereby it is recommended that staff should be used in the most efficient way. This also correlates with the proposed actions of the Every Newborn Action Plan (WHO/UNICEF 2014:29,31) in which it is proposed that the available staff should be utilised optimally and that lifesaving interventions should therefore be delegated to mid-level healthcare workers. However, they should be trained and supported. Part of this would be to make sure doctors are placed in areas where they have the necessary knowledge and skills to render quality care.

According to Pattinson et al. (2005:7), the second most common recorded modifiable factor directly related to neonatal mortality is the critical staff shortages. If a significant reduction in neonatal mortality rates is expected, adequate numbers of well-trained nurses in both maternity and neonatal care should be recognised as one of the greatest needs of the health sector.

A further suggestion would be to develop an acuity scale for neonates in the NICU and the allocation of the number of staff and skills mix according to the patient acuity levels. According to Jooste and Jasper (2012:59), an imbalance exists between the supply and demand of nursing resources in South Africa. The shortages of staff have a negative impact on both the nursing staff and the quality care of patients. These authors go on to explain that in private hospitals patient profiles and not budget indicators are used for safe nurse-to-patient skills mix. Patient acuity is therefore used to allocate the right numbers of staff for the right reasons to render the required level of care. This can also be considered for public healthcare and to determine the optimal skills mix ratio required to render quality patient care, especially with regard to neonatal care and therefore contributing towards meeting the MDGs.

From the reflections of the researcher a recurring theme was that new staff has indeed been appointed, but due to the challenges experienced on a daily basis, they became demoralised and overworked. These challenges caused a negative attitude because the new staff members felt overwhelmed by the workload and the lack of resources. Unfortunately, it so happened that they give up and resigned for better salaries and improved working conditions. This caused a vicious circle and a snowball effect regarding the retention of staff. The work environment and the challenges should therefore be addressed to keep staff positive and committed to the maternity section. Staff turnover is influenced by the work environment and the factors influencing the work environment and therefore nurse managers should be vigilant to create a positive work environment to reduce staff turnover (Duffield et

al. 2010:29-30). According to Hayes et al. (2006: 237-263), high staff turnover has a negative influence on an organisation's ability to provide quality care. Furthermore, the high staff turnover affects the attitude/moral and the involvement of the remaining staff. New staff has to be recruited and orientated. Factors influencing nursing staff turnover are job satisfaction and professional commitment as well as organisational factors such as workload, management, empowerment and autonomy, promotional opportunities, work schedules as well as individual and financial factors. The improvement of the work environment and staffing could contribute towards problems regarding quality care and patient safety; it can also improve factors associated with staff retention. An increase in nurse-to-patient ratios can also benefit patients in terms of quality care (Coetzee et al. 2012:162, 171).

There should be a formal retention strategy in place for staff that wants to resign. The resignation of staff could potentially be prevented by implementing an incentives/reward system for committed staff, and through supporting professional growth through development and training. Furthermore, staff would also be retained if they worked in an environment conducive to the quality of care – therefore in an environment with enough resources such as equipment and staff. According to McSherry et al. (2012:7), nurse managers, leaders and educators should play a pivotal role in enabling quality nursing care. These authors suggest that the implications for nursing management will be that they have to focus on determining what resources are required to ensure a healthcare environment that enables compassionate, safe and quality nursing care. The work environment and salaries need to be improved to ensure that the public healthcare facilities attract and retain more staff (NaPeMMCo 2011:101). The budget for recruitment of staff at this hospital should therefore be reviewed and new staff should be recruited in an attempt to improve on the nurse-to-patient ratios and quality care.

The first step should therefore be to address the work environment and the job satisfaction of the staff members currently working in the maternity section of the district hospital in order to decrease staff turnover, and to keep staff positive and motivated. Another challenge that caused the staff, especially those from the NICU, to be despondent were the challenges related to the transport of critical ill neonates during transfer.

7.3.2.5 Strategies to address challenges with regards to transport and transfer of neonates

After neonatal resuscitation and the stabilisation of a critical ill neonate, it is in some cases imperative for the neonate to be transported to a tertiary institution where more specialised care can be provided to improve the outcome of the patient. The findings of CYCLE 1 indicated there were challenges regarding the transport for transfer of the neonates to other institutions. These challenges were experienced by staff from the NICU and included challenges with regard to time delays, the availability of ambulances equipped to transfer critically ill neonates, and incompetence of the EMS staff to transfer such patients. Furthermore, challenges emerged relating to experiences regarding the communication when booking transport. Tragically, these challenges caused neonatal deaths and had a negative outcome on neonatal mortality.

To address the challenges regarding transport for transfer of patients to tertiary institutions or from clinics to the district hospital, the steering group decided to establish a task team to address these concerns. Meetings were held where these challenges were discussed. It was also important for the transport to be available without a delay in response time and the ambulances had to be equipped with the emergency equipment needed for transfer of a critical ill patient and, lastly, trained EMS staff had to accompany the patient. Moreover, communication regarding transport was also part of the strategy as there was a need for improved communication from the side of the EMS as well as and smoother operation of the EMS services. Part of the strategies was also to report incidents where neonates died while waiting for the EMS services.

As mentioned in Chapter 5, transporting critically ill neonates for transfer to and from the district hospital needs to be without a time delay. Most importantly, it is extremely necessary to render quality care during transport as this can have a direct influence on neonatal mortality and morbidity. To render quality and safe care during transport of critical ill neonates it is important for EMS services to have sufficient emergency equipment and competent EMS personnel.

Unfortunately, most of the nursing staff working in the NICU still experienced problems with the transport of critically ill neonates for transfer from the district hospital to a tertiary institution (see Question 12, Annexure I). The labour ward staff indicated their transport problems had improved as far as the transferring of pregnant women was concerned, but their ward did not really transport critical ill neonates. The postnatal ward rarely experienced problems due to their lack of needing transport for ill neonates. Neonates that become

critically ill are transferred from the postnatal ward to NICU; from there they are transported to a tertiary institution if necessary. Table 7.13 illustrates the frequency distribution when comparing the perceptions of the respondents regarding challenges experienced with transport in the three units (CYCLE1 [N=42]; CYCLE 3 [N=40]).

Table 7.13: Frequency distribution: Comparison between CYCLE 1 and CYCLE 3 of respondents' perception regarding problems experienced with transportation when a neonate needs to be transferred to another institution

DO YOU EXPERIENCE PROBLEMS WITH TRANSPORTATION WHEN A NEONATE NEEDS TO BE TRANSFERRED TO ANOTHER INSTITUTION?	LABOUR WARD				POSTNATAL WARD				NICU			
	CYCLE 1 (n=12)		CYCLE 3 (n=4)		CYCLE 1 (n=9)		CYCLE 3 (n=11)		CYCLE 1 (n=16)		CYCLE 3 (n=19)	
	<i>f</i>	%	<i>F</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Never	3	25%	2	50%	5	55.6%	6	54.4%	2	12.5%	1	5.3%
Seldom	0	0	0	0	1	11.1%	0	0	0	0	1	5.3%
Sometimes	3	25%	2	50%	2	22.2%	2	18.2%	2	12.5%	7	36.8%
Often	3	25%	0	0	1	11.1%	1	9.1%	5	31.3%	1	5.3%
Always	3	25%	0	0	0	0	2	18.2%	7	43.8%	9	47.4%
TOTAL	12	100%	4	100%	9	100%	11	100%	16	100%	19	100%

From the results in Table 7.13 it is clear that the biggest challenges regarding transportation were experienced in the NICU. Therefore, Figure 7.12 below illustrates the above results in Table 7.13 for the NICU.

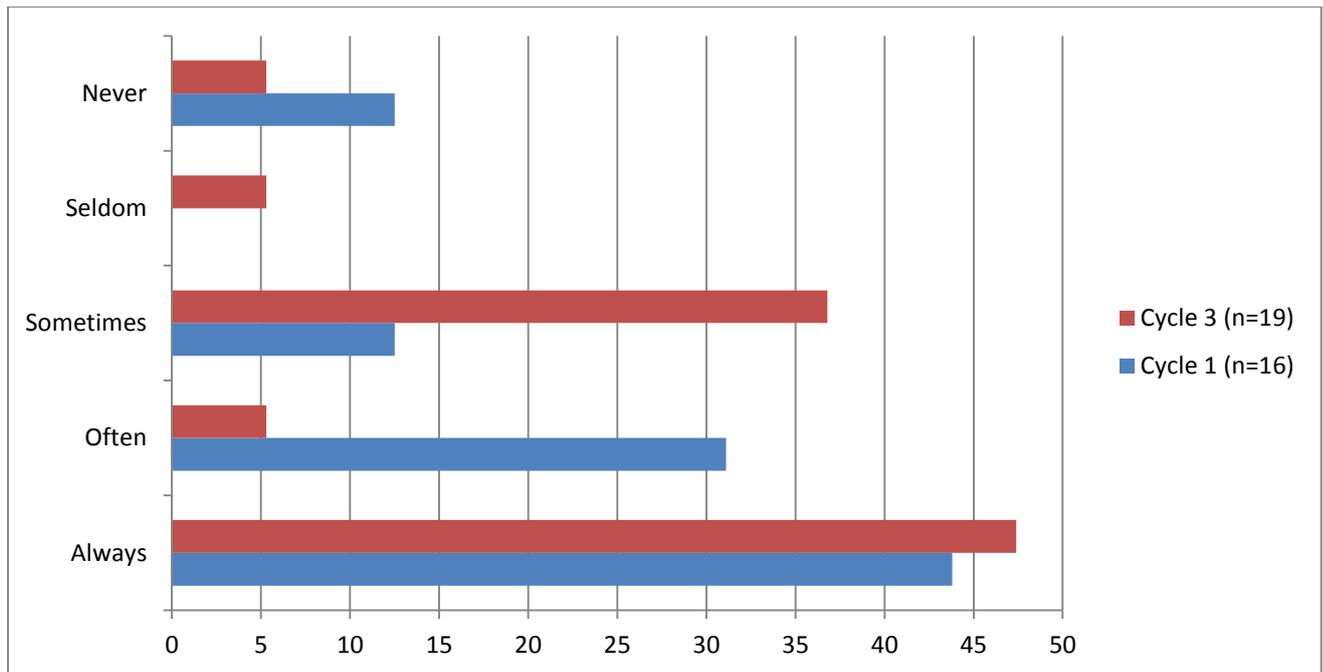


Figure 7.12: Changes in percentage between CYCLE 1 and CYCLE 3 regarding transport from the perspectives of the respondents working in the NICU

From the findings in Figure 7.12 it can be concluded that nurses working in the NICU experienced more problems in CYCLE 3 with regard to transport than in CYCLE 1. Some comments made by the NICU nursing staff in the qualitative part of this *questionnaire* are the following:

- *“The emergency medical services don’t arrive on time and it’s become a problem as most of the time we lose [the neonate dies] neonates on that process.”*
- *“They take time to arrive in the unit, sometimes they send personnel not well trained. At times they arrive when the baby is already dead.”*
- *“Most of the time we lose babies only because we wait forever for EMS to come and fetch the baby. EMS does not have enough trained staff.”*
- *“EMS personnel arriving late claiming that they did not receive the message in time. EMS won’t take a [an] unstable baby.”*
- *“EMS staff or call centre takes time to respond to call for transport booking. When they arrive they come first to look at how bad is the baby before they can go and call an ambulance that can transport an intubated baby or very ill baby. During these delays the baby’s condition deteriorates.”*
- *“When the patient need to be transferred to other institution EMS has to be called and they usually come after hours and with an ambulance that is not well equipped for neonatal resuscitation.”*

The comments above still reflected themes of transport delays and the lack of appropriately equipped ambulances and trained EMS staff. This remains a serious challenge as these challenges have a direct influence on neonatal mortality. Quality care during transfer of critically ill neonates may seriously be affected in a negative way. Therefore, government, the management of the hospital and EMS services should seriously address the challenges regarding transport. Unfortunately, it seemed as if there had been very little improvement with regard to the transport and the transfer of critical ill neonates. The same challenges were experienced and included poor communication, delayed response times, ambulances not having the correct equipment, and EMS staff unable to care for a critical ill neonate.

It was apparent problems were especially experienced with telephonically getting hold of the EMS services at the call centres. The following comments were made by the participants in the *focus group*.

- *“But when you talk to them at least they respond, but the problem is to get hold of them sometimes ... you have to hold the line on the phone 30 minutes and hour no one is picking up.”* (Participant 1).
- *“... the problem is to get hold of them you can spend 20 minutes even more trying to talk to them as soon as you’ve talked to them, they come quickly.”* (Participant 7).
- *“... we need to contact the call centre which is you know a nightmare to be on that phone. That receiver waiting for somebody to respond. The delay according to my observation is not from the staff here it’s from there ...”* [The context in which this was said was related to the booking transport for neonates to other institutions and delays in getting hold of the operators at the call centre]. (Participant 10).

The condition of the patient is communicated to the call centre by the doctor booking the transfer; the EMS then arrive without the appropriate equipment and with staff who are not competent in neonatal care; time passes and sometimes neonates die due to this delay. For example, as previously mentioned, a despatch team was sent to the hospital and they came to evaluate the patient’s condition. During the evaluation they realised the ambulance that they had despatched was not equipped with the correct equipment and the staff was unable to take care of the patient. This resulted in them having to call for another ambulance which delayed the transfer of the patient. Moreover, it was obvious the doctors also struggled to find beds for critical ill neonates in tertiary hospitals. The participants in the *focus group* made the following comments regarding these challenges:

- *“... they can’t bring an EMS but then you discover that on the phone you tell them everything ... the baby is on incubator, need oxygen ... but they bring on a vehicle that doesn’t have*

equipments for ... for say ventilated babies and the staff when they ... when they arrive they say no they are not trained to handle such patients [neonates] ... the EMS came, they cannot take this child they send a special ambulance ... it took another patient and they left and it took like forever for another EMS and the baby died.” (Participant 1).

- *“... it takes time because you talk to the voice and answering machine for a long time and then eventually you get somebody and you give the message that what is that you want them to do ... the doctor is talking about the condition of the baby and the equipments that are needed for you know transporting that baby, but when they do come there will always be those who comes first, and say they want to see the baby ... the condition before they can bring him equipment so that is sort of disturbs me ... a problem of communication between the initial receiver of the message and the despatch team ... the first group that comes always they don't come with the equipment and then they will phone others to come and bring the equipment later and at that time it takes time for the baby to be transferred.” (Participant 4).*
- *“... they have only one advanced support. Doctor said when you call them they will after you explained the condition of the patient that warrant somebody who has the expertise of managing a neonate but ordinary ... EMS personnel will come and on arrival then he just want to you know an excuse of not taking the patient and say no but this patient is very ill we need to call an advanced support and that advance support its one for the area from here up to Nelspruit because at times they call him, when he is in Nelspruit that he must come to Hospital X.” (Participant 10).*
- *“So the challenge that were ... the doctors were having ... was they phoned the ambulance and it came and when it can't they kept on saying that there is another one which is carrying the ventilator and is on the way they kept saying no it's at [XXX] and we waited for plus minus an hour ... doctor spend a lot of time phoning Hospital A [tertiary hospital] to this one and to that one then Hospital A to Hospital S getting that person and that person until finally at hospital B after much deliberation they accepted the baby so the problem is in this equipment and if one you know an ambulance that is having all the equipments are needed for the baby according to the way doctor said on this phone, that would save a life much faster.” (Participant 4).*

As mentioned before, it seemed as if there was slight improvement regarding the transport of women in labour from the labour ward's side. There was also the prospect of improvement in the future as the Department of Health launched emergency obstetric ambulances in Gauteng. However, there remains uncertainty as to how this would play out on the side of the district hospital. At the time the study was concluded it was unclear how these emergency obstetric ambulances will operate and the effect it would have with regards to transport of neonates to and from the district hospital. Meetings were held between the hospital and EMS services to address challenges; however, the importance of reporting all problems was emphasised. Below are some comments made by participants during the *focus group interview*:

- *“Yes, but in labour ward for the past three months all the patients that we referred to hospital A they responded within the next thirty minutes after phoning them they were there ... I was impressed. I even told them that ...”* (Participant 2).
- *“Mrs D is the one who is on this committee of ... in one of the nursing managers supervising emergency and children. So she is the one who is attending this meetings with the EMS group so that issues was raised several times and they promised that they will address it ... some of the things are not reported you just hear them when you are in meetings like this, that there was this and that, because there was this and that, because these things they need to be reported so that you keep on informing no ... there is no improvement or there is an improvement... So on Friday there was a launch of obstetric emergency ambulances. So Gauteng was provided with a well-equipped ambulance ... maternity ambulance ... we wanted to find out is how this ambulance going to work.”* (Participant 10).
- *“... what I would like to have is an ambulance here in the hospital if possible, with everything and there must be somebody who would know what to do with a baby on ventilator and this babies who have been resuscitated and who must go to a tertiary level and there must be you know something that has been done, because this thing of communication not being good between the despatcher and the one who receives the message on five distorted information to the other and they have first to come to hospital to find out what it is that they are supposed to be taking for this baby that doesn't work.”* (Participant 4).

The effective and efficient transport of critically ill neonates from the district hospital to other healthcare facilities can have a direct impact on the outcomes of neonates and neonatal mortality. This statement correlates with the Recommended Standards for Essential Neonatal Care (2012:35) wherein it is also stated critically ill neonates born in district hospitals should be transferred to secondary or tertiary centres and they depend on emergency transfers. The outcome of these neonates depends on efficient and rapid transport time and the care they receive before and during transport.

In conclusion, the findings regarding the changes that occurred from the implementation of the strategy addressing transport revealed only slight changes had occurred with no significant improvement: the response time improved slightly, but it still took a long time to get hold of the call centre for booking transport. According to the Recommended Standards for Essential Neonatal Care (2012:35-37), the referral system works as follows: the call centre staff receives a call for the transfer of a neonate. These calls are prioritised according to a list – it is recommended that neonatal transfers should be high priorities. For transporting a neonate, trained EMS staff is needed. The three categories of staff (call centre, clinical staff from the hospital, and EMS staff) should have regular meetings to

address challenges. Subsequently, meetings were held and the problems were addressed. A slight improvement was discerned in the labour ward with regard to the transport of patients to tertiary hospitals. The focus, however, needed to be on the improvement of transport for critical ill neonates as this has a direct influence on the neonatal mortality rates. Disappointingly, the problem with regard to ambulances that were not equipped for the transport of critical ill neonates persisted.

Furthermore, it was perceived that most of the time the EMS was unable to care for these neonates during transfer. According to the Recommended Standards for Essential Neonatal Care (2012:37), ambulances must have basic equipment for transporting neonates. This includes a transport incubator, oxygen, a pulse oximeter, drip stand, and intravenous infusion rate controller, adequate resuscitation equipment and, if needed, transport ventilators. The communication regarding transport should therefore be clear in terms of the needed equipment. According to these standards, a qualified paramedic should be part of the EMS team. Hopefully, there will be a change in the future with the new emergency obstetric ambulances that were launched in Gauteng. According to South Africa's National Strategic Plan for a Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA) (Department of Health, South Africa's National Strategic Plan, [s.a.]) access to skilled birth attendance is a priority. Therefore, obstetric ambulances dedicated to ensure the prompt transfer of women in labour and women and children with obstetric and neonatal emergencies to the appropriate level of care were allocated for every sub-district.

From the reflections of the researcher it was apparent there were inconsistencies with regard to the changes that occurred. During the implementation phase of the strategies a feedback meeting was held with the steering group. During this meeting it was indicated improvement had been observed as regards transport in the NICU, especially when they made use of private ambulance services. However, it transpired that this improvement was only temporarily and the challenges regarding transport for neonates continued.

Suggestions for future changes would be to continue with meetings between the management of the district hospital and the EMS services. But, it will be essential for the operational manager and some of the senior professional nurses to be involved in these meetings in order to give a detailed description of the challenges they experience. It is also very important that incident reports should be written every time when these challenges are experienced. This would serve as a paper trail and be evidence of the challenges faced and problems experienced. In this way problems can be addressed and hopefully obviated. It seems as if the quality improvement initiatives taken by the government is not reaching those that also need to be reached, namely the neonates. Addressing these problems

should be a high priority for the district hospital as well as the Gauteng Department of Health. According to the NaPeMMCo report (NaPeMMCo 2011:99), transport systems need to be improved by means of treating women in labour and critically ill neonates as emergency patients. Furthermore, the response time from receiving the call at the EMS call centre up until arrival at the hospital should be less than an hour. Hence, referral routes should be established and adhered to and, moreover, referral systems must be implemented in such a way that patients in need of transfer have no problems with access. This implies that the district hospitals must be well supported by regional and tertiary hospitals.

Having protocols in the maternity section also has an implication for quality care and the reduction of neonatal mortality. The changes that occurred associated with protocols are discussed next.

7.3.2.6 Strategies addressing protocols

There was a lack of protocols in the maternity sections, specifically with regard to neonatal resuscitation in CYCLE 1 (see Chapter 5, section 5.2.2.3). Addressing protocols was one of the priorities identified during the nominal group technique discussion. To address the challenges regarding protocols, it was decided to establish a task team to address protocols concerned with neonatal resuscitation. Protocols are important for evidence-based practice and to serve as a guideline for quality care. It was also important for all the staff to be aware of these protocols. With regard to neonatal resuscitation, the algorithms were printed, laminated and displayed near the resuscitation area. The same question regarding protocols asked in CYCLE 1 was asked again in CYCLE 3 (see Question 22, Annexure I). The following question was asked: '*Are there protocols in place regarding neonatal resuscitation?*' Table 7.14 illustrates the frequency distribution comparing the perceptions of the respondents regarding protocols in the three units (CYCLE1 [N=42]; CYCLE 3 [N=40]).

Table 7.14: Frequency distribution: Comparison between CYCLE 1 and CYCLE 3 of respondents' perception regarding protocols in the three units

ARE THERE PROTOCOLS IN PLACE REGARDING NEONATAL RESUSCITATION?	LABOUR WARD				POSTNATAL WARD				NICU			
	CYCLE 1 (n=12)		CYCLE 3 (n=8)		CYCLE 1 (n=10)		CYCLE 3 (n=11)		CYCLE 1 (n=16)		CYCLE 3 (n=19)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Yes	10	83.3%	7	87.5%	3	30%	6	54.5%	10	62.5%	18	94.7%
Do not Know	0	0	0	0	3	30%	4	36.4%	0	0	0	0
No	2	16.75	1	12.5%	4	40%	1	9.1%	6	37.5%	1	5.3%
TOTAL	12	100%	8	100%	10	100%	11	100%	16	100%	19	100%

From the results in Table 7.14 it is clear that in all three the units there were improvements with regard to staff's awareness of protocols regarding neonatal resuscitation. Figure 7.13 illustrates the overall results for this question in the maternity section. Out of the 40 respondents, 38 answered this question (CYCLE1 [N=42]; CYCLE 3 [N=40]).

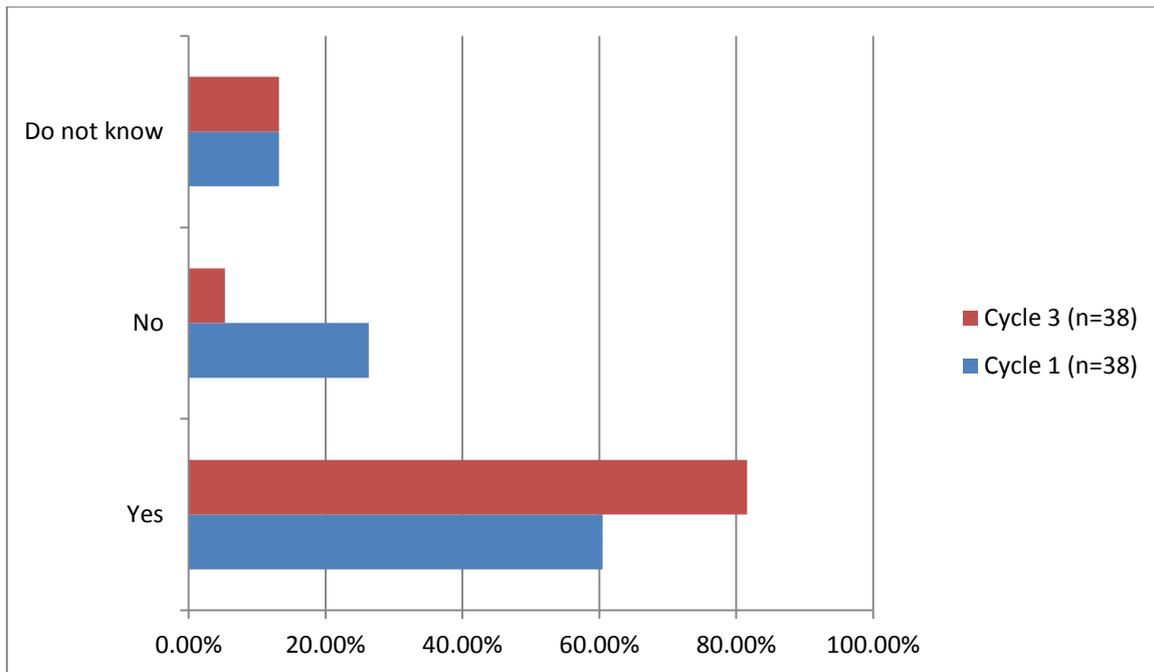


Figure 7.13: Changes in percentage between CYCLE 1 and CYCLE 3 of respondents' perceptions regarding the availability of protocols on neonatal resuscitation in the maternity section

From the overall results in the maternity section it was clear that more respondents were aware of protocols regarding neonatal resuscitation. Below is a comment made during the *focus group* regarding the awareness of neonatal resuscitation protocols:

- *"... protocols that are there next to the emergency trolley with algorithms so that when you resuscitate if you think that you are going to [get] stuck somewhere there will be somebody who'll be ... looks and say not it's not 60 beats per minute let's start a ... the chest compressions so we have guidelines that are there were everybody can see them. We also have the aim which we always have in to realise that there I am saving babies and they are displayed and they are communicated. So all the people know what we are busy with."* (Participant 4).

However, there was also a need for protocols regarding neonatal care to serve as a guideline and assist doctors not familiar with neonates in treating certain conditions, for example, jaundice. It seemed there was a need for the protocols to be reviewed; they also needed to be visibly available in all three the maternity units in order to standardise and render consistent quality care. A doctor had compiled protocols but they had not been signed or rolled out to all the units. Management indicated that they would address the issue. During the *focus group* the following comments were made regarding protocols in general. It must be noted these comments were not necessarily associated with neonatal resuscitation.

- *“When there is jaundice or the baby is not breathing well everything, but there is CPAPs phototherapy. But sometimes I don’t know when ... when exactly I should say I’m putting on phototherapy, double phototherapy depending on the size and gestation of the baby and everything. So sometimes it becomes a problem if I have to look for a book, how to ... when check so I think you know the point she’s mentioning it ... it’s the main reason or the main obstacle toward achieving a good outcome.”* (Participant 1).
- *“... but now we have a doctor that has compiled ... and the protocols. They are not yet complete all of them but there is those she has already done and they are to be signed.”* (Participant 4).
- *“I would say the protocols ... it’s still a challenge, as she was saying they are there but not yet signed so ... for as long as we are not signed we’ve wouldn’t say we have them so we are still waiting to get protocols from the paediatrician which we will be able to display and use... It’s a process it’s not yet finished and it’s not yet handed over to us and maybe postnatal.”* (Participant 3).
- *“... if there is a guideline there, it will assist on how to handle the ... the situation he finds himself in ... we do have protocols its only that they were not reviewed there because we can’t keep on having protocols that were signed by somebody who left four years ago ... it will be followed up and make sure those protocols they are reviewed, they are signed and they are valid and everyone is free to use them... Because everybody has got confidence now but if they don’t have protocols still it’s going to affect that confidence and skill.”* (Participant 10).
- *“Protocols obviously we can’t function without them ... we always want them to be available ”* (Participant 3).

The reflections made by the steering group during the reflective meeting with regard to protocols were that they also improved the collaboration between the doctors and nursing staff. They reflected the doctors also used the neonatal resuscitation algorithms as guidelines.

In conclusion, it seems there was improvement regarding neonatal resuscitation protocols. Neonatal resuscitation algorithms had been laminated and were displayed on the walls in the resuscitation area. The paediatrician is currently still busy compiling the final protocols. As soon as they have been signed they will be made available to all three the units. Protocols should be in place to guide nursing staff and doctors regarding the management of neonates, improve quality care and to make sure that certain standards regarding the treatment of patients remain consistent. According to the NaPeMMCo report (NaPeMMCo 2011:100), national guidelines on the management of neonatal conditions should also be available. There was a specific strategy which addressed protocols. Although protocols were made available for the NICU and were displayed and communicated, some inconsistencies

were noticed regarding protocols in the postnatal and labour wards. Management confirmed they would ensure that further issues regarding protocols were addressed.

Suggestions for future changes included the strategy to establish a task team to address the protocols, needed to be implemented to its fullest extent. The protocols regarding neonatal resuscitation should be finalised, signed and distributed to all three the units. Furthermore, protocols regarding neonatal care should also be reviewed and finalised in order to serve as guidelines for all the staff that work in the maternity section to standardise the quality of care. Having protocols in place regarding neonatal resuscitation and neonatal care would contribute towards reducing neonatal mortality.

7.3.3 CHANGES THAT OCCURRED REGARDING NEONATAL MORTALITY STATISTICS

Data were also collected by using the same data capturing sheets that was used in CYCLE 1 (see Chapter 5, section 5.4). Similar documents used during CYCLE 1 were used to compare the results thereby evaluating the changes that occurred in neonatal mortality after the implementation of the strategies. However, one should keep in mind that the strategies implemented were not the only factor. There were many variables, for example, the presence of a paediatrician in the maternity section. Over the two years that this study was done, three different paediatricians worked in the setting; therefore, there were times when no paediatrician was in charge of the NICU. Additionally, the procurement of certain equipment and the training regarding neonatal resuscitation had an effect on the statistics regarding neonatal mortality.

7.3.3.1 Changes in statistics regarding neonatal mortality for labour ward and the NICU

The statistics for 2014 were only updated up until the end of November 2014.

- ***Changes regarding neonatal mortality in labour ward***

The total number of admissions for the labour ward was determined by combining the number of deliveries with the born-before-arrivals. The total number of admissions for 2014 in the labour ward was 5 142. Late neonatal deaths did not apply to the labour ward because neonates are transferred within a few hours after birth to either the postnatal ward or the NICU. The early neonatal deaths as a percentage of the total of admissions in the labour

ward were 0.33% in 2014. Due to the fact that the statistics for December were not included as well as early neonatal deaths that most likely might have occurred, could indicate there would have been an increase in the 0.33% early neonatal deaths in the labour ward. The early neonatal deaths as a percentage of total admissions for 2013 were also 0.33%. Fresh stillbirths made up 0.89% of the total admissions which showed a decrease of 0.02%. The total number of deliveries for 2014 was 5 004 and the total number of live births before births constituted 4 901; however, these excluded the statistics for December 2014. The number of premature neonates as a percentage of admissions was 10.73 % for 2013 and 10.97% for 2014 indicating a probable increase in preterm births as preterm births would probably also have occurred during December. The total number of deaths as a percentage of the total number of admissions was 3.26% for 2012 and 2.93% for 2013. Up to the end of November 2014 it was 2.66% thus indicating a slight decrease in neonatal mortality in the labour ward.

- ***Changes in neonatal mortality statistics for NICU***

In the NICU the following changes with regard to the statistics were noticed. The number of admissions in the NICU slightly decreased from 1 324 patients in 2013 to 1 113 patients in 2014. This could indicate the quality of care as well as that of resuscitation had improved in the labour ward. A decrease in admissions in the NICU was still noticeable despite an increase in the percentage of preterm births in the facility. It needs to be acknowledged that the statistics from the NICU also excluded the month of December. However, there was a slight increase in the neonatal deaths as a percentage of admissions: from 6.19% in 2013 to 6.56% in 2014. This increase could be somewhat due to the fact that neonatal mortalities would probably also have occurred during 2014.

Figure 7.14 illustrates the changes that occurred regarding neonatal mortality on a monthly basis for each year. These are the neonatal mortality for both the labour ward and the NICU (these exclude stillbirths).

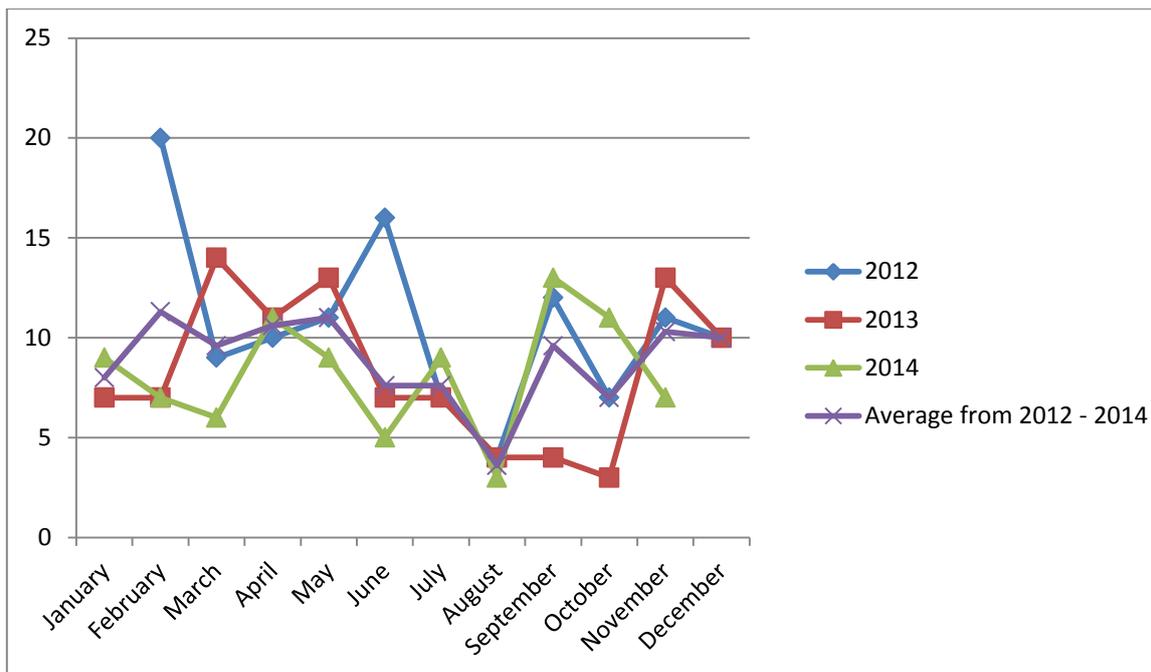


Figure 7.14: Comparison of the neonatal mortality rates (labour ward & NICU) on a monthly basis for each of the three years

It is important to note no statistics were available for January 2012 and December 2014. The average number of neonatal deaths for these two months was therefore adjusted accordingly. Considering the statistics as indicated in Figure 7.14, it is concluded in both 2012 and 2013 from February to August (with the exceptions of April and July) there was a decline in neonatal mortality. The most consistent statistic relating to neonatal mortality is indicated for August. Contemplating the neonatal mortality rate/1 000 live births for the district hospital from 2012 to 2014, the conclusions drawn are shown in Table 7.15.

Table 7.15: Neonatal mortality rate/1 000 live births in the maternity section

YEAR	NEONATAL MORTALITY RATE/1 000 LIVE BIRTHS IN THE MATERNITY SECTION
2012 (February – December)	52/1 000 live births
2013 (January – December)	46/1 000 live births
2014 (January – November)	42/1 000 live births

The results depicted in Table 7.15 clearly show the neonatal mortality was decreasing in the district hospital, but was still very high when compared with the neonatal mortality rate in South Africa which was 14/1 000 live births. The expected neonatal mortality rate for 2015 set by the MDGs was for a total mortality rate of 7/1 000 live births. Obviously, at the time of study this goal had not been attained.

7.3.3.2 Changes regarding causes of neonatal mortality

As in CYCLE 1 the statistics regarding the weight and diagnosis for neonatal mortality were also analysed and Figures 7.15 illustrate the results and changes with regard to causes of neonatal deaths in the maternity section of the district hospital.

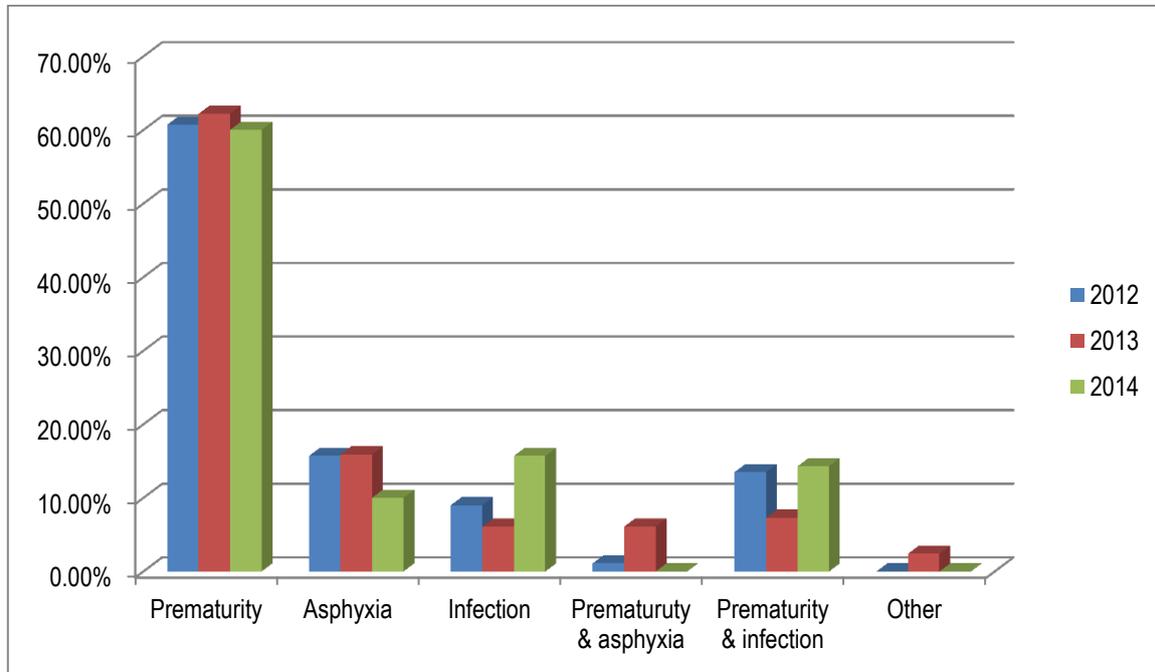


Figure 7.15: Bar chart of the percentage of deaths per cause of neonatal deaths for each of the three years

From the above results it is evident that, irrespective of the changes that resulted from the implementation of the strategies, prematurity remained the main cause of death in neonates; this transcribes to prematurity being the major cause of neonatal mortality.

In 2012 and 2013 birth asphyxia was the second leading cause of mortality with infections in the third position (see Figure 7.15). The 2014 results show two significant changes: infection increased and asphyxia decreased. Therefore, the leading causes of neonatal deaths at this specific district hospital in 2014 were prematurity followed by infection and then asphyxia.

During a reflective meeting held with the steering group at the end of CYCLE 3, the members reflected they had experienced a noticeable decrease in asphyxia. The operational manager said the nursing staff was aware of the Golden Minute and they were focused on applying bag mask ventilation correctly and looking for chest rise to confirm effective ventilation. Due to their prompt reactions when neonatal resuscitation was needed, the cases of asphyxiated neonates had decreased. This was confirmed by two steering group

members from the NICU who shared they also detected a decrease in admitting neonates with birth asphyxia. The effect of resuscitation training in facilities on the reduction of intrapartum-related neonatal deaths can be decreased by 30% and early neonatal deaths by 38% (Bhutta et al. 2014:354).

The reflections of the researcher during the capturing of data revealed a few neonates were admitted from home with herbal intoxication; from this they developed distended abdomens, infections and sepsis. These cases should be investigated further.

However, the decrease in neonatal mortality due to birth asphyxia may be due to the improved knowledge and skills the staff possessed after neonatal resuscitation training. Singularly this would have been an extremely positive outcome; however, other factors which possibly influenced the outcome cannot be excluded.

7.4 SUSTAINABILITY ACCORDING TO THE MASTER SCORE SYSTEM

The Master Score System (see Annexure Q) was used to determine if the quality improvement project – in the case of this study the strategies to sustain the quality improvement initiative- was sustainable; therefore, for answering the following sub-question: *“How sustainable was the strategies implemented to sustain a quality improvement initiative?”*

The Master Score System is part of the NHS Sustainability Model and Guide and is a valid and tested instrument to measure sustainability. Permission to use the Mater Score System was obtained from the NHS Institute (see Annexure F). The Master Score System is therefore used to identify the factor with the greatest potential for improvement.

The Master Score System was completed as decided by the steering group. Every operation manager as well as the matron of the maternity section completed the Master Score System, thus (N=5). The directions for completing the Master Score System were explained and the procedure as detailed Chapter 3, section 3.3.5 was followed. First participants were asked to read through the model and select the level of each factor associated with process, staff and organisation that best described their situation. The operational managers and matron were requested to complete the Master Score System according to the situation in the area of the maternity section they were responsible for. For example, the operation manager of the labour ward completed it according to the situation in labour ward and the matron of the

maternity section completed the Master Score System according to the situation in the maternity section. They were further requested to complete it as honestly and as objectively as possible. They had to identify the box next to description with a tick. The master version (see Annexure Q) of the Master Score System was used to calculate the scores. Scores were entered into the assessment panel at the bottom of the score system. The factors with the greatest potential for improvement were plotted onto the bar chart. Preliminary evidence suggests a score of 55 or higher indicates there is a possibility for sustainability of the quality improvement initiative (Maher et al. 2007:n.p.). A score of 45 or lower suggests action should be taken to increase the likelihood of sustainability of the quality improvement initiative. The researcher also completed the Master Score System to illustrate her perception and to serve as a control.

Descriptive statistics were used to analyse the quantitative data generated by the Master Score System. Figure 7.16 illustrates the findings from the Master Score System for each of the units and the maternity section as a whole.

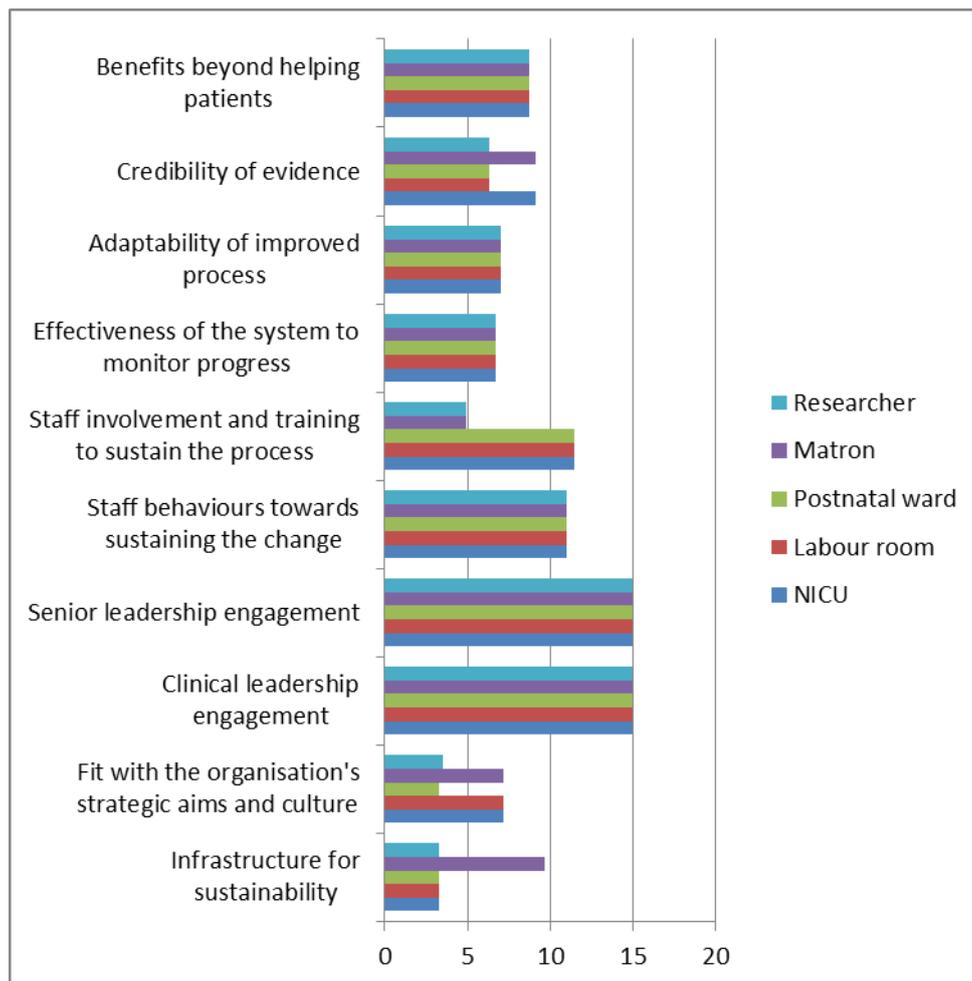


Figure 7.16: Probability of sustainability of strategies for NICU, labour ward, postnatal ward, maternity section and researcher's perspectives according to the Master Score System (Adopted from Maher et al. 2007:n.p.)

All (operational managers of the three units, matron of the maternity section and the researcher) who completed the Master Score System gave the same score for some of the factors. These included benefits beyond helping patients; the adaptability of the improved process; effectiveness of the system to monitor progress; staff behaviours towards sustaining change; senior leadership engagement, and clinical leadership engagement. The implication of the factors in the context of this study is discussed next according to each of these factors:

- ***Benefits beyond helping patients***

Benefits beyond helping patients is part of the factors related to the process of the Sustainability Model and refers to the fact that, in addition to helping patients, there are also other benefits to a quality improvement initiative.

In the context of this study it can be concluded the benefits regarding the quality improvement initiative in neonatal resuscitation may not only have benefitted the neonate as the patient, but may also have had other benefits like an improved staff attitude and building the staff's confidence to practice neonatal resuscitation. It seemed as if the teamwork and collaboration between senior and clinical leaders and the staff doing the groundwork also improved. Through training on neonatal resuscitation, personal development also took place as staff acquired new skills and knowledge regarding neonatal resuscitation. Improvement in other areas was also perceived. For example, a greater awareness with regard to challenges experienced such as the lack of equipment and shortage of staff which the quality improvement initiative created. There was also improvement in the procurement of equipment such as saturation monitors, mobile incubators, suctioning equipment and so forth.

The factor benefits beyond helping patient can be applied in the context of the findings as staff indicated things in their work environment will run more smoothly. They also noticed a difference in their daily work lives. Respondents made the following comments related to benefits beyond helping patients in the qualitative aspect of the questionnaire:

- *"It makes it easier to resuscitate babies."*
- *"it makes us to be competent and have confidence."*
- *"it will make our daily duties worker-friendly as all members in the unit will take part in resuscitating to help as they will have the knowledge of what is happening and what steps to take. This will save more lives and make to achieve my objectives and goals of caring for neonates."*
- *"It will build one's confidence and enhance more knowledge about neonatal resuscitation."*
- *"Emergency trolley that is well equipped with working equipment."*

These comments confirm the benefits of this quality improvement initiative were beyond patients and were also beneficial to the maternity section as a whole.

- ***Adaptability of improved process***

Adaptability of improved process is also part of the factors related to process. It implies that the quality improvement process can overcome internal pressures and continue to improve to meet ongoing needs.

This study was an action research study and therefore research took place in practice in the context of a maternity section of a district hospital. A steering group was established and

members were involved in the action research process as well as the quality improvement initiative related to neonatal resuscitation. The changes and quality improvement did not rely on an individual but on the steering group and therefore it can be foreseen that quality improvement related to neonatal resuscitation will continue and will be sustained. The sustainability of this quality improvement will also be enhanced if the train-the-trainer model for training in neonatal resuscitation and neonatal resuscitation practise drills on the mannequins will be implemented to its full extent. This will contribute towards knowledge and skill retention, and create a snowball effect where all staff members involved in caring for a neonate will have the opportunity to become knowledgeable and competent regarding neonatal resuscitation.

- ***Effectiveness of the system to monitor progress***

Effectiveness of the system to monitor progress is related to the factors regarding process of the Sustainability Model and implies the changes require special monitoring systems to identify improvement. Effectiveness can be determined by asking questions; for example, are there feedback systems to reinforce benefits and progress?; are data available to be communicated back into the setting?

In the context of this study effectiveness of the system to monitor progress was noted in the quality improvement initiative. The strategies were implemented based on an action plan that set clear guidelines on how to implement the strategy and how and when it will be monitored and evaluated. Feedback regarding the implementation of the strategies was also given through meetings. In terms of sustainability the strategies can be measured and continuous improvement can be communicated to all stakeholders involved. The strategies can therefore be refined and continuously be evaluated. There are thus many systems in place in the maternity section to monitor progress.

- ***Staff behaviours towards sustaining change***

Staff behaviours towards sustaining change are part of the factors related to staff in the Sustainability Model. This factor implies that staff should be encouraged to express their ideas and give inputs. They must also feel empowered and view the changes as beneficial and a better way of doing things. From the findings discussed in section 7.3 of this chapter it emerged that the operational managers and staff gave more input and were able to communicate the challenges they experienced. The findings further indicated the staff felt

empowered because of the training they received. There was a sense of confidence and competence related to neonatal resuscitation.

In terms of sustainability it is important to continue with the quality improvement initiative especially related to the training in neonatal resuscitation.

- ***Senior leadership engagement***

Senior leadership engagement is also part of the factors related to staff in the sustainability model. This factor implies senior leaders should set examples of trustworthiness, respect and believability. They must also be involved in the quality improvement initiative, understand and promote it, take responsibility, and give their time to ensure the changes are sustained.

From the findings of this study it was derived that senior leaders were involved in the quality improvement initiative. The operational managers gave their time and attended the train-the-trainer learning programme to become trainers in neonatal resuscitation. They were also involved in setting up neonatal resuscitation practise stations in order for staff to practise neonatal resuscitation. They are therefore facilitating training in their own units.

In terms of sustainability, more staff would have to be trained to be trainers. Senior leaders should be role models for their junior colleagues and should share their knowledge and information regarding neonatal resuscitation. Based on the findings in section 7.3, it seemed as if there was improvement regarding the communication of information about neonatal resuscitation.

- ***Clinical leadership engagement***

Clinical leadership engagement is part of the factors related to staff in the Sustainability Model and implies the same principles as senior leadership engagement. From the findings in this study it can be concluded that some of the clinical leaders did share information and take responsibility for change. There was also improved teamwork and collaboration among doctors and nursing staff.

With regard to the following factors there were differences in the scores given by the three operational managers, the matron of the maternity section as well as the researcher. These factors included credibility of evidence; staff involvement and training to sustain the process;

fit with the organisation's strategic aims and culture, and infrastructure for sustainability. These factors are discussed individually.

- ***Credibility of evidence***

Credibility of evidence is part of the factors related to process in the Sustainability Model and refers to the visibility of the benefits to patients, the staff and the organisation. Furthermore, it implies that staff should believe in the benefits and they must have knowledge of what the benefits will be.

In the results from the Master Score System of the matron and one of the operational managers it was evident that they rated the factor 'credibility of evidence' higher than the rest. They might have felt that the benefits to the patients, the staff and the organisation were more visible in, for example, the maternity section and the NICU than in the other wards.

In the context of this study the steering group and stakeholders were aware of the benefits of the quality improvement initiative to a larger extent than the staff members. The stakeholders had buy-in and acknowledged that by implementing a quality improvement initiative in neonatal resuscitation, it could bring about positive change in neonatal mortality at this district hospital. The implementation of the strategies and the benefits related to the quality improvement initiative in neonatal resuscitation could be made more visible to the staff members; however, the benefits of change were obvious in the findings indicated in section 7.3 and were supported by evidence.

- ***Staff involvement and training to sustain the process***

Staff involvement and training to sustain the process is a factor related to staff in the Sustainability Model, implying that staff members play a part in the design and implementation of change; ideas of the staff should therefore inform the change process. This factor also relies on an infrastructure of training and development to identify gaps in the knowledge and skills of staff and training them to effect change.

According to the results of this factor in the Master Score System, the researcher and the matron scored staff involvement and training to sustain the process lower than the operational managers in each of the units. The researcher's score was lower because although there was an improvement with regard to creating training opportunities for

neonatal resuscitation training, a gap remained in the knowledge and skill of some of the staff and therefore a need for training still existed. The focus group also reflected on the aim of this study which was that every staff member working in the maternity section should be trained and competent in neonatal resuscitation. This goal had not been met to the full extent.

In the context of this study gaps in the knowledge and skills related to neonatal resuscitation and the other influencing factors were identified in CYCLE 1. This situation analysis therefore formed the baseline of data and the findings of CYCLE 1 were used to reach consensus in the nominal group technique (NGT) discussion on the prioritisation of the strategies. Stakeholders, doctors and nursing staff were part of the NGT and therefore they all played a role in the design and implementation of change regarding the strategies to sustain a quality improvement initiative in neonatal resuscitation. For example, there was a need for neonatal resuscitation training and therefore one of the strategies addressed training and created training opportunities for staff to acquire the necessary knowledge and skills on neonatal resuscitation.

- ***Fit with the organisation's strategic aims and culture***

Fit with the organisations strategic aims and culture is a factor related to organisation in the Sustainability Model. It implies that the organisation must have had sustained improvements in the past; the goals must be clear and the improvement should be aimed to align with the strategic aims of the organisation. The change must also be important to the organisation and its leadership. Staff must be motivated with a 'can do' culture.

The researcher and operational manager of the postnatal ward scored this factor lower than the rest. It was the reflection of the researcher that there was still room for improvements with regard to creating a culture where staff members are motivated to implement strategies to sustain the quality improvement initiative.

In the context of this study the action research process accommodated the organisation's strategic aims and cultures. Through active collaboration participants in this study were given the opportunity to identify challenges they experienced and that needed improvements. The strategies that were implemented were aimed at addressing these challenges. However, it was not clear whether previous quality improvements in this hospital had been sustained and also whether top management were fully on board with all of the suggested strategies. Some of the strategies were also beyond the control of the

management of the maternity section and relied on hospital management and the South African Government.

- ***Infrastructure for sustainability***

Infrastructure for sustainability is also a factor described as part of the organisation in the Sustainability Model and implies that there should be enough trained staff, able and willing to work in the new way. There should be enough facilities and equipment to support the quality improvement initiative and new requirements should also be reflected in the job description of staff. Lastly, policies and procedures as well as communication regarding the quality improvement should be in place.

In the results of the Master Score System the matron of the maternity section scored this factor higher than the rest. The reason for this could be that she viewed the quality improvement as a whole. There had been improvements on many levels, but the operational managers still felt there were room for improvement especially with regard to staff shortages and procurement of emergency equipment. These findings are evidenced in section 7.3.

In the context of this study the issues concerning the staff shortage, all staff not trained in neonatal resuscitation, and the lack of some facilities and equipment may still have a negative impact on this quality improvement initiative. However, protocols regarding neonatal resuscitation are in place and algorithms are displayed and visible. From the findings in section 7.3 it also seems as if communication systems improved.

When interpreting the Master Score System results, all the scores added up to more than 55. It can therefore be concluded the possibility that the strategies implemented to sustain a quality improvement initiative in neonatal resuscitation in the maternity section of this district hospital cannot be discarded. However, to maintain sustainability it is vital for the steering group to continue motivating the staff and implementing the strategies.

As mentioned in Chapter 3, the Master Score System can be used at intervals of three to six months to evaluate the sustainability of a quality improvement initiative (Maher et al. 2007:n.p.). In this study the Master Score System was used to evaluate the sustainability at the end of the study in the third cycle, but it was also suggested that evaluation of the sustainability of strategies should be done every six months by the steering group.

7.5 REFLECTIONS OF THE RESEARCHER

Reflection was part of step four (REFLECT) of CYCLE 3 but it was discussed simultaneously with the other findings according to the strategies. Reflection took place in meetings held with the steering group, focus group with the steering group, doctors and nurses as well as a reflective meeting with the steering group held at the end of CYCLE 3. The steering group also handed in reflective notes at the end of this study.

It is the reflection of the researcher that staff attitude is central to any quality improvement initiative. The staff need to be motivated to have 'a can do' culture where they would *want* to improve on their working conditions as well as their knowledge and skills regarding neonatal resuscitation. It is a further reflection of the researcher that for the way forward the steering group should keep on implementing the strategies and top management should have buy-in and be aware of the challenges experienced in the maternity section. With the continuous implementation of the strategies and following the recommendations for practice (to be discussed in Chapter 8 in section 8.5.1), the possibility of this quality improvement initiative in neonatal resuscitation to be sustainable in the future is well-founded.

7.6 CONCLUSION

In this chapter the changes that occurred as a result of the strategies were discussed. This evaluation of change was part of CYCLE 3 of this action research process. The six strategies were evaluated based on the analysis and findings of the data collected and the reflections of the steering group and the researcher.

The strategy addressing neonatal resuscitation training was implemented with positive effect. Neonatal resuscitation training opportunities were created where the staff had the opportunity to attend the adjusted Helping Babies Breathe training. From the findings it was clear the staff perceived this training as positive and their confidence and involvement with regard to neonatal resuscitation were enhanced. Enforcement and support in training regarding neonatal resuscitation was implemented by means of neonatal resuscitation practise drills on a mannequin. Most importantly, there was improvement in the knowledge regarding the critical aspects of neonatal resuscitation as evidenced by the results from the questionnaires; especially in the NICU where most staff were trained and most questionnaires were received back.

The strategy addressing equipment was evaluated. There were some positive changes as concluded from the findings. The maternity section did receive some of the necessary equipment needed for quality care and neonatal resuscitation, but some lifesaving equipment was still needed. This equipment had been procured but due to the slow procurement process and the complicated government tender system, it had not yet been received by the time this study was concluded. This is essential equipment needed for advanced neonatal resuscitation when a neonate needs to be intubated, for example, laryngoscope blades.

When evaluating the changes that occurred with regard to staff attitude, it can be concluded that there was an overall improvement in staff attitude. These changes could be ascribed to the training and improvement in knowledge and skills. Recurrent themes emphasised that the training had a positive effect on the confidence of staff and staff involvement and this also contributed towards augmenting the staffs' positive attitudes. Furthermore, there were reflections that management was addressing challenges experienced and teamwork had improved. However, it was noted the need for debriefing after neonatal resuscitation was still certain as well as for mortality and morbidity meetings.

Staff shortages also remained a challenge which was out of the control of the steering group. However, awareness was created and management was aware of the challenges regarding staff shortage. Therefore, the minimal staff available should be utilised efficiently and effectively. This strategy still needed to be implemented to its full extent in order to motivate and retain the staff that is currently working in the maternity section of this hospital.

Unfortunately, there were still critical challenges regarding transport for transfer of critically ill neonates. These challenges included time delays, the lack of equipped ambulances with competent EMS staff and poor communication on the part of the EMS services. But there is hope for improvement in the near future as the Gauteng Department of Health launched emergency obstetric ambulances.

With regard to awareness of protocols there was some improvement in that neonatal resuscitation algorithms were put on the walls in the resuscitation areas where they can be seen by everyone. On the other hand, the need still remained for protocols regarding neonatal care which could serve as guidelines for healthcare providers helping out in the NICU and who are not familiar with all the neonatal care aspects, for example, community service doctors and nurses and casualty doctors helping out over weekends. If the quality of care can be improved by means of protocols, it can also help with the prevention of having to perform neonatal resuscitation.

The overall neonatal mortality decreased as discussed in section 7.3.3. Neonatal mortality rates are an indicator of quality care and therefore it can be concluded that there could have been an overall improvement in quality care. This could be as a result of various factors of which one could be the training with regard to neonatal resuscitation and the new equipment. The number of admissions to NICU and the number of deaths due to asphyxia decreased and this could be a direct result of the improved bag and mask ventilation skills which formed part of the basic neonatal resuscitation.

Most importantly, the strategies that were developed and implemented have the probability to be sustainable based on the results of the NHS Master Score System. This might indicate a positive outcome regarding the sustainability of the strategies in the long term. This PRAR research study was based on the NHS Sustainability Model, as sustainability of the strategies were central to this study. Therefore, a holistic approach was followed, not only focusing on the practice of neonatal resuscitation but also on other influencing factors. In the next chapter the conclusions and recommendations are discussed.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

South Africa made a commitment towards attaining the MDG 4 of which the aim is to reduce the under-five mortality rates by two-thirds before 2015 (Bradshaw et al. 2008a:1294-1304; Bryce et al. 2008:1247-1257). Currently, the neonatal mortality makes up 44% of the under-5 mortality rate and its reduction has lagged behind in comparison with the maternal and child mortality rates. Therefore, reducing neonatal mortality would contribute towards the reduction of the under-5 mortality rates. (Darmstadt et al. 2014:174; WHO/UNICEF 2014:12).

The global newborn mortality rate decreased by only 37% from 33/1 000 live births to 21/1 000 live births (WHO/UNICEF 2014:9). The target for 2015 regarding the reduction of neonatal mortality rate (NMR) was to reduce the NMR from 21/1 000 live births in 1998 to 7/1 000 by 2015. According to Statistics South Africa (StatsSA), the neonatal mortality rate for South Africa was 14/1 000 live births in 2009 (Lloyd & de Witt 2013:1; Velaphi & Rhoda 2012:67). The data from StatsSA indicate there was no change regarding the NMR from 2000 to 2008 (Lloyd & de Witt 2013:1; Velaphi & Rhoda 2012:67). According to Lloyd and de Witt (2013:1), the Saving Babies Report for 2010–2011 reflected the early neonatal death rate was 21/1000 live births. Therefore, the neonatal mortality in South Africa did not improve significantly. Moreover, the highest neonatal mortality rates are indicated in the country's district hospitals (Lloyd & de Witt 2013:1; Velaphi & Rhoda 2012:67). These neonates die mostly due to avoidable or modifiable factors. Despite clear guidelines on addressing the problems related to the avoidable and modifiable causes (Pattinson 2009:38; 2011:39-41; 2013:12).

Effective neonatal resuscitation is an intervention that can potentially save the life of a neonate; hence, effective resuscitation can contribute towards the reduction of the country's neonatal mortality rates (Bhutta et al. 2014:354; Conroy et al. 2014:2; Goudar et al. 2013:e345; Wall et al. 2009:s48). Unfortunately, training in neonatal resuscitation only is not sufficient as there are other significant factors influencing neonatal resuscitation that also need to be considered. These factors can be addressed as part of a quality improvement initiative, but the problematic issue is that quality improvement initiatives are difficult to sustain. Therefore, this study to improve neonatal resuscitation was based on the National

Health Services' (NHS) Sustainability Model in order to enhance the probability of sustainability.

This research study was conducted in three cycles. The divided main research question was:

“How can a quality improvement initiative in neonatal resuscitation be sustained in a district hospital in Gauteng?”

To answer this research question, the research comprised of three cycles. In each of these three one of the following three sub-questions was addressed:

- *CYCLE 1 – “What is the existing situation regarding factors influencing neonatal resuscitation and neonatal mortality in a district hospital in Gauteng?”*
- *CYCLE 2 – “What strategies can be implemented to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng?”*
- *CYCLE 3 – “What are the changes that occurred as a result of the strategies for a quality improvement initiative in neonatal resuscitation that were implemented? Were the strategies implemented to sustain a quality improvement initiative sustainable?”*

The aim of this study was to explore and describe the existing situation to enable the researcher and stakeholders in the specifically selected district hospital to develop strategies to sustain the quality improvement initiative implemented in neonatal resuscitation for decreasing neonatal mortality. In addition, to determine what changes occurred as a result of these strategies and whether the changes were sustainable.

To achieve this aim, action research was chosen as the methodology of choice. The methodology was based on the PRAR-model as discussed in detail in Chapter 4. The study was done in three cycles. In CYCLE 1 the existing situation was analysed and the challenges/problems identified. In CYCLE 2 the development and implementation of the strategies were done and in CYCLE 3 the changes that occurred as a result of the strategies that were implemented were evaluated. For the purpose of this study only these three cycles were reported on. Because the method was action research which is characteristically a continuous process of quality improvement, the strategies developed during the course of this study need to be refined, evaluated and re-implemented continuously in order for the changes to be sustainable. The conclusions of the findings of each of the cycles are discussed next.

8.2 CONTEXT OF THE STUDY

This study was done in the maternity section of a district hospital (see Chapter 1 section 1.7.5 and section 1.9) in Gauteng, one of the nine provinces in South Africa. The district hospital is situated in a rural area and patients from 32 other rural clinics are referred to this hospital. At the time of study, the maternity section consisted of three units: the labour ward, the postnatal ward and the neonatal intensive care unit (NICU) which also had a Kangaroo Mother Care unit (KMC unit). Approximately 70 healthcare staff worked in the maternity section. They included professional nurses, enrolled nurses and enrolled nursing auxiliaries.

The maternity section was managed by operational managers and the maternity section by the sectional matron. The specialists working in the maternity section (consisting of the labour ward, postnatal ward and NICU) over the two years that this study was conducted included one gynaecologist and three different paediatricians. Each of these three took up employment in the maternity section but left after some time meaning there were times when the maternity section was left without a paediatrician. The medical doctors and community service doctors allocated to the maternity section did not always have experience in caring for neonates. In addition, over weekends doctors from the casualty department rotated through the NICU.

The NICU admitted ill neonates in need of specialised care; premature babies were also cared for in the NICU where there were some facilities available to care for these neonates. The NICU had 35 beds of which four was for ICU patients; there was also a 12-bed KMC unit. Neonates who presented with congenital abnormalities that could be treated and those who were critically ill were transported and transferred to a tertiary institution where specialised treatment was available. The maternity section had a high turnover of staff and provided care to a large number of patients. There was on average more than 5 000 deliveries a year of which an approximate 10% were born preterm. On average, approximately 1 000 patients were admitted to the NICU per year. Obviously, this is a very busy maternity section facing many challenges.

8.3 CONCLUSIONS OF FINDINGS

As previously mentioned, the study consisted of three cycles. The conclusions from the findings of each of the three cycles will now be discussed.

8.3.1 Conclusions of CYCLE 1 – Situation analysis

The aim of CYCLE 1 was to examine the existing situation regarding neonatal resuscitation and its influencing factors. Different data collection techniques were used for this purpose. In conclusion, the findings regarding the existing situation consisted of recurring themes pertaining to the challenges that were experienced on a daily basis in the maternity section of the district hospital. The recurring themes included themes regarding training, scarcity of staff resources and expertise, the lack of equipment and stock, aspects influencing staff attitude, challenges with regard to transport for transferral of critically ill neonates, and aspects pertaining to the culture of the organisation such as protocols.

The challenges experienced regarding training, staff and equipment resources, and transport correlated with the Saving Babies Reports as avoidable and modifiable causes of neonatal mortality (Pattinson 2011:21-41).

8.3.1.1 Neonatal resuscitation training

Training with regard to neonatal resuscitation was identified as an area which needed improvement.

- Only 2.6% of the respondents (nursing staff working in the maternity section) who completed the questionnaires were trained in paediatric care; no one was trained in neonatal care. This creates a problem when caring for neonates as a neonate and paediatric child are two totally different types of patients. Thus, there was a dire lack of expertise.
- Factors such as staff shortages and a lack of financial resources also prevented staff from attending training opportunities.
- One of the findings was also that the staff who perceived themselves as *knowledgeable* (n=39; 56.4%) regarding neonatal resuscitation were not necessarily competent in it. The nursing staff who perceived themselves as *competent* (n=39; 35.9%) made gross critical mistakes in answering the questions regarding the practice of neonatal resuscitation. Likewise, nursing staff that perceived themselves as knowledgeable regarding the new trends and guidelines in neonatal resuscitation were making the same critical mistakes. These correlations were concluded from the results of the cross-tabulations (see Chapter 5, section 5.2.2).

- Training was inconsistent and there were respondents (nursing staff) who had never had the opportunity to attend neonatal resuscitation training.
- From the respondents who had completed the questionnaire, 89.2% (n=37) had never practised neonatal resuscitation on a mannequin.
- A need was identified by participants for an in-house training programme specifically focusing on neonatal resuscitation.

8.3.1.2 Staff shortages

Staff shortages were identified as a challenge from the perspectives of the nursing staff as well as the doctors working in the maternity section of this district hospital.

- Shortages of staff were a recurrent theme and 68.4% (n=38) of respondents (nursing staff) indicated there was not enough staff to render quality care and quality neonatal resuscitation.
- Participants from the focus group interview indicated that they experienced a lack of staff especially during night duty and the nurse to patient ratio was very low. For example, in the NICU there will only be one professional nurse on duty during the night and she will be assisted by three other sub-category nurses.
- There was also a need for senior and clinical leaders with expertise, specifically with regard to neonatal care.
- Overall the shortage of staff has an impact on the functioning of the hospital and provision of quality care.
- Shortages of staff also lead to ethical issues and causing staff to make difficult decisions such as choosing between saving a mother or her baby.
- Shortages of staff had a negative impact on the staff attitude.

8.3.1.3 Staff attitude

Staff attitude (feelings and behaviours) were identified as a challenge during the focus group interview. Factors related to staff attitude were also part of the questionnaire. The following conclusions were drawn from the findings:

- Staff felt overworked and demoralised because of the challenges they experienced.
- There was a lack of self-confidence with regard to neonatal resuscitation. Not having enough confidence had a negative influence on the staffs' attitude towards neonatal

resuscitation in that it prevented them from becoming involved with attempts to resuscitate a neonate; they were therefore unwilling to take accountability and responsibility. They avoided involvement in neonatal resuscitation.

- There was no clear vision and aim regarding neonatal resuscitation in the maternity section.
- A lack of communication between the staff and the management was also identified. Challenges staff experienced in their work environment were not discussed with management causing staff to feel despondent.
- There was a need for improvement regarding communication in order to address challenges and enhance quality care.

8.3.1.4 Equipment and stock

The lack of essential emergency equipment and stock was another theme that kept on recurring. The following conclusions were made from the findings:

- There was a need for the availability of emergency equipment and stock used during neonatal resuscitation. These included suctioning, radiant warmers, ambubags, laryngoscope blades, and some essential stock. For example, the labour ward had one functioning suction machine and one radiant warmer for the 10 labour rooms.
- Meetings were held to address these challenges but the procurement process was very slow due to all the channels and tender processes that need to be followed.
- Problems were also identified regarding the maintenance of equipment, for example, equipment would be available but because they were not serviced and maintained they were not functioning.

8.3.1.5 Transport

Problems regarding the effectiveness of transport for transfer of critically ill neonates were also identified during the situation analysis. The following conclusions could be made from the findings:

- There were recurrent themes of delay of transport contributing towards neonatal deaths.
- Ambulances were not equipped with the necessary equipment to transport critically ill neonates.

- The EMS staff was perceived not competent to render care to the neonates.
- Communication regarding the transport process was also ineffective.

8.3.1.6 Protocols

There was a certain culture in the hospital with regard to inconsistency of practices and protocols. In all three units (labour ward, postnatal ward and NICU) of the maternity section, protocols were inconsistent and not available.

8.3.1.7 Causes of neonatal mortality

The causes of neonatal deaths in this district hospital correlated with the causes of deaths in South Africa (Pattinson 2009:15; 2011:39-40) with the main causes being prematurity, asphyxia and infection. The following conclusions could be drawn from the data collected with the data capturing sheets:

- The neonatal mortality rate as a percentage of the admissions in the NICU decreased from 6.97% in 2012 to 6.19% in 2013. In the labour ward the neonatal mortality also declined from 3.26% in 2012 to 2.9% in 2013.
- The neonatal mortality rate for 2012 at this district hospital was 52/1 000 live births (for the period February – December; statistics for January was not available) and for 2013 the neonatal mortality rate was 46/1 000 live births (January – December) therefore showing a decline in neonatal mortality in 2014.
- There are still neonates that die due to avoidable and modifiable causes, for example, neonates die while waiting for transport; neonates die while staff are looking around for emergency equipment such as ambubags. These neonates have the potential to survive and they were the focus of this study, and the reason for this study in the first place.

8.3.1.8 Priorities based on consensus through nominal group technique (NGT) discussion

To reach consensus and prioritise the challenges that had to be addressed, a nominal group technique (NGT) discussion was held with the steering group, nurses and doctors. The findings of the results of the situational analysis served as a baseline for the NGT

discussion. Through consensus the following six priorities were identified by the participants of the nominal group technique discussion:

1. *Challenges regarding training*
2. *Challenges regarding equipment and stock*
3. *Challenges regarding staff attitude*
4. *Challenges regarding staff shortage*
5. *Challenges regarding transport for transfer of patients*
6. *Challenges regarding protocols*

In the nominal group technique discussion ideas were generated and prioritised to address these challenges. The findings of the nominal group technique discussion formed the basis of the strategies that were developed to sustain a quality improvement initiative in neonatal resuscitation.

8.3.2 Conclusions of CYCLE 2 – Implementation of the strategies

The strategies were developed in a collective manner with the involvement of the participants of the nominal group technique discussion, the steering group and the researcher. These strategies were developed and implemented in CYCLE 2 which was the implementation phase of this action research study.

8.3.2.1 Development of strategies

The strategies were developed based on the findings of CYCLE 1 and the consensus reached by participants (the matron, operational managers, professional nurses, and doctors) during the nominal group technique discussion. The following conclusions were drawn with regard to the development of strategies:

- A strategy document was drafted and the action plan (the ‘what’, ‘why’, ‘when’, and ‘who’ as well as the monitoring and evaluation aspects) for implementation of the strategies was drafted by the steering group in consultation with the staff working in the maternity section and the different departments involved.
- The strategies addressed neonatal resuscitation training, equipment and stock, staff attitude, staff shortage, transport and protocols.
- The theoretical framework for this study was the Sustainability Model and therefore the strategies were formulated on aspects of the process, staff and organisation.

- The focus of this study was not on training of staff in neonatal resuscitation only but also on other influencing factors related to staff, equipment, the culture of the organisation and so forth.

8.3.2.2 Implementation of strategies

After the strategies had been developed and it had been determined how they would be implemented as outlined, they were implemented. The following conclusions can be made regarding the implementation of the strategies:

- Each operational manager was responsible for the implementation of the strategies in their own unit. The manager of the maternity section was involved in aspects beyond the control of the operational managers, for example, the staff budget.
- The implementation and spread of the strategies to sustain a quality improvement initiative were different in all three the units and were influenced by many factors. For example, the nursing services manager of the maternity section was on leave for three months during the implementation phase of the strategies due to personal reasons. She was the one driving all the decisions that needed to be made by management such as the budget for recruitment of staff, procurement of equipment, and even addressing challenges with regard to transport.
- The focus was on the improvement of those things that could be possible and on utilising the things they had in the maternity section optimally and efficiently. For example, staff resources and financial budgets were beyond the management of the steering group and the researcher, but it was important to create awareness on all the challenges that were experienced in the maternity section for future improvement and sustainability.
- Staff attitude was also an influencing factor with regard to the implementation of the strategies. No person could be forced to implement anything or to attend training. The involvement of staff in these aspects was up to themselves.
- The aspects of the strategies that could be implemented were indeed implemented although not all of them were implemented to the same extent in the different units. For example, the strategy addressing training was implemented to a far better extent than the strategy regarding protocols. The reason for this could be that addressing training regarding neonatal resuscitation was viewed as more important and was perhaps easier to implement.

In the end this was an action research study; therefore, the maternity section had ownership in the study and was part of the decision-making processes. The changes that occurred as a result of the implementation of the strategies were evaluated in CYCLE 3.

8.3.3 Conclusions of CYCLE 3

The focus of CYCLE 3 was to evaluate the changes that occurred in the maternity section as a result of the strategies implemented to sustain a quality improvement initiative in neonatal resuscitation. Furthermore, the objective for this cycle was also to determine the probability of the sustainability of the implemented strategies by evaluating it with the NHS Master Score System.

Various data collection techniques similar to those used in CYCLE 1 were used to collect data in order to evaluate the changes that occurred as a result of the strategies having been implemented. Questionnaires were used to evaluate the changes that occurred from the perspectives of nurses. A focus group interview was held with the steering group and stakeholders to solicit information regarding their perceptions on the changes. Furthermore, the same data capturing sheets were used to collect data regarding neonatal mortality in the maternity section. Lastly, the Master Score System was used to determine the probability of the sustainability of the strategies. The same data analysis techniques were used for both the qualitative and quantitative data (see Chapters 4, 5 and 7).

In comparison with CYCLE 1 there were no significant changes with regard to the demographics of the nurses who completed the questionnaire and their years of work experience.

Six strategies were implemented and evaluated. They addressed neonatal resuscitation training; equipment and stock; staff attitude; staff shortages; transport for transfer of critically ill neonates, and protocols.

8.3.3.1 Neonatal resuscitation training

With regard to addressing neonatal resuscitation training the following conclusions were made (see Chapter 7, section 7.3.2.1 for findings):

- Neonatal resuscitation training opportunities were created on-site in the maternity section of the district hospital.

- Staff members had the opportunity to attend Helping Babies Breathe training.
- In total 81 staff members attended the Helping Babies Breathe training. Of these, 53 were nursing staff from the maternity section of the district hospital.
- There was also staff that attended some other courses regarding neonatal resuscitation but these were separate from this study.
- The neonatal resuscitation training was further supported and enforced by giving staff the opportunity to practise neonatal resuscitation on a mannequin.
- After the implementation of the strategies, the percentages of the respondents in CYCLE 3 who never had the opportunity to practise neonatal resuscitation on a mannequin decreased to 15.4% (from 89.2% in CYCLE 1) and those who had a monthly opportunity increased to 56.3%. (See Figure 7.6 in Chapter 7, section 7.3.2.1).
- There were still some staff members who identified training as a need especially with regard to continuation of training regarding neonatal resuscitation. Unfortunately, not all the staff members working in the maternity section had been trained.
- Communication regarding the availability of training and availability of practising on the mannequin were limited and this could have been contributing towards the lack of attendance by some of the staff with regard to training and practise on the mannequin.
- Another contributory factor could have been the shortage of doctors and therefore those who were on duty were unable to attend training sessions due to their workload.
- Healthcare providers are responsible for their own learning and if these opportunities are provided they should have the inner need and positive attitude to embrace the training and learn more about neonatal resuscitation.
- Staff members who did attend the neonatal resuscitation training indicated that they had a positive experience and that they feel more confident in practising neonatal resuscitation.
- There was also an increase in staff members perceiving themselves as feeling competent regarding neonatal resuscitation. From the findings in Cycle 3 it could be concluded that 69.7% (n=39) felt confident in comparison to the 35.9% (n=39) in Cycle 1.
- After the training there were also improvements regarding the critical aspects of neonatal resuscitation and nurses who perceive themselves to be knowledgeable regarding the new trends and guidelines in neonatal resuscitation and feeling competent. As outlined in Chapter 7 section 7.3.2.1, these improvements are mostly

evident in the NICU. This can be due to the fact that most of the nursing staff working in the NICU completed the questionnaire and most of them attended the Helping Babies Breathe training. From these results it can be concluded that there was an improvement in the nurses' knowledge regarding neonatal resuscitation. This could be seen in the improvement and correct answering of seven out of the eight critical aspects identified.

- Practising their neonatal resuscitation knowledge and skills on the mannequin were also perceived as a positive by the staff members. These practise sessions contributed to their improved level of confidence when practising neonatal resuscitation.

8.3.3.2 Equipment and stock

The following conclusions were made regarding the changes that occurred as a result of the implementation of the strategy addressing equipment and stock (see Chapter 7 section 7.3.2.2 for findings):

- The maternity section received some equipment before this study, but part of the strategies was a needs assessment regarding the equipment they still needed. During the quality improvement initiative the maternity section received some of the this needed equipment, namely, radiant warmers, mobile suction machines, Neopuffs and a mobile incubator to name a few.
- The staff received in-service training on the use of the above mentioned equipment.
- The steering group reflected that the maternity section also received some ambubags and the casualty department received a blood gas machine which can also be used by the NICU if needed. The use of this equipment can contribute towards the prevention of the need for neonatal resuscitation and improve neonatal outcomes.
- Each of the units also received a resuscitation toolbox. These boxes contain the necessary emergency equipment and stock needed for neonatal resuscitation. The neonatal resuscitation algorithms for basic and advanced neonatal resuscitation and other indicator cards were attached to the handles of the resuscitation boxes for easy reference. Staff members perceived these resuscitation boxes as extremely helpful because it meant they do not have to run around looking for equipment during resuscitation.

- There was still a dire need for some lifesaving equipment for the intubation of a neonate such as laryngoscope blades and McGill's forceps as well as more radiant warmers for the ICU area in the NICU.
- According to the reflections of the researcher and the operational managers, staff should be more involved in the decisions regarding the prioritisation of equipment which needs to be procured.
- Equipment should be controlled and there were positive changes in this regard. Each of the three units was supplied with books for this purpose, namely, to keep track of the movement of equipment.
- There was still a need for the maintenance of equipment. This could be influenced by financial resources. The management and control of equipment contributed to ensuring that the equipment the maternity section has are available and functioning optimally.
- There seems to be improvement for the future with regard to stock control as improvements were made in recruiting knowledgeable staff in the supply chain management of the hospital.

8.3.3.3 Staff attitude

The following conclusions were made from the evaluation of the strategy addressing staff attitude (see Chapter 7 section 7.3.2.3 for findings):

- Staff attitude was addressed as part of the strategies but was also part of six other priorities as mandated by the office of the Minister of Health.
- Task teams for the units were established and it was their responsibility to address staff attitude.
- It was the reflection of the researcher and the steering group that there was an overall improvement regarding staff attitude in the maternity section.
- The staff attitude was influenced by many factors related to the work environment and the work conditions. This finding was significant since staff attitude influences staff involvement and the quality of care.
- The researcher's reflection was that staff attitude is central to the success of a quality improvement initiative because in order for something to improve or change, identified strategies need to be implemented and sustained.
- Staff attitude was positively influenced by the training. With the acquisition of the knowledge and skills staff members indicated they felt more confident and competent

in performing neonatal resuscitation. The training and the resulting enhancement of the staffs' confidence and competency had a positive influence on staff involvement regarding neonatal resuscitation.

- A further positive influence on staff attitude was attributed to improvement in communication with regard to information sharing about neonatal resuscitation and addressing the challenges experienced in the maternity section.
- Staff members started to focus on the same goal and this led to the development of a vision and aim for neonatal resuscitation which was subsequently displayed on posters on the walls of the resuscitation areas.
- Improvement was noticed regarding teamwork and team spirit among the staff including doctors and nurses.
- From the reflections of the steering group in the reflective meeting it was also indicated there was a positive change regarding collaboration and teamwork between the team members and units.
- Staff members also felt supported because management addressed the challenges identified; however, it is important to realise some of these challenges were beyond the control of the steering group and management.
- Factors that had a negative influence on staff attitude were the lack of certain lifesaving equipment and staff resources. These factors contributed to the staff feeling despondent and overworked.
- Staff members also demonstrated a need for emotional support in the form of mortality and morbidity meetings and debriefing sessions after failed resuscitations.
- Staff members were educated regarding professional conduct and adherence to the Batho Pele principles and the Patient Rights Charter. These were also displayed on the walls in the units and corridors of the maternity section.

The reflections of the researcher on this research process were that staff attitude and staff morale plays an important role in the success of any study regarding quality improvement. Staff must have a positive attitude towards their work environment as a whole. Unfortunately, their attitude is influenced by many factors and it is understandable that people feel demoralised and overworked when they are faced with challenges on a daily basis.

8.3.3.4 Staff shortages

The following conclusions can be made from the evaluation of the strategy addressing staff shortages (see Chapter 7 section 7.3.2.4 for findings):

- Staff shortage still remained a significant problem in the maternity section.
- There was a need for clinical leaders including trained neonatal nurses and paediatricians.
- There was no significant improvement regarding the recruitment of staff.
- The numbers of staff members between 2013 and 2014 were the same for the labour ward and the postnatal unit. The NICU recruited only one additional professional nurse.
- The nurse-to-patient ratio remained a problem, especially during the night. The ratios were determined based on the average number of patients on a daily basis (see Chapter 7, section 7.3.2.4, Table 7.12).
- There was a high staff turnover which still remained a challenge even after the study was concluded because staff members who had been trained, left taking their skill and knowledge with them. These staff members were replaced with new untrained staff.
- Due to the staff shortage and the inability of staff to attend training off-site, neonatal resuscitation training were given on-site in the hospital in alternating groups of six to eight people. The training consisted of an adjusted Helping Babies Breathe programme and focused on bag mask ventilation and cardiac compressions; hence, the staff learned how to do neonatal resuscitation on their own. Therefore, in spite of being short staffed, all staff working in the maternity section at any given time should all be able to perform neonatal resuscitation on their own and continue with the resuscitation until other staff arrives to assist them.
- Available staff should therefore be used efficiently and effectively; the placement of staff according to interest and skill was found extremely important for better patient outcomes and staff motivation.

8.3.3.5 Transport

The following conclusions were made regarding the evaluation of the strategy that addressed the issue of transport (see Chapter 7 section 7.3.2.5 for findings):

- There was a slight improvement in the transport of critically ill neonates from the NICU when private ambulance services were used. Unfortunately, this only lasted for a short period of time. The findings showed there was no significant improvement regarding transport in the long-term.
- According to participants there was a slight improvement in response time.

- However, the problem with regard to ambulances that arrived unequipped for the transport of critical ill neonates continued. Additionally, EMS staff that was not knowledgeable about transporting critically ill neonates aggravated this problem.
- From the findings it was further concluded that, according to participants, the telephonic booking of transport took an unacceptably long time. It was difficult to get hold of the EMS call centre and upon explaining the condition of the neonates and the equipment and expertise needed for transport, the EMS services would still arrive without the required equipment and trained EMS staff.
- There was ineffective communication between the despatcher and the despatch team.
- Meetings were held between district hospital and the EMS services and the problems were addressed. However, it seems that there is a need for more meetings and discussion regarding the challenges experienced with transport and the transfer of critically ill neonates, as there are still problems pertaining to this issue.
- There was improvement in the labour ward with regard to the transport of pregnant women to tertiary hospitals.
- The focus should be on improvement of transport of critical ill neonates as this has a direct influence on the neonatal mortality rates.

8.3.3.6 Protocols

The following conclusions were made from the evaluation of the strategy that addressed the protocols (see Chapter 7 section 7.3.2.6 for findings):

- There was improvement regarding neonatal resuscitation protocols but the roll-out was found not to be the same in all the units.
- Each unit was provided with laminated neonatal resuscitation algorithms and they were fully displayed on the walls in the resuscitation area.
- Protocols regarding neonatal care needed to be in place in each of the three units. At the time of study a paediatrician (working in the maternity section at that stage) was, however, still in the process of compiling the final protocols (protocols have not been finished and signed off) and it was concluded that as soon as it had been signed, it would be made available to all three the units. At the time the study was concluded this situation had not yet changed; however, management undertook to attend to this as a matter of urgency.
- Management ensured that they would address further issues regarding protocols.

From the conclusions regarding the changes that occurred as a result of the implementation of the six strategies to sustain a quality improvement initiative in neonatal resuscitation, recommendations for the future were made in order to sustain the strategies and to improve practice regarding neonatal resuscitation.

8.3.3.7 Changes in neonatal mortality rates and causes of neonatal mortality

The following conclusions were made regarding the changes in neonatal mortality rates and causes of neonatal mortality in the district hospital:

- The overall neonatal mortality rate decreased from 46/1 000 live births in 2013 to 42/1 000 live births in 2014. (This was based on the data collected from statistics, excluding statistics for December 2014).
- The neonatal mortality rate in this hospital was still high when looking at the target set by the MDG 4 for 7/1 000 live births. It is also higher than the current neonatal mortality for South Africa. The reason for this might be that this is the only rural district hospital in its area and serving a large demographic area and population.
- The total number of deaths as a percentage of the total number of admissions was 3.26% for 2012, 2.93% for 2013 and – up to the end of November 2014 – it was indicated as 2.66%. The percentages showed a slight decrease in neonatal mortality in the labour ward.
- Prematurity remains the main cause of neonatal death (60% in 2014).
- There was a noticeable change with regard to infection and asphyxia as causes of neonatal death: asphyxia as the cause of death decreased (from 15.9% in 2013 to 10% in 2014) while infection as a cause increased (from 6.1% in 2013 to 15.7% in 2014). (See figure 7.15, Chapter 7, section 7.3.3.2).
- From the reflections of the steering group it was concluded that due to the training staff became more aware of the Golden Minute and the skill of bag mask ventilation improved. Due to the prompt reactions of the staff the NICU admitted less asphyxiated neonates.
- The training of staff with regard to neonatal resuscitation and the knowledge and skills obtained might have resulted in the decrease of the neonatal mortality rate due to asphyxia.

8.3.3.8 Sustainability of strategies

The NHS Master Score System (which forms part of the NHS Sustainability Model and Guide) was used to determine the probability of the sustainability of the strategies to sustain a quality improvement initiative in the maternity section of the district hospital (Maher et al. 2007:n.p.). The operational managers of the three maternity units (labour ward, postnatal ward and NICU), the matron of the maternity section, and the researcher each completed a Master Score System. The master version (see Annexure Q) of the Master Score System was used to calculate the scores. The factors with the greatest potential for improvement were plotted onto the bar chart (see Figure 7.16 in section 7.4, Chapter 7). Preliminary evidence suggested by the NHS is that a score of 55 or higher indicates there is the possibility of sustaining the quality improvement initiative. The interpretation of the current results revealed the scores added up to more than 55 (see Figure 7.16 in section 7.4, Chapter 7). The scores were between 87.8 and 94.5. Therefore, it was concluded that it is possible for the strategies implemented to sustain a quality improvement initiative in neonatal resuscitation in the maternity section of this district hospital to be sustained in future.

Factors from the NHS Sustainability Model (see Figure 1.1, section 1.6.2, Chapter 1) highlighted by the same score by all participants as indicated on the Master Score System included benefits beyond helping patients; adaptability of improved process; the effectiveness of the system to monitor progress; staff's behaviours towards sustaining change; senior leadership engagement, and clinical leadership engagement. (These are discussed in detail in section 7.4, Chapter 7). The factors where different scores were allocated by participants, was for credibility of evidence, staff involvement and training to sustain the process, fit with the organisation's strategic aims and culture as well as infrastructure for sustainability. (These factors are detailed in section 7.4 in Chapter 7).

In order to maintain sustainability, the steering group should keep on motivating the staff and implementing the strategies. The Master Score System will be used again in six months' time to evaluate the sustainability of the quality improvement initiatives (Maher et al. 2007:n.p.). According to the NHS Master Scores results, a high probability exists for the strategies to be sustained; this will effect change in practice in the long-term (Maher et al. 2007:n.p.). If these strategies can be sustained, it could contribute to continually decreasing neonatal mortality in district hospitals in South Africa thereby contributing positively towards the attainment of the MDG 4.

8.4 LIMITATIONS OF THIS STUDY

A limitation for this study was definitely the time constraints, especially with regard to determining the sustainability of the strategies. The ideal would have been to evaluate the sustainability after one year of implementation; however, a follow-up evaluation would be done after six months of completing the study to evaluate the sustainability of the strategies after one year of implementation.

The small sample size could also be seen as a limitation of this study. Yet, all healthcare providers working in the maternity section were directly or indirectly involved in this study and all of them were invited to participate and given the opportunity to participate. However, this study was context-specific and therefore the researcher and statistician were satisfied with the sample size. The fact that the steering group grew smaller might have been a limitation as the ideal would have been for it to have stayed the same during the course of this study.

Furthermore, all the strategies could not be implemented to their fullest extent and changes will therefore not be seen for some time due to the fact that some of the improvements take a long time to be implemented. Causality could also have been a limitation as the changes that occurred could have been due to other contextual causes. Therefore, the true effect of the changes that occurred as a result of the strategies implemented to sustain the quality improvement initiative in neonatal resuscitation was not sufficiently tangible at the time of evaluation. Therefore, follow-up evaluations should be done to evaluate further changes that might have occurred as a result of the implementation of strategies to sustain a quality improvement initiative in neonatal resuscitation.

Another limitation was that some of the improvements (recruiting more staff, procurement of the needed emergency equipment, budgets and so forth) needed for a quality improvement initiative in neonatal resuscitation were beyond the control of the steering group. This was a frustration because these improvements have the potential to make a difference in quality neonatal resuscitation and neonatal mortality rates.

Staff attitude and staff involvement was also seen as a limitation by the researcher as the effect of change can only really be seen if there is optimal implementation of the quality improvement initiative. In this respect, it was unfortunately one of the potential barriers and limitations of the study in some cases.

A further limitation was that the steering group did not use their reflective journals to keep reflective notes on the research process and the challenges they experienced. This data could have added more in-depth knowledge about their perceptions and experiences. However, reflective meetings were held with the steering group at the end of each cycle during which the members verbally reflected on their experiences, perceptions, and what they had learned.

8.5 RECOMMENDATIONS

Recommendations for practice, education and research are made in the following sections

8.5.1 Recommendations for practice

Recommendations for practice are made based on the findings of this study in the specific context of the study. It is the responsibility of all the stakeholders and healthcare providers involved to implement these recommendations. The recommendations are made according to the strategies that were implemented. Therefore, the recommendations are automatically based on the aspects of the Sustainability Model and include aspects of training and involvement, staff attitude, senior and clinical leaders, the goals and structures as well as the infrastructure of the organisation. The process that was followed encapsulated benefits beyond helping patients, credibility of evidence and adaptability. Most importantly, the changes were monitored and can be evaluated continuously as time progresses. The recommendations for practice may enhance the sustainability of the quality improvement initiative; they also address other factors associated with neonatal resuscitation.

The following recommendations for practice are made:

- *The benefits of the quality improvement initiative and the implementation of the strategies should be more visible in each of the units. All the staff members must be aware of the quality improvement initiative and the strategies that have to be implemented. Staff members should have ownership in the quality improvement initiative.*
- *Staff attitude should be placed central in any quality improvement initiative and before organisational change are implemented staff attitude should be addressed first and foremost. District hospitals can offer incentives and rewards for professional conduct based on criteria set by management for hardworking staff with a positive*

attitude that makes a difference. Staff should be proud of the work they are doing and they should feel they are duly acknowledged for it.

- *Staff members should also be acknowledged for personal development through training and courses and they should receive rewards or incentives for their efforts. This will promote excellence in their work and help them to feel motivated and committed to rendering quality care. Management should also come up with appropriate and applicable criteria associated with rewards and incentives.*
- *The challenges regarding work environment (infrastructure, culture of the organisation and staff) should be addressed because these all have a direct influence on the attitude, involvement and motivation of staff. It will be the responsibility of the operational managers and nursing services manager of the maternity section to address issues regarding the work environment. Challenges should be addressed as they occur.*
- *Communication regarding changes that occur and the implementation of organisational changes such as quality improvement initiatives should be optimal and sufficient as this has an effect on involvement of staff in the implementation of such initiatives. Changes with regard to quality improvement practices should be communicated through meetings and memos. Staff should be required to sign written communications as proof that they have read it to ensure continuity of care.*
- *Teamwork and collaboration between the different categories of staff and between the healthcare providers and management of an organisation are essential to maintain positive staff attitudes and motivation regarding quality improvement initiatives. Operational managers should facilitate teamwork; teamwork should facilitate a positive team spirit. Teamwork also should be encouraged among staff members themselves. Climate meetings should be held between nursing staff and doctors to discuss problems regarding communication and protocols in order to establish a conducive and positive work environment where doctors and nurses can work as a team to render quality care to patients. Teamwork and team spirit will further contribute towards trust and respect among colleagues.*
- *Structured mortality and morbidity (M&M) meetings and debriefing sessions should be implemented on a regular basis in order for staff to identify gaps in quality care and to find additional ways to improve on quality care, especially with regard to neonatal resuscitation. These types of meetings can contribute towards professional learning, and staff attending these meetings should feel free to share their opinions and learn from their mistakes. Mortality and morbidity meetings also give staff the opportunity to learn from their peers.*

- *Clinical and senior leaders should lead from the front and set positive examples for their peers regarding attitudes, involvement and competence. In other words, they must be role models for their juniors and peers with regard to quality care, work ethics and professional conduct.*

Equipment is part of the infrastructure and is essential for rendering quality care to patients; in this case, the neonates. Without equipment even when one has the knowledge and skills, without equipment one cannot render quality care. The following are recommendations regarding equipment and stock:

- *A proper needs assessment regarding the procurement of equipment and stock should be done by the operational managers in collaboration with the staff working in the unit. This equipment should be procured based on priority according to the requirements of the maternity section.*
- *Nursing staff and doctors should have an input regarding the procurement of equipment. At least an annual procurement meeting should be held with stakeholders and management to address the needs for equipment.*
- *Emergency and lifesaving equipment (such as laryngoscope blades and McGill's forceps) should be the first priority. It must be ensured that such equipment is available as they have a direct influence on neonatal mortality.*
- *Other equipment needed to improve quality care for neonates should also be a high priority for procurement (such as more NeoPuffs, saturation monitors, etcetera). The procurement of equipment should be driven by management and the operational managers of the maternity section.*
- *The urgent procurement of a ventilator for the NICU should be considered to ensure stabilisation of neonates before and while waiting for transfer to a tertiary institution. This will contribute towards quality care and improved patient outcomes.*
- *Facilities should be adjusted to accommodate the overflow of patients and to accommodate more high-care beds and specialised equipment such as radiant warmers, SiPAP machines and saturation monitors as specified by the standard recommendations for newborn care. In this particular context the ideal would be for the NICU to be moved to a bigger room to accommodate more beds and equipment.*
- *Facilities in the maternity section should be evaluated by hospital management in collaboration with the senior and clinical leaders and operational manager of the labour ward with the prospect of setting up facilities in each of the labour ward to resuscitate a newborn immediately. Some of the labour rooms in the labour ward*

have inserted points for oxygen and air and this is therefore a feasible option. This would also contribute towards a baby-friendly initiative where neonates can be resuscitated immediately after birth when the need arises. Currently the compromised neonate has to be taken to a resuscitation area where neonatal resuscitation can be initiated. The risk of this practice is that sometimes there is not enough space, especially if two neonates need to be resuscitated at the same point in time. There is also a risk of neonates developing hypothermia and related complications because there is only one functional radiant warmer in that area.

- In this specific context, at least four radiant warmers are needed in the NICU to accommodate the high-care patients. This suggestion can also be written in a request to the CEO of this hospital to include these needs for improved facilities and more equipment in the budget of the hospital. A report should be written regarding the equipment needs of this hospital and this report need to be presented to the Gauteng Department of Health. The South African Government should be aware of the needs of a level 1 (district) hospital and should provide these hospitals with the necessary equipment, stock and facilities to render the required quality of care to all of its patients.*
- In-service training should be given to staff members by representatives of the companies supplying the equipment to ensure that staff knows how to use and maintain equipment. This can be done as a ‘once-off’ by the service provider when new equipment is delivered to the units. However, different training sessions should be available to enhance the opportunity for attendance by all staff members. Furthermore, it is imperative that new staff is also immediately trained on the use and maintenance of equipment to ensure sustainability and continuity.*
- Maintenance plans for servicing of equipment should also be in place and records should be kept regarding broken or irreplaceable equipment to ensure that functional equipment is always available. The record keeping in the maintenance book is the responsibility of all the staff and it should be overseen by the operational managers. The maintenance department of the hospital should be responsible for the maintenance and servicing of machines.*
- Equipment should be controlled in the sense that records must be kept regarding the movement of equipment within the hospital. Records such as an inventory and movement/borrowing books should be updated by nursing staff and overseen by operational managers on a weekly basis.*

- *Stock should be controlled by stock controllers from the pharmacy to determine maximum and minimum levels of stock and to ensure that no section runs out of emergency stock such as suction and intubation tubes.*
- *Nursing staff should check the resuscitation boxes according to a checklist to ensure that emergency equipment and stock are available when needed. These checks should be done on a daily basis and stock used should be replaced immediately after neonatal resuscitation to ensure that emergency equipment and stock are always readily available in the boxes and at hand. The daily checks of the emergency equipment and stock should be appointed to a staff member as part of their specific duty on a daily basis. Free standing equipment such as NeoPuffs, mobile suction machines and saturation monitors should also be checked for functionality.*

Staff shortages are a global problem; it is also a major challenge in South African district hospitals. Quality care can be directly linked to staff resources. The following recommendations are made regarding shortages of staff:

- *Trained neonatal nurses should be recruited to enhance the knowledge and skill pool in the NICU and to improve on quality care.*
- *The available staff should be utilised effectively and efficiently, therefore staff should be placed according to their knowledge, skills and interest. Enrolled nurses and enrolled nurse auxiliaries should be trained to do basic neonatal resuscitation.*
- *Staff turnover should be minimised by addressing challenges in the work environments. Positive work environments contribute to job satisfaction and loyalty towards the organisation. Positive work environments can be created by addressing challenges regarding the work environment such as lack of staff and certain equipment.*
- *Staff should be recruited according to the minimal requirements for the nurse-to-patient ratio of level 1 hospital. For example, in the NICU the ratio should be 1:4.*
- *The skill mix of staff should be adjusted according to the needs of each unit, and the acuity of the patients, for example professional nurses, should be allocated to care for high-care patients.*
- *There should be an equal number of staff allocated in the NICU during the day and during the night to optimise quality care. Quality care can be provided to all patients if there is enough staff. Vacant positions should be filled and allocating more staff for night duty should be a priority.*

- *A clinical neonatal specialist should be available 24/7 for decision-making purposes and to do certain lifesaving procedures such as the administration of surfactant. These positions should be filled if vacant and, if not yet available, such positions should be created.*
- *There should be a retention strategy in place to ensure that staff feels motivated and positive regarding the organisation. Budgets for better salaries can play a significant role as part of a retention strategy.*

Effective, efficient and timeous transport of critically ill neonates from the district hospital to other healthcare facilities can have a direct impact on the outcomes of neonates and neonatal mortality. Recommendations regarding transport are the following:

- *Regular meetings should be held between the call centre, staff working in the labour ward and the NICU of the maternity section, and EMS personnel who are part of the despatch team to address the challenges experienced regarding transport. Management of both the EMS services and the district hospital should be involved in these meetings.*
- *A standardised control list should be made available for completion on booking of transport to ensure that communication regarding the condition of the patient and the type of equipment and EMS expertise needed are followed through and consistent. This control list should be completed by the doctor ordering the transport and the despatcher in the call centre. Aspects regarding the diagnosis and condition of the neonate as well as the required equipment and staff expertise needed should be on the control list.*
- *Incident reports should be written by the staff members involved in every incident such as time delays, ambulances arriving without the correct requirement and so forth. This will serve as a paper trail for challenges experienced.*
- *EMS staff should be trained regarding neonatal resuscitation and care for critical ill neonates during transfer. They could be invited to attend the adjusted Helping Babies Breathe training sessions at the district hospital.*
- *The transfer of critical ill neonates should be seen as a high priority by the despatch team and ambulances equipped to care for such patients should be made available in every district.*
- *If a neonate needs to be transferred from the clinic to the district hospital or from the district hospital to another facility the possibility of the mother traveling with the*

neonate giving skin-to-skin contact should be considered if the neonate is in a stable condition.

Protocols serve as guidelines for quality patient care and it ensures that the quality of care is consistent. The following recommendations are made regarding protocols:

- *All protocols related to neonatal care and the treatment of the most conditions should be reviewed, updated, signed and distributed to all three the units. The protocols should be updated as new information comes to light, for example, new resuscitation guidelines. The paediatrician (as a clinical leader) in collaboration with the operational managers should be responsible for the reviews and updating of protocols. The operational managers should oversee the distribution and signing of new protocols.*
- *Specific protocols regarding neonatal resuscitation should also in the future be updated and reviewed according to the new International Liaison Committee on Resuscitation (ILCOR) guidelines. These should be displayed in the resuscitation areas for referral during neonatal resuscitation and other emergencies.*
- *Management should be involved in the realisation of protocols because without protocols there are no guidelines to quality care.*
- *The protocols should be based on current evidence-based practice and should be updated on a regular basis.*

Recommendations were also made regarding training and education. This is outlined in the next section.

8.5.2 Recommendations for education

The recommendations for nursing education with regard to neonatal resuscitation focus on sustaining neonatal resuscitation training opportunities in the maternity section of the district hospital. The following recommendations are made towards training:

- *All staff members working in the maternity section of the district hospital should be trained in neonatal resuscitation, irrespective of their category. Training and refresher courses should take place at least every six months. This training opportunities can be facilitated by the Helping Babies Breathe train-the-trainers or consultants.*

- *Neonatal training opportunities should be created on-site to ensure that all of the staff are afforded the opportunity to attend neonatal resuscitation training.*
- *High-frequency low-impact training opportunities regarding neonatal resuscitation should be created to accommodate time constraints and shortages of staff. These can be facilitated by consultants or the Helping Babies Breathe trainers.*
- *The Helping Babies Breathe train-the-trainer model should be implemented to its full extent and fully functional in order to ensure continuous training opportunities and to enhance the sustainability of knowledge and skills retention. It should also be rolled-out to other sections such as the emergency room and theatre as well as clinics and the communities.*
- *All staff members should get the opportunity to practise neonatal resuscitation in simulation on a mannequin. These simulation drills should be part of the daily work life of staff in order to enhance the sustainability of the knowledge and skills acquired during initial training. The recommendation is that a practise station with a mannequin be set up on the specific day in the week which suits the particular unit. During the course of the day or night staff members (doctors and nurses) can practise neonatal resuscitation on the mannequin. A simulation practise book can be implemented in which the staff member should sign that they have completed a practise session. This will contribute towards sustaining the knowledge and skills regarding neonatal resuscitation.*
- *Regular update and refresher courses should be held on an ongoing basis. These refresher courses can be facilitated by a consultant or the Helping Babies Breathe trainers. The suggestion is that these refresher courses, which can be arranged by the operational managers of the units, be held every three to six months.*
- *Training opportunities should be created for professional nurses, midwives and doctors regarding advanced neonatal resuscitation and post-resuscitation care of neonates. This can be arranged by the nursing service manager in collaboration with the operational managers. Consultants or companies willing to give training can facilitate these sessions.*
- *Training opportunities should also be created for all staff regarding basic neonatal care, the recognition of early warning signs, and the identification of risk factors in order to prevent or anticipate neonatal resuscitation and improve quality care and patient outcomes. This can take place in a formal or informal way and can be arranged by operational managers. Training should be facilitated by experts in the field.*

- *Staff members should be given the time to disseminate the new information and share their knowledge with their peers. They should discuss new information and knowledge in their units.*
- *A mentoring programme or buddy system should be developed. The idea of such a programme or system is to involve clinical and senior leaders in the teaching and support of junior staff members. For example, a senior leader will buddy up with a junior staff member for a shift and during the shift the senior leader will do on-the-spot teaching. This will contribute towards sustainability of the quality improvement initiative and it will also enhance the knowledge pool of the unit. Such a buddy system can also decrease the effect created by knowledgeable staff that resigns and are replaced with junior staff. Senior staff therefore has the opportunity to share their knowledge and skills with junior staff. This will further contribute towards quality care and continuity of care.*
- *Staff should be recognised for training that they attend because this will motivate them even more to improve on their knowledge, skills and competence. Incentives and rewards should be used to acknowledge personal development. Management should come up with criteria for these.*
- *Being trained in neonatal nursing care should be a prerequisite for caring of neonates, especially premature newborns. It is therefore recommended that neonatal nursing care should be a training course at tertiary institutions such as universities with the specific aim of training neonatal nurses.*
- *Having adequate training in neonatal nursing care will contribute significantly towards the outcome and mortality rates of neonates, especially for those nurses who are working in environments and settings where there is a lack of resources and a lack of doctors and where they have to rely on their own knowledge and skills to care for the critically ill neonates. Having a skilled and knowledgeable neonatal nurse caring for neonates can make a difference between life and death and, most importantly, the outcome of these neonates when sent back to the community.*

8.5.3 Recommendations for research

CYCLE 3 should be repeated after regular intervals to determine the sustainability of the strategies implemented to sustain the quality improvement initiative in neonatal resuscitation over a period of time. The following recommendations are made for future research:

- *The role of staff attitude on the sustainability of quality improvement initiatives.*

- *The improvement of staff attitude in a district hospital faced with challenges in the work environment.*
- *The influencing factors of staff shortages on staff turnover in district hospitals.*
- *The influencing factors of work environment on staff turnover in district hospitals.*
- *The long-term sustainability of knowledge and skills retention regarding neonatal resuscitation training based on high-frequency low-impact training opportunities.*
- *The effect on knowledge and skills retention and sustainability with weekly neonatal resuscitation practise simulation drills on mannequins.*
- *The impact of neonatal resuscitation training on the long-term outcome of patients and quality of life.*
- *The effect of training regarding post-resuscitation care on the outcomes of neonates within 24 hours after neonatal resuscitation.*
- *The effect of neonatal resuscitation training on attitude and confidence of staff.*
- *The difference in outcomes of the same quality improvement initiative implemented in a private hospital and a low-resource setting.*
- *The effect of using patient acuity to establish minimal staffing norms on the outcomes and quality of neonatal care in district hospitals.*
- *Case studies to determine the neonatal mortality rate during the day and in the week in comparison to during the night and over weekends. “Do babies die more often during the night and over weekends in district hospitals and, if so, why?”*
- *The effect of neonatal resuscitation training on neonatal mortality due to asphyxia as the cause of death in district hospitals.*

8.6 CONCLUSION

The neonatal mortality rate in this district hospital was high (46/1 000 live births in 2013), which might have been affected by the modifiable and avoidable causes. The aim of this study was to develop strategies to sustain a quality improvement initiative in neonatal resuscitation. The development and implementation of strategies to sustain a quality improvement initiative in neonatal resuscitation was based on the theoretical framework of the NHS Sustainability Model using Problem Resolving Action Research (PRAR) (Maher et al. 2007:n.p.; Piggott-Irvine 2009:2-3).

To address the challenges regarding neonatal resuscitation and neonatal mortality, an action research approach was followed with the use of the PRAR model. Furthermore, the study was based on the theoretical framework of the Sustainability Model to enhance the

probability of the sustainability of the quality improvement initiative regarding neonatal resuscitation.

The strategies addressed challenges with regard to neonatal resuscitation training, equipment and stock, staff attitude, staff shortages, transportation and protocols. The initiative resulted in a marked decrease in neonatal mortality rates (from 52/1 000 live births in 2012 to 42/1 000 live births in 2014). The neonatal mortality rate is still much higher than the target set for South Africa by the WHO for neonatal mortality rate to be 7/1 000 by 2015 (Lloyd & de Witt 2013:1; Velaphi & Rhoda 2012:67).

There was also improvement in some of the challenges experienced related to neonatal resuscitation. Neonatal training opportunities were created and supported by opportunities to practise neonatal resuscitation on a mannequin. Training in neonatal resuscitation had a positive effect on the critical aspects of neonatal resuscitation and the competence of the nursing staff to practice neonatal resuscitation. After the training there were also a marked decrease in neonatal mortality due to asphyxia, and a decrease in neonates admitted to the NICU with asphyxia. This study created an awareness regarding the need for certain equipment, and during the course of this study the maternity section did receive some of this equipment, however there is still a need for some lifesaving equipment. Staff attitude was influenced by many factors related to work environment and work conditions. Furthermore, staff attitude had an influence on staff involvement and quality care. Staff attitude therefore forms a central part of quality improvement initiatives. Future research should be done on the influence of staff attitude on the sustainability of quality improvement initiatives. In the case of this study staff attitude were positively influenced by the training, which had a positive influence on the staff confidence and competence as well as their involvement in neonatal resuscitation. Staff shortages still remained a problem in this setting due to high staff turnover, leaving staff to feel despondent and overworked. A slight improvement regarding the transport of critical ill neonates to tertiary institutions were marked, with a slight improvement in response time. However there is still room for improvement and more meetings should be held to discuss the challenges related to transport. Protocols regarding neonatal resuscitation needs to be in place and implemented in all three the units; however neonatal resuscitation algorithms were placed in resuscitation areas.

The researcher will continue to work with the hospital towards sustaining the quality improvement initiative in neonatal resuscitation. The steering group will continue to drive the strategies that were implemented in order to enhance sustainability of the quality improvement initiative. The sustainability will be evaluated again after six months' time according to the Master Score System. The researcher will also go back to provide training

with regard to basic newborn care, early warning signs of deterioration, and developmental supportive care.

The researcher learned that staff members working in the maternity section of this South African district hospital are faced with numerous challenges in their daily work which sometimes leave them despondent and negative towards their work environment. Some of these challenges can easily be addressed and improved, but others need financial resources and support from management and also the South African Government. It is the researcher's hope that all these challenges can be addressed in future; that the positive changes brought about by the initiative initiated in the maternity section will inspire other changes on various levels so that quality improvement can spill over to other units and the rest of the hospital. The researcher believes if the challenges regarding the work environment are addressed, the staff working in this hospital will have a more positive attitude which will contribute to their job satisfaction when delivering care to the patients – from the smallest and weakest to the oldest and frailest.

This chapter concluded with the conclusions of each cycle and the recommendations made for practice, education and research. For the purpose of this study reporting was only done on the three cycles. However, the challenge will be to keep on evaluating and refining the six strategies developed to address the influencing factors related to neonatal resuscitation. Ongoing evaluations and refinements will assure the quality improvement initiative is taking place continuously and with maximum sustainability. Future research could be done Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng were implemented with the probability of sustainability. The researcher hopes that these strategies will contribute towards effective and competent neonatal resuscitation thereby decreasing neonatal mortality and contributing towards the MDG 4.

REFERENCE LIST

- Alderman, H & Behrman, JR 2004, 'Estimated economic benefits of reducing low birth weight in low-income countries', The International Bank for Reconstruction and Development/The World Bank, Washington DC, USA.
- Allen, C, Greenwood, I, Hudson, S, Ketley, D, Maher, L, Penny, J, Rogers, H, Singh, J, Tibble, J & Woodard, F 2007, *Improvement leaders guide –sustainability and its relationship with spread and adoption – general improvement skills*, pp. 1-56, viewed 12 December 2012, <www.institute.nhs.uk/improvementleadersguides>.
- Anderson, JM & Warren, JB 2011, 'Using simulation to enhance the acquisition and retention of clinical skills in neonatology', *Seminars in Perinatology*, April, 2011, vol. 35, no. 2, pp. 59-67, viewed 18 September 2014, doi:10.1053/j.semperi.2011.01.004.
- Archibald, C 2006, 'Job satisfaction among neonatal nurses', *Pediatric Nursing*, vol. 32, no. 2, pp. 176–179.
- Ariff, S, Soofi, SB, Sadiq, K, Feroze, AB, Khan, S, Jafarey, SN, Ali, N & Bhutta, ZA 2010, 'Evaluation of health workforce competence in maternal and neonatal issues in public health sector of Pakistan: an assessment of their training needs', *BMC Health Services Research*, vol. 10, pp. 1–9, viewed 20 December 2014, <<http://www.biomedcentral.com/1472-6963/10/319>>.
- Atkinson, S, Ingham, J, Cheshire, M & Went, S 2010, 'Defining quality and quality improvement', *Clinical Medicine*, vol. 10, no. 6, pp. 537–539.
- Babbie, E 2010, *The practice of social research*, 12th edn, Wadsworth, Cengage Learning.
- Baleta, A 2011, 'South Africa takes steps to reduce perinatal mortality', *The Lancet*, April vol. 377, pp. 1303–1304, viewed 2 August 2012, <www.thelancet.com>.
- Barros, FC, Matijasevich, A, Requejo, JH, Giugliani, E, Maranhão, AG, Monteiro, CA, Barros, AJD, Bustreo, F, Meriáldi M & Victora, CG 2010, 'Recent trends in maternal, newborn, and child health in Brazil: progress toward Millennium Development Goals 4 and 5', *American Journal of Public Health*, October, vol.100, no. 10, pp. 1877–1889.

Bastida, EM, Tseng, T, McKeever, C & Jack, L 2010, *Ethics and community-based participatory research: perspectives from the field. Health promotion practice*, January, vol. 11, no. 1, pp. 16–20, viewed 9 May 2012, <<http://hpp.sagepub.com/content/11/1/16>>.

Berkley, S, Dybul, M, Godal, T & Lake, A 2014, 'Integration and innovation to advanced newborn survival', *The Lancet*, vol. 384, pp. e22–e23, viewed 14 August 2014, [http://dx.doi.org/10.1016/S0140-6736\(14\)60691-7](http://dx.doi.org/10.1016/S0140-6736(14)60691-7).

Bhutta, ZA, Das, JK, Bahl, R, Lawn, JE, Salam, RA, Paul, VK, Sankar, MJ, Blencowe, H, Rizvi, A, Chou, VB & Walker, N 2014, 'Can available interventions end preventable deaths in mothers, newborn babies, and stillbirths, and at what cost?', *The Lancet*, vol. 384, pp. 347–370, viewed 14 August 2014, <[http://dx.doi.org/10.1016/S0140-6736\(14\)60792-3](http://dx.doi.org/10.1016/S0140-6736(14)60792-3)>.

Bissinger, RL & Ohning, BL 2009, *Neonatal resuscitation*. eMedicine Specialities>Pediatrics: Cardiac Disease and Critical Care Medicine> Neonatology, pp. 1–22, viewed 27 September 2010, <<file:///C:/DOCUME~1/wvm/LOCALS~1/Temp/S4QI29YL.htm>>.

Bookman, L, Engmann, C, Srofenyoh, E, Enveronu-Laryea, C, Owen, M, Randolph, G, Price, W & Barker, P 2010, 'Educational impact of a hospital-based neonatal resuscitation program in Ghana', *Resuscitation*, vol. 81, pp. 1180–1182, viewed 18 September 2014, doi:10.1016/j.resuscitation.2010.04.034.

Bradshaw, D, Chopra, M, Kerber, K, Lawn, JE, Bamford, L, Moodley, J, Pattinson, R, Patrick, M, Stephan, C & Velaphi, S 2008a, 'Every death counts: use of mortality audit data for decision making to save the lives of mothers, babies and children in South Africa', *The Lancet*, vol. 317, no. 9620, pp. 1294–1304.

Bradshaw, D, Chopra, M, Kerber, K, Lawn, J, Moodley, J, Pattinson, R, Patrick, M, Stephan, C & Velaphi, S 2008b, 'Every Death Counts: saving the lives of mothers, babies and children in South Africa', *Every Death Counts*, pp. 1–15.

Bradshaw, D, Dorrington, R & Laubscher, R 2012, *Rapid Mortality Surveillance Report 2011*, South African Medical Research Council, Cape Town, South Africa.

Brandrud, AS, Schreiner, A, Hjortdahl, P, Helljesen, GS, Nyen, B & Nelson, EC 2011, 'Three success factors for continual improvement in healthcare: an analysis of the reports of improvement team members', *BMJ Quality & Safety*, vol. 20, pp. 251–259, viewed 22 June 2012, doi:10.1138.bmjqs.2009.038604.

Brink, H, van der Walt, C & van Rensburg, G 2009, *Fundamentals of research methodology for health care professionals*, 2nd edn, JUTA, Cape Town.

Brodsky, D, Gupta, M, Quinn, M, Smallcomb, J, Mao, W, Koyama, N, May, V, Waldo, K, Young, S & Pursley, DM 2013, 'Building collaborative teams in neonatal intensive care', *BMJ Quality & Safety*, vol. 22, pp. 374–382, viewed 2 February 2014, doi:10.1136/bmjqs-2012-000909.

Bryce, J, Daelmans, B, Dwivedi, A, Fauveau, V, Lawn, JE, Mason, E, Newby, H, Requejo, J, Salama, P, Shankar, A, Starrs, A, & Wardlaw, T 2008, 'Countdown to 2015 for maternal, newborn, and child survival: the 2008 report on tracking coverage of interventions'. *The Lancet*, vol. 371, no. 9620, pp. 1247–1257.

Buchan, J & Aiken, L 2008, 'Solving nursing shortages: a common priority', *Journal of Clinical Nursing*, vol. 17, pp. 3262–3268, viewed 2 February 2014, doi:10/1111/j.1365-2702.2008.02636.x

Buchanan, D, Fitzgerald, L, Ketley, D, Gollop, R, Jones, JL, Lamont, SS, Neath, A & Whitby, E 2005, 'No going back: a review of literature on sustaining organizational change', *International Journal of Management Reviews*, vol. 7, issue 3, pp. 189–205.

Burns, N & Grove, SK 2009, *The practise of nursing research: conduct, critique & utilization*, 6th edn, WB Saunders Elsevier, Missouri.

Business dictionary [S.a.], Definition of strategy, viewed 11 August 2011, <<http://www.businessdictionary.com/definition/strategy.html>>.

Carlo, WA, Wright, LL, Chomba, E, McClure, EM, Carlo, ME, Bann, CM, Collins, M & Harris, H 2009, 'Educational impact of the neonatal resuscitation program in low-risk delivery centres in a developing country', *Journal of Paediatrics*, April, vol. 154, pp. 504–508.

Chatora, R & Tumusiime, P 2004, 'Health Sector Reform and District Health Systems', World Health Organization, Regional office of Africa, Brazzaville.

Chin, MH, Kirchhoff, AC, Schlotthauer, AE, Graber, JE, Brown, SES, Rimington, A, Drum, ML, Schaefer, CT, Heuer, LJ, Huang, ES, Shook, ME, Tang, H & Casalino, LP 2008, 'Sustaining quality improvement in community health centres: perceptions of leaders and staff', *Journal of Ambulatory Care Management*, vol. 31, no. 4, pp. 319–329, viewed 9 April 2011, doi:10.1097/01.JAC.0000336551.67922.2f.

Chopra, M, Daviaud, E, Pattinson, R, Fonn, S & Lawn, JE 2009, 'Saving the lives of South Africa's mothers, babies and children: can the health system deliver?', *The Lancet*, August, pp. 29–39.

Coetzee, SK, Klopper, HC, Ellis, SM & Aiken, LH 2013, 'A tale of two systems – nurses' practice environment well-being, perceived quality of care and patient safety in private and public hospitals in South Africa: a questionnaire survey', *International Journal of Nursing Studies*, vol. 50, pp. 162–173, viewed 10 December 2014, <<http://dx.doi.org/10.1016/j.ijnurstu.2012.11.002>>.

Coghlan, D & Brannic, T 2010, *Doing action research in your own organization*, 3rd edn, SAGE, London.

Cohen, LM 1999, *Section III – philosophical perspectives in education*, (Pt2), pp. 1-3, viewed 6 December 20, <<http://oregonstate.edu/instruct/ed416/PP2.html>>.

Conroy, N, Morrissey, B & Wolman, Y 2014, 'Reducing neonatal mortality in resource-poor settings. What works?', *Journal of Neonatal Biology*, vol. 3, issue 3, pp. 1–3, viewed 14 August 2014, <<http://dx.doi.org/10.4172/2167-0897.1000139>>.

Couper, K & Perkins, GD 2013, *Debriefing after resuscitation*, Lippincott Williams & Wilkins, June, vol. 19, no. 3, pp. 188–194, viewed 28 October 2014, doi:10.1097/MCC.0b013e32835f58aa.

Couper, K, Salman, B, Soar, J, Finn, J & Perkins, JD 2013, 'Debriefing to improve outcomes from critical illness: a systematic review and meta-analysis', *Intensive Care Med*, vol. 39, pp. 1513–1523, viewed 30 October 2014, doi:10.1007/s00134-013-2952-7.

Couper, ID, Thurley, JD & Hugo, JF 2005, 'The neonatal resuscitation training project in rural South Africa', *The International Electronic Journal of Rural and Remote Health Research, Education Practice and Policy*, pp. 1–10, viewed 8 November 2010, <<http://rrh.deakin.edu.au/>>.

Cowan, DT, Norman, I & Coopamah, VP 2005, 'Competence in nursing practise: a controversial concept – a focused review of literature', *Nurse Education Today*, vol. 25, pp. 355–362, viewed 10 December 2014, doi:10.1016/j.nedt.2005.03.002.

Cullinan, K 2006, 'Health Services in South Africa a basic introduction', Health-e News Service, viewed 12 January 2015, <www.health-e.org.za/wp-content/uploads/2013/04/health_services_briefing_doc.pdf>.

Creswell, JW 2009, *Research design qualitative, quantitative and mixed methods approaches*, 3rd edn, SAGE, California.

Darmstadt, GL, Kinney, MV, Chopra, M, Cousens, S, Kak, L, Paul, VK, Martines, J, Bhutta, ZA & Lawn, JE 2014, 'Who has been caring for the baby?', *Lancet*, July, vol. 384, pp. 174–188, viewed 7 August 2014, <[http://dx.doi.org/10.1016/S0140-6736\(14\)60458-x](http://dx.doi.org/10.1016/S0140-6736(14)60458-x)>.

Delbecq, AL, Van de Ven, AH & Gustafson, DH 1975, *Group techniques for program planning a guide to nominal group and Delphi processes*, Scott, Foresman & Company, USA.

Department of Health 2002, National Norms and Standards for District Hospitals 2002, pp. 1–60, viewed 3 July 2011, <http://www.ruralrehab.co.za/uploads/3/0/9/0/3090989/norms_and_standards_district_hospital.pdf>.

Department of Health and Human Services 2006, Gaining consensus among stakeholders through nominal group technique – November 7, viewed 11 August 2011, <<http://www.cdc.gov/healthyyouth/evaluation/pdf/brief7.pdf> NGT>.

Department of Health [S.a.], South Africa's National Strategic Plan for a Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA), pp. 1-18, viewed 14 August 2014, <http://www.rmchsa.org/wp-content/resources/resources_by_type/SANationalDoHPolicies_Strategies/CARMMA_SouthAfricaStrategicPlan.pdf>.

Department of Health 2012, Office of Standards Compliance, Quality Improvement Guide: Quality Improvement – the key to providing improved quality of care 2012, pp. 1–40, viewed 19 January 2015, <www.rmchsa.org/wp-content/uploads/.../Quality-Improvement-Guide.pdf>.

Department of Public Service and Administration 1997, Batho Pele – “People First” White Paper on Transforming Public Service Delivery, 1997, viewed 10 December 2012, <www.polity.org.za/polity/govdocs/white_papers/transform.html>.

De Vos, AS, Strydom, H, Fouché, CB & Delport, CSL 2002, *Research at grass roots: for the social sciences and human service professions*, 2nd edn, Van Schaik, Pretoria.

Dictionary [S.a.], Definition of strategy, viewed 11 August 2001, <<http://dictionary.reference.com/browse/strategy>>

Duffield, GM, Roche, MA, Blay, N & Stasa, H 2010, ‘Nursing unit managers, staff retention and the work environment’, *Journal of Clinical Nursing*, vol. 20, pp. 23–33, viewed 10 December 2014, doi:10.1111/j.1365-2702.2010.03478.

Dunham, RB 1998, *Nominal group technique: a user's guide*, University of Wisconsin, School of Business, viewed 17 August 2011, <<http://instruction.bus.wisc.edu/obdemo/readings/ngt.html>>.

Duran, R, Aladag, N, Vatansever, Ü, Süt, N & Acunas, B 2008, ‘The impact of neonatal resuscitation program courses on mortality and morbidity of newborn infants with perinatal asphyxia’, *Brain & Development*, vol. 30, pp. 43–46.

Ersdal, HL & Singhal, N 2013, Resuscitation in resource-limited settings. *Seminars in fetal & neonatal medicine*, vol. 18, pp. 373–378, viewed 18 September 2014, <<http://dx.doi.org/10.1016/j.siny.2013.07.001>>.

Ersdal, HL, Vossius, C, Bayo, E, Mduma, E, Perlman, J, Lippert, A & Søreide, E 2013, 'A one day "Helping Babies Breathe" course improves simulated performance but not clinical management of neonates', *Resuscitation*, vol. 84, pp. 1422–1427, viewed 18 September 2014, <<http://dx.doi.org/10.1016/j.resuscitation.2013.04.005>>.

Fan, E, Laupacis, A, Pronovost, PJ, Guyatt, GH & Needham, DM 2010, 'How to use an article about quality improvement', *JAMA*, November, vol. 304, no. 20, pp. 2279–2287, viewed 18 September 2014, <www.jama.ama-assn.org>.

Fernandes, CJ, Weisman, LE & Kim, MS 2014, *Neonatal resuscitation in the delivery room*, Wolters Kluwer Health, pp. 1-9, viewed 18 September 2014, <<http://www.uptodate.com/contents/neonatal-resuscitation-in-the-delivery-room>>.

Foster, K, Craven, P & Reid, S 2006, 'Neonatal resuscitation educational experience of staff in New South Wales and Australian Capital Territory hospitals', *Journal of Paediatrics and Child Health*, vol. 42, pp.16–19, viewed 2 February 2014, doi:10.1111/j.1440-1754.2006.00783.x

Gardner, SL, Carter, BS, Enzman-Hines, M & Hernandez, JA 2011, *Merenstein & Gardner's handbook of neonatal intensive care*, 7th edn, Mosby Elsevier, Missouri.

Gerrish, K & Lacey, A 2010, *The research process in nursing*, 6th edn, Blackwell Publishing, United Kingdom.

Goldsmid, G, Rabasa, C, Rodríguez, S, Aguirre, Y, Valdés, M, Pretz, D, Carmona, D, Tornow, SL & Fariña, D 2012, 'Risk factors associated to clinical deterioration during transport of sick newborn infants', *Arch. Argent. Pediatr.*, vol. 110, no. 4, pp. 304–309, viewed 2 February 2014, <http://dx.doi.org/10.5546/aap.2012.eng.304>.

Goudar, SS, Somannavar, MS, Clark, R, Lockyer, JM, Revankar, AP, Fidler, HM, Sloan, NL, Niermeyer, S, Keenan, WJ & Singhal, N 2013, 'Stillbirth and newborn mortality in India after Helping Babies Breathe training', *Pediatrics*, February, vol. 31, no. 2, pp. e344–e352, viewed 10 September 2014, doi:10.1542/peds.2012-2112.

Greenfield, DH 2011, '10 years of national PPIP data', *paper presented at the 30th Conference on Priorities in Perinatal Care in Southern Africa, 2011 March 8–11*, Limpopo, South Africa.

Gunay, I, Agin, H, Devrim, I, Apa, H, Tezel, B & Ozbas, S 2013, 'Resuscitation skills of pediatric residents and effects of neonatal resuscitation program training', *Pediatrics International*, vol. 55, pp. 477–480, viewed 2 February 2014, doi:10.1111/ped.12081.

Haworth, EJN & Crehan, C 2013, 'Multidisciplinary newborn resuscitation training in Ethiopia and the RCPCH VSO fellowship scheme', *Archives of Disease in Childhood*, vol. 98, Suppl. 1, pp. A1–A117, viewed 2 February 2014, doi:10.1136/archdischild-2013-304107.164.

Hayes, LJ, O'Brien-Pallas, L, Duffield, C, Shamian, J, Buchan, J, Hughes, F, Spence Laschinger, HK, North, N & Stone, PW 2006, 'Nurse turnover: a literature review', *International Journal of Nursing Studies*, vol. 43, pp. 237–263, viewed 10 December 2014, doi:10.1016/j.ijnursetu.2005.02.007.

Health Professions Council of South Africa 2008, *Guidelines for good practise in the health care profession*, National Patient Rights Charter 2008, Pretoria, viewed 12 December 2014, <<http://www.hpcsa.co.za>>.

Herr, K & Anderson, GL 2005, *The action research dissertation: a guide for students and faculty*, SAGE, California.

Higginson, J, Walter, R & Fulop, N 2012, 'Mortality and morbidity meeting: an untapped resource for improving the governance of patient safety?', *BMJ Quality and Safety*, pp. 1–10, viewed 28 October 2014, doi:10.1136/bmjqs-2011-000603.

Hornby, AS 2010, *Oxford Advanced learning dictionary*, 8th edn, Oxford University Press, New York.

Hussey, SG, Ryan, CA & Murphy, BP 2004, 'Comparison of three manual ventilation devices using an intubated mannequin', *Archives of Disease in Childhood, Fetal and Neonatal Edition*, vol. 89, pp. F490–493, viewed 9 December 2014, doi:10.1136/adc.2003.047712.

Ireland, S, Gilchrist, J & Maconochie, I 2008, 'Debriefing after failed paediatric resuscitation: a survey of current UK practise', *Emergency Medicine Journal*, vol. 25, pp. 328–330, viewed 28 October 2014, doi:10.1136/emj.2007.048942.

Joint United Nations Programme on HIV/AIDS 2000, *Caring for carers: managing stress in those who care for people with HIV and AIDS*, Geneva, UNAIDS.

Jooste, K & Jasper, M 2012, 'A South African perspective: current position and challenges in health care service management and education in nursing', *Journal of Nursing Management*, vol. 20, pp. 56–64, viewed 10 December 2014, doi:10.1111/j.1365-2834.2011.01342.x.

Kaczorowski, J, Levitt, CL, Hammond, M, Outerbrigde, E, Grad, R, Rothman, A & Graves, L 1998, 'Retention of neonatal resuscitation skills and knowledge: a randomized controlled trial', *Family Medicine*, vol. 30, no. 10, pp. 705–711.

Kangas, SM, Kee, CC & McKee-Waddle, R 1999, 'Organizational factors, nurses' job satisfaction, and patient satisfaction with nursing care', *Journal of Nursing Administration*, January, vol. 29, no. 1, pp. 32–42, viewed 10 December 2014, <<http://0-ovidsp.tx.ovid.com.innopac.up.ac.za/sp-3.13.1a/ovidweb.cgi?QS2=434f4e1a7>>.

Kattwinkel, J, Perlman, JM, Aziz, Colby, C, Fairchild, K, Gallagher, J, Hazink, MF, Halamek, LP, Kumar, P, Little, G, McGowan, JE, Nightengale, B, Ramirez, MM, Ringer, S, Simon, WM, Weiner, GM, Wyckoff, M & Zaichkin, J 2010, 'Special Report – Neonatal resuscitation: 2010 in American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care', *Pediatrics*, vol. 126, no. 5, pp. e1400–e1413, viewed 9 April 2011, <<http://www.pediatrics.org/cgi/content/full/126/5/e1400>>.

Kemmis, S 2010, 'What is to be done? The place of action research', *Educational Action Research*, vol. 18, no. 4, pp. 417–427, viewed 29 February 2012, <http://dx.doi.org/10.1080/09650792.2010.524745>.

Khomeiran, RT, Yekta, ZP, Kiger, AM & Ahmadi, F 2006, 'Professional competence: factors described by nurses as influencing their development', *International Nursing Review*, vol. 53, pp. 66–72.

Kinney, MV, Kerber, KJ, Black, RE, Cohen, B, Nkrumah, F, Coovadia, H, Nampala, P, Lawn, JE 2010, 'Sub-Saharan Africa's mothers, newborns, and children: where and why do they die?', *PLoS Medicine*, June, vol. 7, no. 6, pp. 1–8, viewed 9 April 2011, doi:10.1371/journal.pmed.1000294.

Klopper, HC, Coetzee, SK, Pretorius, R & Bester, P 2012, 'Practise environment, job satisfaction and burnout for critical care nurses in South Africa', *Journal of Nursing Management*, vol. 20, pp. 685–695, viewed 10 December 2014, doi:10.1111/j.1365-2834.2011.01350.x.

Koshy, E, Koshy, V & Waterman, H 2011, *Action research in healthcare*, SAGE, London.

Kreuger, RA & Casey, MA 2009, *Focus groups: a practical guide for applied research*, 4th edn, SAGE, California.

Ksouri, H, Balanant, P, Tadié, J, Heraud, G, Abboud, I, Lerolle, N, Novara, A, Fagon, J & Faisy, C 2010, 'Impact of morbidity and mortality conferences on analysis of mortality and critical events in intensive care practise', *American Journal of Critical Care*, March, vol.19, no. 2, pp. 135–148, viewed 30 October 2014, doi:10.4037/ajcc2010590.

Lawn, JE, Blencowe, H, Oza, S, You, D, Lee, ACC, Waiswa, P, Lali, M, Bhutta, Z, Barros, AJD, Christian, P, Mathers, C & Cousens, SN 2014, 'Every newborn: progress, priorities, and potential beyond survival', *The Lancet*, July, vol. 384, pp. 189–205, viewed 7 August 2014, <[http://dx.doi.org/10.1016/S0140-6736\(14\)60496-7](http://dx.doi.org/10.1016/S0140-6736(14)60496-7)>.

Leard statistics [S.a.], Descriptive and inferential statistics, viewed 7 February 2011, <<https://statistics.laerd.com/statistical-guides/descriptive-inferential-statistics.php>>.

Lee, AC, Cousens, S, Wall, SN, Niermeyer, S, Darmstadt, GL, Carlo, WA, Keenan, WJ, Bhutta ZA, Gill, C & Lawn, JE 2011, 'Neonatal resuscitation and immediate newborn assessment and stimulation for the prevention of neonatal deaths: a systematic review, meta-analysis and Delphi estimation of mortality effect', *BMC Public Health*, vol. 11, Suppl 3, pp. S12, 1–19, viewed 7 April 2014, <<http://www.biomedcentral.com/1471-2458/11/S3/S12>>.

Leone, TA & Finer, NN 2005, 'Neonatal resuscitation: beyond the basics', *Neoreviews*, April, vol. 6, no. 4, pp. e177–e183, viewed 28 October 2014, <<http://neoreviews.aappublications.org/>>.

Liljestrand, J 1999, 'Reducing perinatal and maternal mortality in the world: the major challenges', *British Journal of Obstetrics and Gynaecology*, vol. 106, pp. 887–880.

Little, GA, Keenan, WJ, Niermeyer, S, Singhal, N & Lawn, JE 2011, 'Neonatal nursing and Helping Babies Breathe an effective intervention to decrease global neonatal mortality', *Newborn and Infant Nursing reviews*, vol. 11, no. 2, pp. 82-83, viewed 12 October 2014, doi:10.1053/j.nainr.2011.04.007.

Lloyd, LG & de Witt, TW 2013, 'Neonatal mortality in South Africa: how are we doing and what can we do better?', *The South African Medical Journal*, vol.103, no. 8, pp. 1–5, viewed 7 April 2014, <<http://www.samj.org.za/index.php/samj/article/view/7200/5281>>.

Mabaso, MHL, Ndaba, T & Mkhize-Kwitshana, ZL 2014, 'Overview of maternal, neonatal and child deaths in South Africa: challenges, opportunities, progress and future prospects', *International Journal of MCH and AIDS*, vol. 2, issue 2, pp. 182–189, viewed 14 August 2014, <www.mchandaids.org>.

Maher, L, Gustafson, D & Evans, A 2007, National Health Service Institute for Innovation and Improvement: Sustainability Model and Guide, viewed 12 December 2011, <http://www.insitute.nhs.uk/index2.php?option=com_content&task=view&id=39&po>.

Majosi, BM, Lawn, JE, van Niekerk, A, Bradshaw, D, Abdool Karim, SS & Coovadia, M 2012, 'Health in South Africa: changes and challenges since 2009', *The Lancet*, December, vol. 380, pp. 2029–2043, viewed 14 August 2013, <[http://dx.doi.org/10.1016/S0140-6736\(12\)61814-5](http://dx.doi.org/10.1016/S0140-6736(12)61814-5)>.

Maree, JG, Creswell, JW, Ebersöhn, L, Eloff, I, Ferreira, R, Ivankova, NV, Jansen, JD, Nieuwenhuis, J, Pietersen, J, Plano Clark, VL & van der Westhuizen, C (eds.) 2010, *First steps in research*, Van Schaik, Pretoria.

Marmot, M 2005, 'Social determinants of health inequalities', *The Lancet*, March, vol. 365, pp. 1099-1104.

Mason, E, McDougall, L, Lawn, JE, Gupta, A, Claeson, M, Pillay, Y, Presern, C, Lukong, MB, Mann, G, Wijnroks, M, Azad, K, Taylor, K, Beattie, A, Bhutta, ZA & Chopra, M 2014, 'From evidence to action to deliver a healthy start for the next generation', *The Lancet*, August, vol. 384, pp. 455–467, viewed 11 August 2014, <[http://dx.doi.org/10.1016/S0140-6736\(14\)60750-9](http://dx.doi.org/10.1016/S0140-6736(14)60750-9)>.

McCaffrey, R, Hayes, RM, Cassell, A, Miller-Reyes, S, Donaldson, A & Ferrell, C 2012, 'The effect of an educational programme on attitudes of nurses and medical residents towards the benefits of positive communication and collaboration', *Journal of Advanced Nursing*, vol. 68, no. 2, pp. 293–301, viewed 9 December 2014, doi:10.1111/j.1365-2648.2011.05736.x.

McSherry, R, Pearce, P, Grimwood, K & McSherry, W 2012, 'The pivotal role of nurse managers, leaders and educators in enabling excellence in nursing care', *Journal of Nursing Management*, vol. 20, pp. 7–19, viewed 9 December 2014, doi:10.1111/j.1365-2834.2011.01349.x.

Meaney, PA, Topjian, AA, Chandler, HK, Botha, M, Soar, J, Berg, RA & Nadkarni, VM 2010, 'Resuscitation training in developing countries: a systematic review', *Resuscitation*, vol. 81, pp. 1462–1472.

Mertler, CA 2009, *Action research: teachers as researchers in the classroom*, 2nd edn, SAGE, London.

Mills, DM, Williams, DC & Dobson, JV 2013, 'Simulation training as a mechanism for procedural and resuscitation education for paediatric residents: a systematic review', *Hospital Pediatrics*, vol. 3, issue 2, pp.167-176, viewed 18 March 2015, doi: 10.1542/hpeds.2012-0041.

Mosley, CMJ & Shaw, BNJ 2013, 'A longitudinal cohort study to investigate the retention of knowledge and skills following attendance on the Newborn Life support course', *Archives of Disease in Childhood*, pp. 1–5, viewed 10 September 2014, doi:10.1136/archdischild-2012-303263.

Murphy, AA & Halamek, LP 2005, 'Simulation-based training in neonatal resuscitation', *NeoReviews*, vol. 6, no. 11, pp. e489–e492, viewed 18 August 2014, <<http://neoreviews.aappublications.org/content/6/11/e489.full.pdf%3E>>.

Musafili, A, Essen, B, Baribwira, C, Rukundo, A & Persson, L 2013, 'Evaluating Helping Babies Breathe: training for healthcare workers at hospitals in Rwanda', *Acta Paediatrica*, vol. 102, pp. e34–e38, viewed 18 September 2014, doi:10.1111/apa.12034.

Nannan, N, Dorrington, R, Laubscher, R, Zinyakatira, N, Prinsloo, M, Darikwa, T, Matzopoulos, R & Bradshaw, D 2012, 'Under-5 mortality statistics in South Africa: shedding some light on the trends and causes 1997-2007', Cape Town, *South African Medical Research Council*, viewed 7 August 2014, <<http://www.mrc.ac.za/bod/bod.htm>>.

National Perinatal Mortality and Morbidity Committee (NaPeMMCo) 2011, *National Perinatal Mortality and Morbidity Committee (NaPeMMCo) Triennial Report (2008–2010)*, pp. 1–203, viewed 14 August 2014, <www.researchgate.net/...Report.../0c96053480b2d40c7e000000.pdf>.

Nelson, CA & Spector, JM 2011, 'Neonatal resuscitation capacity in Nepal', *Journal of Paediatrics and Child Health*, vol. 47, pp. 83–86, viewed 2 February 2014, doi:10.1111/j.1440-1754.2010.01893.x.

O'Brien, R 2001, 'An overview of the methodological approach of action research', Faculty of Information Studies, University of Toronto, viewed 8 November 2010, <<http://www.web.net/~robrien/papers/arfinal.html>>.

Opiyo, N, Were, F, Govedi, F, Fegan, G, Wasunna, A & English, M 2008, 'Effect of newborn resuscitation training on health worker practices in Pumwani Hospital, Kenya', *PLoS ONE*, February, vol. 3, issue 2, p. e1599, viewed 9 April 2011, doi:10.1371/journal.pone.0001599.

Owen, LS, Morley, CJ & Davis, PG 2014, 'Effects of synchronisation during SiPAP-generated nasal intermittent positive pressure ventilation (NIPPV) in preterm infants', *Archives of Disease in Childhood. Fetal and Neonatal Edition*, vol. 100, pp. F24–F30, viewed 9 December 2014, doi:10.1136/archdischild-2013-305830.

Parliamentary monitoring group 2013, Child mortality in South Africa: Minister of Health briefing, viewed 7 April 2014, <<http://www.pmg.org.za/report/20130305-briefing-department-health-child-mortality-south-africa>>.

Pattinson, RC 2001, *Saving Babies: a perinatal care survey of South Africa 2000*, viewed 3 August 2012, <www.hst.org.za/info/>.

Pattinson, RC 2009, 'Saving Babies 2006–2007', *Sixth report on perinatal care in South Africa* Pretoria, Tshepesa Press, Pretoria.

Pattinson, RC 2011, 'Saving Babies 2008–2009', *Seventh report on perinatal care in South Africa*, Tshepesa Press, Pretoria.

Pattinson, RC 2013, 'Saving Babies 2010-2011', *Eight report on perinatal care in South Africa*, Tshepesa Press, Pretoria.

Pattinson, RC, Woods, D, Greenfield, D & Velaphi, S 2005, 'Improving survival rates of newborn infants in South Africa', *Reproductive Health*, vol. 2, no. 4, pp. 1–8, viewed 28 October 2014, <<http://www.reproductive-health-journal.com/content/2/1/4>>.

Perlman, JM, Wyllie, J, Kattwinkel, J, Atkins, DL, Chameides, L, Goldsmith, JP, Guinsburg, R, Hazinski, FM, Morley, C, Richmond, S, Simon, WM, Singhal, N, Szyld, E, Tamura, M, Velaphi, S & Neonatal Resuscitation Chapter Collaborators 2010, 'Neonatal resuscitation, Chapter Collaborators 2010', *Neonatal Resuscitation: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations*, vol. 122 (Pt 11), pp. s516–s538, viewed 18 March 2011, <http://circ.ahajournals.org/cgi/content/full/122/16_suppl_2/S516>.

Piggot-Irvine, E 2009, *Action research in practice*, NZCER Press, Wellington, New Zealand.

Polit, DF & Beck, CT 2008, *Nursing research: generating and assessing evidence for nursing practice*, 8th edn, Lippincott Williams & Wilkins, China.

Polit, DF & Beck, CT 2012, *Nursing research: generating and assessing evidence for nurse practice*, Lippincott (Kindle Edition), Philadelphia.

Potter, M, Gordon, S & Hamer, P 2004, 'The nominal group technique: a useful consensus methodology in physiotherapy research', *New Zealand Journal of Physiotherapy*, vol. 32, no. 3, pp. 126–130.

Ranse, J & Arbon, P 2008, 'Graduate nurses' lived experience of in-hospital resuscitation: a hermeneutic phenomenological approach', *Australian Critical Care*, vol. 21, pp. 38–47.

Recommended Standards for Essential Neonatal Care 2012, Essential newborn care, 2012, pp. 1–38, viewed 14 August 2014,

<www.rmchsa.org/...NewbornHealth/Essential%20Newborn%20Care%20>.

Riley, WJ, Moran, JW, Corso, LC, Beitsch, LM, Bialek, R & Cofsky, A 2010, 'Defining quality improvement in public health', *Journal of Public Health Management and Practice*, vol. 16, no. 1, pp. 5–7.

Rovamo, LM, Mattila, M, Andersson, S & Rosenberg, PH 2013, 'Testing of midwife neonatal resuscitation skills with a simulator manikin in a low-risk delivery unit', *Pediatrics International*, 55, pp. 465–471.

Schmuck, RA 2009, *Practical action research: a collection of articles*, 2nd edn, Corwin Press, California.

Scribante, J & Bhagwanjee, S 2007, 'National audit of critical care resources in South Africa – nursing profile', *SAMJ*, December, vol. 97, no. 12, pp. 1315-1318.

Singhal, N, Lockyer, J, Fidler, H, Keenan, W, Little, G, Bucher, S, Qadir, M & Niermeyer, S 2012, 'Helping Babies Breathe: global neonatal resuscitation program development and formative educational evaluation', *Resuscitation*, vol. 83, pp. 90–96, viewed 10 September 2014, doi:10.1016/j.resuscitation.2011.07.010.

Skidmore, MB & Urquhart, H 2001, 'Retention of skills in neonatal resuscitation', *Paediatric Child Health*, January, vol. 6, no. 1, pp. 31–35.

Smith, L 2008, 'Ethical principles in practice', special edn, *Kairaranga*, vol. 9, pp. 16–21.

Sousa, A, Hill, K & Dal Poz, MR 2010, 'Sub-national assessment of inequality trends in neonatal and child mortality in Brazil', *International Journal of Equity in Health*, vol. 9, no. 21, pp. 1–10, viewed 7 August 2012, <<http://www.equityhealthj.com/content/9/1/21>>.

South African Health Review 2010, 'South African Health Review 2010', Durban, *Editorial*, S Fonn & A Padarath (eds.), Health Systems Trust 2010, viewed 2 February 2010, <<http://www.hst.org.za/publications/876>>.

Surcouf, JW, Chauvin, SW, Ferry, J, Yang, T & Barkemeyer, B 2013, 'Enhancing residents' neonatal competency through unannounced simulation-based training', *Medical Education Online*, vol. 18, pp. 1–7, viewed 2 February 2014, <<http://dx.doi.org/10.3402/meo.v18i0.18726>>.

Thomas, EJ, Taggart, B, Crandell, S, Lasky, RE, Williams, AL, Love, LJ, Sexton, JB, Tyson, JE & Helmreich, RL 2007, 'Teaching teamwork during neonatal resuscitation program: a randomized trial', *Journal of Perinatology*, vol. 27, pp. 409–414, viewed 9 December 2014, doi:10.1038/sj.jp.7211771.

Ulrich, BT, Lavandero, R, Woods, D & Early, S 2014, 'Critical care nurse work environments 2013: a status report', *Critical Care Nurse*, August, vol. 34, no. 4, pp. 64–78, viewed 2 February 2015, doi:<http://dx.doi.org/10.4037/ccn2014731>.

United Nations Inter-agency Group for Child Mortality Estimation, 'Level and Trends in Child Mortality', viewed 16 March 2015, <<http://www.indexmundi.com/facts/south-africa/mortality-rate>>.

United Nations International Children's Emergency Fund, United Kingdom 2009, *The UNICEF UK Baby Friendly Initiative – Developing a breastfeeding strategy*, viewed 9 April 2012, <http://www.unicef.org.uk/Documents/Baby_Friendly/Guidance/4/Developing_a_Breastfeeding_Strategy.pdf?epslanguage=en>.

Vakola, M & Nikolauo, I 2005, 'Attitudes towards organization change', *Employee Relations*, vol. 27, issue 2, pp. 160–174, viewed 9 December 2014, <<http://dx.doi.org/10.1108/01425450510572685>>.

Van Teijlingen, ER & Hundley, V 2001, *The importance of pilot studies*, Social Research Update, Sociology at Surrey, University of Surrey, UK.

Velaphi, S & Rhoda, N 2012, 'Reducing neonatal deaths in South Africa – are we there yet, and what can be done?', *SA Journal of Child Health*, August, vol. 6, no. 3, pp. 67–70, viewed 7 August 2014, doi:10.7196/SAJCH.493.

Verklan, MT & Walden, M 2004, *Core curriculum for neonatal intensive care nursing*, 3rd edn, Elsevier Saunders, Missouri.

Victora, CG, Aquino, EM, do Carmo, LM, Monteiro, CA, Barros, FC & Szwarcwald, CL 2011, 'Maternal and child health in Brazil: progress and challenges', *The Lancet*, May, vol. 377, no. 9780, pp. 1863–1876, viewed 7 August 2012, doi:10.1016/S0140-6736(11)60138-4.

Wall, SN, Lee, ACC, Niermeyer, S, English, M, Keenan, WJ, Carlo, W, Bhutta, ZA, Bang, A, Narayanan, I, Ariawan, I & Lawn, JE 2009, 'Neonatal resuscitation in low-resource settings: What, who, and how to overcome challenges to scale up?', *International Journal of Gynaecology and Obstetrics*, vol. 107, pp. s47–s64.

World Bank(a) [S.a.], Neonatal mortality rates for South Africa, viewed 8 August 2012, <<http://data.worldbank.org/indicator/SH.DYN.NMRT>>.

World Bank(b) [S.a.], World Development Indicators, Neonatal mortality rate: comparison between Brazil, Canada, South Africa and the United States, viewed 8 August 2012, <<http://www.indexmundi.com/facts/indicators/SH.DYN.NMRT/compare?country=br:ca:za:us>>.

World Bank(c) 2007, Nominal group technique, Needs Assessment Knowledge Base, WBI Evaluation Group, viewed 17 August 2011, <http://siteresources.worldbank.org/WBI/Resources/2137981194538727144/7Final-Nominal_Group_Technique.pdf>.

World Health Organization 2005, Health information statistics, indicators neonatal mortality, viewed 3 September 2013, <<http://www.who.int/healthinfo/statistics/indneonatalmortality/en/#>>.

World Health Organization/United Nations International Children's Emergency Fund 2010, *Countdown to 2015 Decade Report (2000–2010): taking stock of maternal, newborn and child survival*, World Health Organization, Geneva, Switzerland, viewed 7 August 2014, <www.countdown2015mnch.org>.

World Health Organization/United Nations International Children's Emergency Fund 2014, *Every Newborn: an action plan to end preventable deaths*, World Health Organization, Geneva, Switzerland, viewed 7 August 2014, <www.EveryNewborn.org>.

Williamson, GR, Bellman, L & Webster, J 2012, *Action research in nursing and healthcare*, SAGE, London.

Wyllie, J, Perlman, JM, Kattwinkel, J, Atkins, DL, Chameides, L, Goldsmith, JP, Guinsburg, R, Hazinki, MF, Morley, C, Richmond, S, Simon, WM, Singhal, N, Szyld, E, Tamura, M & Valaphi, S 2010, 'Neonatal resuscitation 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations', *Resuscitation*, (Pt 11), vol. 815, pp. e260–e287, viewed 9 July 2011, <www.elsevier.com/locate/resuscitation>.

Zaichkin, J & Weiner, GM 2011, 'Neonatal Resuscitation Program (NRP) 2011', *Advances in Neonatal Care*, vol. 11, no. 1, pp. 43–51, viewed 9 April 2011, doi:10.1097/ANC.0b013e31820e429f.

ANNEXURES

Annexure A: Tshwane research committee clearance certificate



**TSHWANE RESEARCH COMMITTEE
CLEARANCE CERTIFICATE**

Meeting: 30 January 2013

PROJECT NUMBER: 2013/05

Title: Strategies to sustain a quality improvement initiative in Neonatal Resuscitation in a district Hospital in Gauteng.

**Researcher: Carlien van Heerden
Supervisor:
Department: Department of Nursing Science; University of Pretoria**

**DECISION OF THE COMMITTEE
Approved**

**NB: THIS OFFICE REQUESTED A FULL REPORT ON THE OUTCOME
OF THE RESEARCH DONE**

Date: 30 January 2013


.....
**Dr. K.E. Letebele-Hartell
Chairperson Tshwane Research Committee
Tshwane District**


.....
**Mrs. M. Morewane
Director: District Health Services Support
Tshwane District**

NOTE: Resubmission of the protocol by researcher(s) is required if there is departure from the protocol procedures as approved by the committee.

Annexure B: University of Pretoria ethical clearance

The Research Ethics Committee, Faculty Health Sciences, University of Pretoria complies with ICH-GCP guidelines and has US Federal wide Assurance.

- * **FWA** 00002567, Approved dd 22 May 2002 and Expires 20 Oct 2016.
- * **IRB** 0000 2235 IORG0001762 Approved dd 13/04/2011 and Expires 13/04/2014.



Universiteit van Pretoria
 University of Pretoria

Faculty of Health Sciences Research Ethics Committee
 Fakulteit Gesondheidswetenskappe Navorsingsetiekkomitee
DATE: 22/11/2012

NUMBER	219/2012
TITLE OF THE PROTOCOL	Strategies to sustain a quality improvement initiative in Neonatal Resuscitation in a district Hospital in Gauteng
PRINCIPAL INVESTIGATOR	Student Name & Surname: Carlien van Heerden Dept: Dept of Nursing Science;University of Pretoria. Cell: 0837535028 E-Mail: mariuscarlien@absamail.co.za
SUB INVESTIGATOR	Not Applicable
STUDY COORDINATOR	Not Applicable
SUPERVISOR	Dr Carin Maree E-Mail: carin.maree@up.ac.za
STUDY DEGREE	PhD
SPONSOR COMPANY	Not applicable
CONTACT DEATAILS OF SPONSOR	Not Applicable
SPONSORS POSTAL ADDRESS	Not applicable
MEETING DATE	21/11/2012

The **Protocol and Informed Consent Document** were approved on **21/11/2012** by a properly constituted meeting of the Ethics Committee subject to the following conditions:

1. The approval is valid for **3 years period [till the end of December 2015]**, and
2. The approval is conditional on the receipt of 6 monthly written Progress Reports, and
3. The approval is conditional on the research being conducted as stipulated by the details of the documents submitted to and approved by the Committee. In the event that a need arises to change who the investigators are, the methods or any other aspect, such changes must be submitted as an Amendment for approval by the Committee.

Members of the Research Ethics Committee:

Prof M J Bester	(female)BSc (Chemistry and Biochemistry); BSc (Hons)(Biochemistry); MSc(Biochemistry); PhD (Medical Biochemistry)
Prof R Delport	(female)BA et Scien, B Curationis (Hons) (Intensive care Nursing), M Sc (Physiology), PhD (Medicine), M Ed Computer Assisted Education
Dr NK Likibi	MBB HM – Representing Gauteng Department of Health) MPH
Dr MP Mathebula	(female)Deputy CEO: Steve Biko Academic Hospital; MBChB, PDM, HM
Prof A Nienaber	(female) BA(Hons)(Wits); LLB; LLM; LLD(UP); PhD; Dipl.Datametrics(UNISA) – Legal advisor
Mrs MC Nzeku	(female) BSc(NUL); MSc(Biochem)(UCL, UK) – Community representative
Prof L M Ntlhe	MbChB (Natal) FCS (SA)
Snr Sr J Phatoli	(female) BCur(Eet.A); BTec(Oncology Nursing Science) – Nursing representative
Dr R Reynders	MBChB (Prêt), FCPaed (CMSA) MRCPCH (Lon) Cert Med. Onc (CMSA)
Dr T Rossouw	(female) MBChB (cum laude); M.Phil (Applied Ethics) (cum laude), MPH (Biostatistics and Epidemiology (cum laude), D.Phil

Dr L Schoeman
Mr Y Sikweyiya

(female) B.Pharm, BA(Hons)(Psych), PhD – Chairperson: Subcommittee for students' research
MPH; SARETI Fellowship in Research Ethics; SARETI ERCTP;

Dr R Sommers
Prof TJP Swart
Prof C W van Staden

BSc(Health Promotion)Postgraduate Dip (Health Promotion) – Community representative
(female) MBChB; MMed(Int); MPharmMed – **Deputy Chairperson**
BChD, MSc (Odont), MChD (Oral Path), PGCHE – School of Dentistry representative
MBChB; MMed (Psych); MD; FCPsych; FTCL; UPLM - **Chairperson**



DR R SOMMERS; MBChB; MMed(Int); MPharmMed.
Deputy Chairperson of the Faculty of Health Sciences Research Ethics Committee, University of Pretoria

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Annexure C: Provincial consent from the Gauteng Department of Health

GAUTENG APPLICATION TO CONDUCT A CLINICAL TRIAL/EVALUATION

Faculty of Health Sciences Research Ethics Committee

31 Bophelo Road, HW Snyman South Building

University of Pretoria

Level 2 - Rooms 2.33 & 2.34

Pretoria Academic Hospital

P O Box 667, Pretoria, 0001

Tel: 012 354 1330 / 012 354 1677

Fax: 012 3541367

E Mail: manda@med.up.ac.za - Main Committee

E Mail: deepeka.behari@up.ac.za - Student Committee

GAUTENG HEAD OFFICE USE

DATE RECEIVED

PROTOCOL NUMBER

GENERAL INFORMATION AND AGREEMENT BY APPLICANT

APPLICANT: Investigator Carlien van Heerden

HOSPITAL MEDICAL APPOINTEE: Investigator Name Carlien

Designation/Rank: MCur

Telephone Number: 083 753 5028

Fax Number: _____

Email address: mariuscarlien@absamail.co.za

Name of Hospital: n/a

Postal Address of Hospital: n/a

SPONSOR FIRM: n/a

Name of firm: _____

Telephone Number: _____ Fax Number: _____

E-Mail address: _____

Postal Address: _____

Name of representative: _____

Designation: _____

VAT Registration Number: _____

(Must be submitted for Invoice purposes)

FULL TITLE OF CLINICAL TRIAL: Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng.

OUTLINE DETAILS OF PREVIOUS TRIALS/EVALUATIONS CONDUCTED IF ANY:
TRIAL/EVALUATION PRODUCT (S) Name the product(s) and state the mode of application(s)

REGISTRATION n/a _____

PHARMACEUTICAL

State MEDICINE CONTROL COUNCIL registration number: n/a _____

If not registered state MCC trial approval number and attach official approval letter.

NON-PHARMACEUTICAL

State registration/code number: n/a _____

What is the estimated cost of these investigations? _____

Who will be responsible for these costs? _____

What other equipment will be required for the trial? _____

What arrangements have been made for those investigations and with whom?

ARE ANY SPECIAL PRECAUTIONARY MEASURES TO BE TAKEN AND BY WHOM?

INDICATE EXPECTED DATE OF TRIAL / EVALUATION REPORT:

DAY	MONTH	YEAR

INDICATE NUMBER OF PATIENTS INVOLVED:

--	--	--	--

THE NAME OF THE HEAD OF THE DEPARTMENT:

WILL SUFFICIENT TRIAL/EVALUATION MATERIAL BE SUPPLIED? (✓) Yes No

INVESTIGATIONS

WHAT LABORATORY AND OTHER INVESTIGATIONS WILL BE REQUIRED OVER AND ABOVE THOSE NORMALLY REQUIRED.

AGREEMENT BY APPLICANT

- The applicant(s) agree(s) as follows:
- To conduct the trial/evaluation recorded in and under the conditions set out in this application form.

- To conduct this trial/evaluation at no additional expense to the Gauteng Department of Health whatsoever.
- To accept full responsibility for any or all-possible harmful effects on a patient using my/our/ the product recorded in his application form.
- To exonerate the Gauteng Department of Health from all liability of damages, legal, financial or otherwise, including my claim instituted by a patient using my/ our/ the product recorded in this application form, but excluding negligence on the part of the medical officer and/ or employee of the Gauteng Department of Health using the said product on the patient's concerned: provided that the medical officer and/ or employee is not the applicant.
- To inform the Superintendent General: Gauteng Department of Health and other relevant authorities should it be deemed necessary to deviate from protocol or stop this trial/ evaluation.
- To make available without delay all the results of this trial/ evaluation to the Superintendent General: Gauteng Department of Health.
- I/ We understand that the Superintendent-General: Gauteng Department of Health having allowed this trial/ evaluation to be conducted places himself or herself or the Gauteng Department of Health under no obligation whatsoever and to leave the final choice of the institution where the trial/ evaluation will be conducted to the Superintendent-General: Gauteng Department of Health.

THE APPLICANT MUST SIGN HERE

APPLICANT- INVESTIGATOR			DATE		
Signature	Initial(s)	Surname	Day	Month	Year

Designation/ Rank:

SPONSOR FIRM - IF THERE IS A FIRM INVOLVED- THEY MUST SIGN HERE

MANAGING DIRECTOR OR REPRESENTATIVE			DATE		
Signature	Initial(s)	Surname	Day	Month	Year

Designation/ Rank:

IT IS VERY IMPORTANT THAT 2 WITNESSES MUST SIGN IF A FIRM IS INVOLVED!

WITNESSES			DATE		
Signature	Initial(s)	Surname	Day	Month	Year
1.					
2.					

INITIAL CONSENT BY DEPARTMENTAL HEAD

I _____ head of _____ department of _____ hospital in consultation with the Chief Executive Officer / Superintendent of this Hospital grant permission to submit an application to conduct a clinical trial/evaluation to the Chairperson (s) of the relevant Ethics, Research and Therapeutic Committees of this Hospital.

The officer conducting the trial/evaluation will be _____

_____ Designation / Rank _____

THE HEAD OF THE DEPARTMENT MUST SIGN HERE!

HEAD OF DEPARTMENT			DATE		
Signature	Initial(s)	Surname	Day	Month	Year

THE APPLICANT MUST SIGN HERE

TRIALIST-INVESTIGATOR			DATE		
Signature	Initial(s)	Surname	Day	Month	Year

THE APPLICANT THAT APPLY FOR THIS STUDY MUST SEE TO IT THAT THE SUPERINTENDANT/CEO OF THE HOSPITAL WERE THE STUDY WILL BE DONE SIGN HERE BEFORE THE ETHICAL COMMITTEE RECEIVE THIS APPLICATION FORM.

APPROVAL BY HOSPITAL CHIEF EXECUTIVE OFFICER:
--

I _____ Chief Executive Officer / superintendent of
 _____ Hospital, hereby agree that this trial / evaluation be conducted in
 the _____ Department of this hospital.

The officer conducting the trial will be: _____

The officer controlling supplies will be: _____

HOSPITAL C.E.O. / Superintendent			DATE		
Signature	Initial(s)	Surname	Day	Month	Year

Annexure E: Permission to use retrospective documents

Guidelines for the evaluation of retrospective records, research and similar studies.

Compiled by Prof V.O.L. Karusseit on behalf of the Ethics and Protocol Committee of the Medical School of the University of Pretoria. All perusal of personal files should be seen as invasion of privacy, and the patient's consent should normally be sought for this. This would apply to all circumstances except those concerning special cases such as the broadest epidemiological studies dealing with such categories as diagnoses only, research on people incompetent to give consent, etc. However, it is not always possible to obtain consent from study subjects and then the matter should be referred to a research ethics committee for decision.

Part of the process of approval of such studies is obtaining the consent of the custodian of the records concerned. This is usually the CEO of a hospital. This is administered by the University of Pretoria Ethics Committee by requiring the completion of a standardized form according to the Freedom of Access to Information Act of 2000.

What guidelines are available for the approval of records research?

1. The Royal College of Physicians published guidelines in 1994.

These recommend that access to records should be controlled by their custodians. The custodians should be satisfied as to the bona fides, professional standing and competence of the investigator, and the ability of that person to handle the data securely and confidentially. The investigator should also be an appropriate senior person who is bound by a code of ethical standards of a licensing body. Junior staff should be supervised by such a person.

These guidelines would specifically apply to the custodians of records.

2. The well-known medical ethicist Len Doyal compiled recommendations for records research in 1997.

- Access to the clinical record is essential for the completion of the research and consent is not practicable.
- The research is of sufficient merit.
- The research pertains to some future planning, preventive or therapeutic initiatives which may benefit the patients whose records are studied.

- Where possible, identifiers have been removed from the parts of the records to which researchers have access; where not, patients will not be identifiable when the results are made public.
- It is not anticipated that contact will be made with the patients as a result of research findings.

RETROSPECTIVE RECORDS RESEARCH INFORMATION FOR CLINICAL TRIAL / INTERVENTION RESEARCH

- Access is restricted to specific categories of information which have been approved by the local research ethics committee.
- Permission is obtained from the clinician responsible for the patient's care and, depending on the type of record and access concerned the person responsible for its administration (the custodian).
- Researchers who are non-clinicians are formally instructed about their duty of confidentiality. They must also have a clinical supervisor who formally accepts professional responsibility for any breach of confidentiality that may occur. The above sets of guidelines would then allow a REC to waive the necessity of informed consent. Not all of Prof Doyal's recommendations are universally accepted and must not be seen as absolute requirements but firm recommendations.

References:

1. Doyal L. Informed consent in medical research. Journals should not publish research to which patients have not given fully informed consent - with three exceptions. *BMJ* 1997; 314: 1107-11
2. Wald N, Law M, Meade T, et al. Use of personal medical records for research purposes. *BMJ* 1994; 309: 1422-1424.
3. Independent ethical review of studies involving personal medical records. Report of a working group to the Royal College of Physicians Committee on Ethical Issues in Medicine. *Journal of Royal College of Physicians of London* 1994; 28(5): 439-443.

Note:

This document will be supplied to researchers where appropriate and a copy should be given to the custodian of the records to be used.

TO: [Name] **FROM: Carlien van Heerden**

Chief Executive Officer/Information Officer Investigator

.....

Hospital / Clinic

.....

Hospital / Clinic OR University of Pretoria

Re: Permission to do research at Hospital / Clinic

TITLE OF STUDY: Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng.

This request is lodged with you in terms of the requirements of the Promotion of Access to Information Act. No. 2 of 2000. I am a researcher / student at the Department of Nursing, School of Health Sciences at the University of Pretoria / I am working with Dr Carin Maree as my supervisor at the Department of Nursing. I herewith request permission on behalf of all of us to conduct a study on the above topic on the hospital / clinic grounds. This study involves access to records with regards to neonatal mortality as well as incident reports regarding neonatal resuscitation and minutes of mortality and morbidity meetings held at your hospital.

The researchers request access to the following information: clinical files, record books and data bases. We intend to publish the findings of the study in a professional journal and/ or to present them at professional meetings like symposia, congresses, or other meetings of such a nature.

We intend to protect the identity of your hospital. We undertake not to proceed with the study until we have received approval from the Faculty of Health Sciences Research Ethics Committee, University of Pretoria.

Yours sincerely

Signature of the Principal Investigator

Permission to do the research study at this hospital / clinic and to access the information as requested is hereby approved.

Title and name of Chief Executive Officer: _____

Name of hospital / clinic: _____

Signature: _____

Date: _____

1 Title(s) and surname(s) of co-investigator(s) / supervisor(s)

Permission to access Records / Files / Data base at

..... **Hospital / Clinic**

Official Stamp

Annexure F: Permission to use the NHS Sustainability model and Master Score System

Hello Carlien,

Yes you do have permission to use the Sustainability Model and Guide. The master score system is within the sustainability model PDF that I sent through.

Kind regards,

Lynne

Dr. Lynne Maher
Director for Innovation and Design
NHS Institute for Innovation and Improvement
i-House
University of Warwick Science Park
Millburn Hill Road
Coventry
CV4 7HS
Phone (+44) (0) 7879881239

follow me @LynneMaher1

From: Marius van Heerden [mailto:mariuscarlien@absamail.co.za]

Sent: 14 May 2012 15:20

To: Lynne Maher

Cc: carin.maree@up.ac.za; elsie.jansevanrensburg@up.ac.za

Subject: RE: Permission to use NHS Sustainability Model and Guide as part of PhD studies

Dr Lynne

Thank you very much for your prompt response. It is much appreciated. Just to be certain that I understand correctly. Do I have permission to use both the Sustainability model and

guide as well as the Master Score System?

Thank you very much for all the other information that you sent. It will definitely be very helpful.

I will send you the end product.

Kind Regards

Carlien van Heerden

From: Lynne Maher [mailto:lynne.maher@institute.nhs.uk]

Sent: 14 May 2012 12:30 PM

To: Marius van Heerden

Subject: RE: Permission to use NHS Sustainability Model and Guide as part of PhD studies

Hello Carlien,

Thank you for your e mail and for your interest in the NHS Sustainability Model. I am very happy for you to use the model as part of your PhD study and would be very pleased if you could share a copy of your research with me when you have finished.

I have attached a PDF of the Sustainability Model so that you are able to reference and also use the master score system. I will also send a copy of the guide that accompanies the model as you might find this useful as well. I will send this in a separate e mail as it is quite a big file. I have attached a few other things that may be useful.

Good luck with your research!!

Kind regards,

Lynne

Page 2 of 2

Dr. Lynne Maher

Director for Innovation and Design

NHS Institute for Innovation and Improvement

i-House
University of Warwick Science Park
Millburn Hill Road
Coventry
CV4 7HS
Phone (+44) (0) 7879881239

follow me @LynneMaher1

From: Marius van Heerden [mailto:mariuscarlien@absamail.co.za]
Sent: 14 May 2012 10:14
To: Lynne Maher
Subject: RE: Permission to use NHS Sustainability Model and Guide as part of PhD studies

Dear Lynn,

I hope this email finds you well.

My name is Carlien van Heerden and I am currently a PhD student at the University of Pretoria in South Africa. I am planning to use the NHS Sustainability Model and Guide as the theoretical basis of my studies. The focus of my study is on the sustainability of a quality improvement initiative. My topic is: Strategies to sustain a quality improvement initiative in neonatal resuscitation.

In South Africa the neonatal mortality rates are increasing instead of decreasing. Many babies die due to avoidable and modifiable causes. Competent neonatal resuscitation can potentially be lifesaving for many babies. Despite many quality improvement initiatives it still remain a problem therefore my focus is on the sustainability of quality improvement.

Action research is the methodology of choice for my study. I would also like to use the NHS master score system (as is) to evaluate the sustainability of the strategies for a quality improvement initiative in neonatal resuscitation.

I would like to enquire about obtaining permission to use the NHS Sustainability Model and Guide including the Master Score system in my PhD Studies. Also I would like to enquire on obtaining or purchasing the complete model and guide for referencing purposes.

Your assistance in this regard would be highly appreciated.

Kind Regards

Carlien van Heerden

mariuscarlien@absamail.co.za

+72837535028

Annexure G: Letter from the statistician



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Denketers • Leading Minds • Ditgopolo tsa Dihlolefi

DEPARTMENT OF STATISTICS

LETTER OF STATISTICAL SUPPORT

Date: 30 May 2012

This letter is to confirm that **C van Heerden**, studying at the University of Pretoria, discussed the project with the title **Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng** with me.

I hereby confirm that I am aware of the project and also undertake to assist with the statistical analysis of the data generated from the project.

The first phase of the analysis of the quantitative data will consist of basic descriptive statistics such as frequencies and cross tabulations. The second phase will be to perform statistical inference like chi square tests and t-tests where applicable.

No sample will be considered, as the entire population of 40 midwives, who are permanently employed at the hospital, will be requested to complete the questionnaire.

Dr EM Louw
Department of Statistics
Internal Consultation Service
Tel 012 420 3446

University of Pretoria
Department of Statistics

Annexure H: First draft patient information leaflet and questionnaire

PARTICIPANT'S₁ INFORMATION LEAFLET & INFORMED CONSENT FOR ANONYMOUS QUESTIONNAIRES

Carlien van Heerden
01286463
Department of Nursing
University of Pretoria

Dear Participant

Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng

I am a PhD student in neonatal nursing science in the Department of Nursing, University of Pretoria. You are invited to volunteer to participate in a research project on Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng.

This letter gives information to help you to decide if you want to take part in this study. Before you agree you should fully understand what is involved. If you do not understand the information or have any other questions, do not hesitate to ask us. You should not agree to take part unless you are completely happy about what we expect of you.

Neonatal resuscitation is a competence that must be learned, practised and mastered by every person delivering and/or caring for a neonate in order to decrease neonatal morbidity and mortality. The neonatal mortality rate remains high in district hospitals and many of the causes is modifiable and preventable. Lack of equipment and staff etc. are some of the modifiable causes.

The purpose of this study is to develop strategies to sustain a quality improvement initiative in neonatal resuscitation in your district hospital. You as a participant are a very important source of information on the current strategies, policies and practises in place regarding neonatal resuscitation in your district hospital in the area you are working.

We will like you to complete a questionnaire. Questions will be asked pertaining to demographic data, the process, staff and organisation of your hospital as well as on the practise of neonatal resuscitation in the area you are working in. This may take about 20-30 minutes to complete.

We will collect the questionnaire from you before you leave the hospital. It will be kept in a safe place to ensure confidentiality. Please do not write your name on the questionnaire.

The Research Ethics Committee of the University of Pretoria, Faculty of Health Sciences granted written approval for this study. Your participation in this study is voluntary. You can refuse to participate or stop at any time without giving any reason. As you do not write your name on the questionnaire, you give us the information anonymously. Once you have given the questionnaire back to us, you cannot recall your consent. We will not be able to trace your information. Therefore, you will also not be identified as a participant in any publication that comes from this study.

Note: The implication of completing the questionnaire is that informed consent has been obtained from you. Thus any information derived from your form (which will be totally anonymous) may be used for e.g. publication, by the researchers.

We sincerely appreciate your help.

Yours truly,

Carlien van Heerden

STRATEGIES TO SUSTAIN A QUALITY IMPROVEMENT INITIATIVE IN NEONATAL RESUSCITATION IN A DISTRICT HOSPITAL IN GAUTENG.

Instructions:

- *Your participation in this questionnaire is voluntary*
- *Please make sure that you read the information leaflet & informed consent document before completing the questionnaire*
- *Answer each question by ticking in the appropriate block/s or filling in the lines*
- *It is important to answer all the questions*

SECTION A: DEMOGRAPHIC DATA

For office use only

1. Indicate in which of the following sections you are currently working. Indicate only one:

Labour ward	
Postnatal ward	
Baby room	
High care	
Neonatal Intensive Care Unit (NICU)	
Caesarean theatre	
Other (specify):	

V1.1	
V1.2	
V1.3	
V1.4	
V1.5	
V1.6	
V1.7	

2. Indicate the highest qualification that you are registered for:

Registered nurse (bridging course)	
Registered nurse & midwife	
Advanced midwife	
Trained neonatal nurse	

V2.1	
V2.2	
V2.3	
V2.4	

PROCESS, STAFF AND ORGANISATION

SECTION B: PROCESS

3. Indicate the years of experience working with neonates:

<input type="text"/>	V3	<input type="text"/>
----------------------	----	----------------------

4. What are contributing to quality neonatal resuscitation in the area where you are working (what is working)?

.....

.....

.....

.....

.....

5. What are the factors to be improved to achieve quality neonatal resuscitation in the particular area where you are working (what is not working)?

.....

.....

.....

.....

.....

6. What changes do you think can be made in order to improve neonatal resuscitation in the area you are working in?

.....

.....

.....

.....

.....

7. How do you think a quality improvement initiative in neonatal resuscitation will benefit your daily work life?

.....

.....

.....

.....

STAFF AND ORGANISATIONAL FACTORS

SECTION C: STAFF

8. Briefly describe the nature of neonatal resuscitation training that you received?

.....

.....

.....

.....

.....

9. How updated do you consider yourself regarding the new trends in neonatal resuscitation?

Not at all				
Heard about it		V9.1		
Know what it entails		V9.2		
Have expert knowledge of it		V9.3		
		V9.4		

Please explain your answer in more detail

.....

.....

.....

10. Describe your attendance of neonatal training/refresher courses?

.....

.....

.....

.....

.....

SECTION D: ORGANISATION

11. Were previous quality improvement initiatives sustained in the area you are working in?

Yes	
No	

V11.1	
V11.2	

Please explain your answer in more detail

.....

.....

.....

12. Do you experience problems with transportation when a baby needs to be transferred to another institution?

Never	
Seldom	
Sometimes	
Often	
Always	

V12.1	
V12.2	
V12.3	
V12.4	
V12.5	

What are the problems you experience with transportation when a baby needs to be transferred to another institution?

.....

.....

.....

.....

13. Are there adequate facilities and equipment to do neonatal resuscitation if needed?

Never	
Seldom	
Sometimes	
Often	
Always	

V13.1	
V13.2	
V13.3	
V13.4	
V13.5	

Please explain your answer in more detail

.....

.....

.....

.....

14. Is there adequate staffing available when neonatal resuscitation is needed?

Yes		V14.1	
No		V14.2	

Please explain your answer in more detail

.....

.....

.....

15. What roles do the senior leaders (matrons and unit managers) play in neonatal resuscitation and in improving quality of neonatal resuscitation?

.....

.....

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.....

16. What roles do the clinical leaders (doctors and shift leaders) play in neonatal resuscitation or in improving quality of neonatal resuscitation?

.....

.....

.....

.....

.....

17. Are feedback and communication regarding neonatal resuscitation adequate?

Yes		V17.1	
No		V17.2	

Please explain your answer in more detail

.....

.....

.....

18. How are concerns about the quality of neonatal resuscitation addressed?

.....
.....
.....
.....
.....

19. Are there a vision, aim and protocols in place regarding neonatal resuscitation?

Yes	
No	

V19.1	
V19.2	

Please explain your answer in more detail

.....
.....
.....

NEONATAL RESUSCITATION

SECTION E: PRACTISE OF NEONATAL RESUSCITATION

Indicate the answer that is **best reflecting the practice of neonatal resuscitation** in the area where you are working

PREVENTION AND EARLY IDENTIFICATION OF RISK FATORS

20. Identification of risk factors that should be attended to is done by means of:	YES	NO			
• History taking				V20.1	
• Physical assessment				V20.2	
• Behavioural assessment				V20.3	
• Special investigations				V20.4	
• All of the above				V20.5	
• None of the above				V20.6	
21. The following hazards are easily identified and prevented:	YES	NO			
• Obvious hazards in environment				V21.1	
• Cold temperature				V21.2	
• Infection hazards				V21.3	
• Poor monitoring				V21.4	
• Other (specify):				V21.5	
22. Responsiveness of neonate is determined by means of:	YES	NO			
• Talk to patient				V22.1	
• Tactile stimulation				V22.2	
• Other (specify):				V22.3	

RESUSCITATION (INTERVENTION)

23. How do you call for help most of the time:	NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS			
• Shouting to another person							V23.1	
• Phoning							V23.2	
• Emergency bell							V23.3	
• Other (specify):							V23.4	
24. The airway is secured as follows:	YES		NO					
• Suction airway							V24.1	
• Turn baby on side							V24.2	
• Turn head to the side							V24.3	
• Head in sniffing position							V24.4	
• Chin on chest positioning							V24.5	
• Extent neck as far as possible							V24.6	
• Other (specify):							V24.7	
25. Oxygen needed for resuscitation	YES		NO					
• 21% (room air)							V25.1	
• 22-50%							V25.2	
• 51-80%							V25.3	
• 81-100%							V25.4	
• Other (specify)							V25.5.	

26. Bag and mask ventilation principles followed	YES	NO			
• Tight seal over the mouth				V26.1	
• Tight seal over the nose and mouth				V26.2	
• Hear the pop-up valve				V26.3	
• Other (specify)				V26.4	
27. Appropriate tempo of bag mask ventilation	YES	NO			
• 2 per minute				V27.1	
• 15 per minute				V27.2	
• 40-60 per minute				V27.3	
28. Volume criteria followed during bag mask ventilation	YES	NO			
• Hear pop up valve				V28.1	
• Chest rise				V28.2	
• Breathing				V28.3	
• Other (specify)				V28.4	
29. How often do you use a oxymeter during resuscitation					
• Never				V29.1	
• Seldom				V29.2	
• Sometimes				V29.3	
• Often				V29.4	
• Always				V29,5	

30. The circulation is determined as follows:	YES	NO			
• Baby is pink				V30.1	
• Baby is moving				V30.2	
• Feel for a pulse				V30.3	
31. Commencing chest compressions when	YES	NO			
• Heart rate under 120 bpm				V31.1	
• Heart rate under 60 bpm				V31.2	
• Heart rate under 30 bpm				V31.3	
• Other (specify)				V31.4	

32. Method of compressions followed	YES	NO			
• Two thumb encircling method				V32.1	
• Hand on chest				V32.2	
• Two fingers below nipple line method				V32.3	
• Other (specify)				V32.4	
33. Ventilation to compression rate followed	YES	NO			
• 1:5				V33.1	
• 2:15				V33.2	
• 2:30				V33.3	
• Other (specify)				V33.4	

34. Preferred tempo of compressions	YES	NO			
• 40-60 per minute				V34.1	
• 61-119 per minute				V34.2	
• 120-160 per minute				V34.3	
• 161-200 per minute				V34.4	
• Other (specify)				V34.5	
35. Preferred depth of compressions	YES	NO			
• 1/3 -1/2				V35.1	
• 3/4				V35.2	
• 1/5				V35.3	
• Other (specify)				V35.4	

36. Post resuscitation care that should be followed	YES	NO			
• Stabilisation and transfer				V36.1	
• Basic newborn care				V36.2	
• Advanced newborn care				V36.3	
• Anticipation of relapse				V36.4	
• Documentation				V36.5	
• Feeding				V36.6	
• Other (specify)				V36.7	

37. Role during resuscitation that is followed	NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS			
<ul style="list-style-type: none"> Identify problems and call trained staff 							V37.1	
<ul style="list-style-type: none"> Assist during resuscitation 							V37.2	
<ul style="list-style-type: none"> Initiate and maintains basic resuscitation 							V37.3	
<ul style="list-style-type: none"> Take charge and continue with advanced resuscitation 							V37.4	
Other (specify):							V37.5	
38. Practicing resuscitation on a mannequin occurs								
<ul style="list-style-type: none"> Weekly 							V38.1	
<ul style="list-style-type: none"> Monthly 							V38.2	
<ul style="list-style-type: none"> Once every 3-6 months 							V38.3	
<ul style="list-style-type: none"> Yearly 							V38.4	
<ul style="list-style-type: none"> Never 							V38.5	
<ul style="list-style-type: none"> Other (specify) 							V38.6	

39. How often are you involved in resuscitation of a newborn/neonate?

.....

.....

.....

.....

40. Do you feel competent in basic neonatal resuscitation?

Yes	
Uncertain	
No	

V45.1	
V45.2	
V45.3	

Please explain your answer in more detail

.....

.....

.....

SECTION F: REFLECTION ON NEONATAL RESUSCITATION

41. Do you attend mortality and morbidity meetings?

Yes	
No	

V46.1	
V46.2	

42. Do you attend debriefing sessions after neonatal resuscitation?

Yes	
No	

V47.1	
V47.2	

Thank you for your participation!!!

Annexure I: Participant information leaflet and questionnaire used for data collection in Cycle 1 and Cycle 3

PARTICIPANT'S INFORMATION LEAFLET & INFORMED CONSENT FOR ANONYMOUS QUESTIONNAIRES

Carlien van Heerden
01286463
Department of Nursing
University of Pretoria

Dear Participant

Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng

I am a PhD student in neonatal nursing science in the Department of Nursing, University of Pretoria. You are invited to volunteer to participate in a research project on Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng.

This letter gives information to help you to decide if you want to take part in this study. Before you agree you should fully understand what is involved. If you do not understand the information or have any other questions, do not hesitate to ask us. You should not agree to take part unless you are completely happy about what we expect of you.

Neonatal resuscitation is a competence that must be learned, practised and mastered by every person delivering and/or caring for a neonate in order to decrease neonatal morbidity and mortality. The neonatal mortality rate remains high in district hospitals and many of the causes is modifiable and preventable. Lack of equipment and staff etc. are some of the modifiable causes.

The purpose of this study is to develop strategies to sustain a quality improvement initiative in neonatal resuscitation in your district hospital. You as a participant are a very important source of information on the current strategies, policies and practises in place regarding neonatal resuscitation in your district hospital in the area you are working.

We will like you to complete a questionnaire. Questions will be asked pertaining to demographic data, the process, staff and organisation of your hospital as well as on the practise of neonatal resuscitation in the area you are working in. This may take about 20-30 minutes to complete.

We will collect the questionnaire from you before you leave the hospital. It will be kept in a safe place to ensure confidentiality. Please do not write your name on the questionnaire.

The Research Ethics Committee of the University of Pretoria, Faculty of Health Sciences granted written approval for this study. Your participation in this study is voluntary. You can refuse to participate or stop at any time without giving any reason. As you do not write your name on the questionnaire, you give us the information anonymously. Once you have given the questionnaire back to us, you cannot recall your consent. We will not be able to trace your information. Therefore, you will also not be identified as a participant in any publication that comes from this study.

Note: The implication of completing the questionnaire is that informed consent has been obtained from you. Thus any information derived from your form (which will be totally anonymous) may be used for e.g. publication, by the researchers.

We sincerely appreciate your help.

Yours truly,

Carlien van Heerden

QUESTIONNAIRE:

STRATEGIES TO SUSTAIN A QUALITY IMPROVEMENT INITIATIVE IN NEONATAL RESUSCITATION.

Instructions:

- *Your participation in this questionnaire is voluntary*
- *Please make sure that you read the information leaflet & informed consent document before completing the questionnaire*
- *Answer each question by ticking in the appropriate block/s or filling in the lines*
- *Please answer the questions as thorough as possible*
- *It is important to answer all the questions*

QUESTIONNAIRE NUMBER

V1

SECTION A: DEMOGRAPHIC DATA

For office use

1. Indicate in which of the following sections you are currently spending most of your working day. Indicate only one:

1 Labour ward		V1	
2 Postnatal ward			
3 Neonatal unit (NICU and High care)			
4 Caesarean theatre			
5 Other (specify):			

2. Indicate the highest qualification that you are registered for:

1 Registered nurse (bridging course)		V2	
2 Registered nurse & midwife			
3 Advanced midwife			
4 Trained neonatal nurse			
5 Trained in paediatric care			
6 Nursing assistant			
7 Enrolled nursing assistant			

SECTION B: PROCESS

3. Indicate the years of experience working with neonates:

Years

V3

4. What are contributing to quality neonatal resuscitation in the area where you are working?

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5. What are the factors to be improved to achieve quality neonatal resuscitation in the particular area where you are working?

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6. What changes do you think can be made in order to improve neonatal resuscitation in the area you are working in?

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7. How do you think a quality improvement initiative in neonatal resuscitation will benefit your daily work life?

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STAFF AND ORGANISATIONAL FACTORS

SECTION C: STAFF

8. Briefly describe the nature of neonatal resuscitation training that you received?

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9. How updated do you consider yourself regarding the new trends/guidelines in neonatal resuscitation?

1 Not at all	
2 Heard about it	
3 Know what it entails	
4 Have expert knowledge of it	

V9	
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Please explain your answer in more detail

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10. Describe your attendance of neonatal training/refresher courses?

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SECTION D: ORGANISATION

11. Were previous quality improvement initiatives sustained in the area you are working in?

1 Yes			V11	
2 No				

Please explain your answer in more detail

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12. Do you experience problems with transportation when a baby needs to be transferred to another institution?

1 Never			V12	
2 Seldom				
3 Sometimes				
4 Often				
5 Always				

Explain in detail the problems you are experiencing with transportation when a baby needs to be transferred to another institution?

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13. Are there adequate facilities and equipment available to do neonatal resuscitation if needed?

1 Never	
2 Seldom	
3 Sometimes	
4 Often	
5 Always	

V13

Please explain your answer in more detail

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14. Are there adequate staffing available when neonatal resuscitation is needed?

1 Yes	
2 No	

V14

Please explain your answer in more detail

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15. What roles do the senior leaders (matrons and unit managers) play in neonatal resuscitation and in improving quality of neonatal resuscitation?

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16. What roles do the clinical leaders (doctors and shift leaders) play in neonatal resuscitation or in improving quality of neonatal resuscitation?

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17. Is feedback and communication during and after neonatal resuscitation adequate?

1 Yes	
2 No	

V17

Please explain your answer in more detail

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18. Is information (*for example after workshops and training*) regarding neonatal resuscitation communicated effectively?

1 Yes	
2 No	

V18

Please explain your answer in more detail

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19. How are concerns about the quality of neonatal resuscitation addressed?

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20. Is there a **vision** (*meaning what the maternity section want to achieve by doing neonatal resuscitation*) in place regarding neonatal resuscitation?

1 Yes	
2 No	
3 Do not know	

V20

Please explain your answer in more detail

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21. Are there an **aim** (meaning: what is the goal for neonatal resuscitation) in place regarding neonatal resuscitation?

1 Yes	
2 No	
3 Do not know	

V21

Please explain your answer in more detail

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22. Are there protocols in place regarding neonatal resuscitation?

1 Yes	
2 No	
3 Do not know	

V22

Please explain your answer in more detail

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NEONATAL RESUSCITATION

SECTION E: PRACTISE OF NEONATAL RESUSCITATION

Indicate (tick) the answer that **is best reflecting the practice of neonatal resuscitation**. *You may select more than one answer if appropriate.* Please answer all the questions.

PREVENTION AND EARLY IDENTIFICATION OF RISK FACTORS

23. Which of the following is important in identifying risk factors?					
	YES	NO			
1 History taking				V23.1	
2 Physical assessment				V23.2	
3 Behavioural assessment				V23.3	
4 Special investigations				V23.4	
5 Other				V23.5	
24. Which of the following hazards are usually identified and prevented?					
	YES	NO			
1 Obvious hazards in environment				V24.1	
2 Cold room temperature				V24.2	
3 Infection hazards				V24.3	
4 Poor monitoring				V24.4	
5 Other (specify):				V24.5	
25. How is the responsiveness of neonate determined?					
	YES	NO			
1 Talk to patient				V25.1	
2 Tactile stimulation				V25.2	
3 Other (specify):				V25.3	

RESUSCITATION (INTERVENTION)

26. How often are the following methods used to call for help?	NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS			
1 Shouting to another person							V26.1	
2 Phoning							V26.2	
3 Emergency bell							V26.3	
4 Other (specify)							V26.4	
27. How is the airway secured during resuscitation?	YES		NO					
1 Suction airway							V27.1	
2 Turn baby on side							V27.2	
3 Turn head to the side							V27.3	
4 Head in sniffing position							V27.4	
5 Chin on chest positioning							V27.5	
6 Extend neck as far as possible							V27.6	
7 Other (specify):							V27.7	
28. What is the percentage of oxygen used for initiation of resuscitation?	YES		NO					
1 21% (room air)							V28.1	
2 22-50%							V28.2	
3 51-80%							V28.3	
4 81-100%							V28.4	
5 Other (specify)							V28.5.	

29. How is a tight seal obtained during bag and mask ventilation?	YES		NO					
1 Tight seal over the mouth							V29.1	
2 Tight seal over the nose and mouth							V29.2	
3 Other (specify)							V29.3	
30. What is the appropriate tempo of bag mask ventilation that is used?	YES		NO					
1 2 per minute							V30.1	
2 15 per minute							V30.2	
3 40-60 per minute							V30.3	
31. What are the volume criteria that are followed during bag mask ventilation?	YES		NO					
1 Hear pop up valve							V31.1	
2 Chest rise							V31.2	
3 Breathing							V31.3	
4 Other (specify)							V31.4	
32. How often is an oxymeter used during resuscitation?	NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS			
							V32	

33. How is circulation determined?	YES	NO			
1 Baby is pink				V33.1	
2 Baby is moving				V33.2	
3 Feel for a pulse				V33.3	
34. When are chest compressions commenced?	YES	NO			
1 Heart rate under 120 bpm				V34.1	
2 Heart rate under 60 bpm				V34.2	
3 Heart rate under 30 bpm				V34.3	
4 Other (specify)				V34.4	

35. How often are the following methods used for cardiac compressions?	NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS		
1 Two thumb encircling method						V35.1	
2 Hand on chest						V35.2	
3 Two fingers below nipple line method						V35.3	
4 Other (specify)						V35.4	

36. How often is the following ventilation to compression rate followed?	NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS			
1 1:5							V36.1	
2 2:15							V36.2	
3 1:3							V36.3	
4 Other (specify)							V36.4	

37. What is the preferred tempo of compressions used?	YES	NO			
1 40-60 per minute				V37.1	
2 61-119 per minute				V37.2	
3 120-160 per minute				V37.3	
4 161-200 per minute				V37.4	
5 Other (specify)				V37.5	
38. What is the preferred depth of compressions?	YES	NO			
1 1/3 -1/2				V38.1	
2 3/4				V38.2	
3 1/5				V38.3	
4 Other (specify)				V38.4	
39. What post resuscitation					

care is usually followed?	YES	NO			
1 Stabilisation and transfer				V39.1	
2 Basic newborn care				V39.2	
3 Advanced newborn care				V39.3	
4 Anticipation of relapse				V39.4	
5 Documentation				V39.5	
6 Feeding				V39.6	
7 Other (specify)				V39.7	

40. What is your role during resuscitation?	NEVER	SELDOM	SOMETIMES	OFTEN	ALWAYS			
1 Identify problems and call trained staff							V40.1	
2 Assist during resuscitation							V40.2	
3 Initiate and maintains basic resuscitation							V40.3	
4 Take charge and continue with advanced resuscitation							V40.4	
5 Other (specify)							V40.5	

41. How often do you practice resuscitation on a mannequin (doll)?				
1 Weekly			V41	
2 Monthly				
3 Once every 3-6 months				
4 Yearly				
5 Never				
6 Other (specify)				

42. How often are you involved in resuscitation of a newborn/neonate?

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43. Do you feel competent in basic neonatal resuscitation?

1 Yes			V43
2 Uncertain			
3 No			

Please explain your answer in more detail

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SECTION F: REFLECTION ON NEONATAL RESUSCITATION

44. Do you attend mortality and morbidity meetings?

1 Yes	
2 No	

V44	
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45. Do you attend debriefing sessions after neonatal resuscitation?

1 Yes	
2 No	

V45	
-----	--

Thank you for your participation!!!

Annexure J: Data Capturing sheets for labour ward and NICU

DATA CAPTURING SHEET: NICU

MONTH	NO. OF DISCHARGES	NO OF TRANSFERS	TOTAL NUMBER OF DEATHS
JANUARY			
FEBRUARY			
MARCH			
APRIL			
MAY			
JUNE			
JULY			
AUGUST			
SEPTEMBER			
OCTOBER			
NOVEMBER			
DECEMBER			
TOTAL:			

DATA CAPTURING SHEET FOR LABOUR WARD

MONTH	NO OF DELIVERIES	NO. OF LIFE BIRTHS	NO. OF PREMATURES	BORN BEFORE ARRIVAL	BORN BEFORE ARRIVAL DEATHS	NEONATAL MORTALITY
JANUARY						
FEBRUARY						
MARCH						
APRIL						
MAY						
JUNE						
JULY						
AUGUST						
SEPTEMBER						
OCTOBER						
NOVEMBER						
DECEMBER						
TOTAL:						

Annexure K: Participant information leaflet for a focus group interview with doctors (Cycle 1)

INFORMATION LEAFLET AND INFORMED CONSENT FOR NON-CLINICAL RESEARCH (e.g. educational, health systems or non-clinical operational research).

TITLE OF STUDY: Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng.

Dear Participant

1) INTRODUCTION

You are invited to participate in a research study. This information leaflet will help you to decide if you want to participate. Before you agree to take part you should fully understand what is involved. If you have any questions that this leaflet does not fully explain, please do not hesitate to ask the investigator Me Carlien van Heerden.

2) THE NATURE AND PURPOSE OF THIS STUDY

Neonatal resuscitation is a competence that must be learned, practised and mastered by every person delivering and/or caring for a neonate in order to decrease neonatal morbidity and mortality. The neonatal mortality rate remains high in district hospitals and many of the causes is modifiable and preventable. Lack of equipment and staff etc. are some of the modifiable causes.

The aim of this study is to develop strategies to sustain a quality improvement initiative in neonatal resuscitation in your hospital. You as a participant are a very important source of information on the current strategies, policies and practises in place regarding neonatal resuscitation in your district hospital in the area you are working.

3) EXPLANATION OF PROCEDURES TO BE FOLLOWED

At this stage in the study we are asking you to participate in a focus group interview. Your colleagues from the maternity section in your hospital will participate in the focus group interview. During the focus group interview the participants share the experiences, perceptions, attitudes and their views with each other and this generates more and new ideas. The researcher or moderator will ask specific questions during the focus group interview. You will be asked questions regarding neonatal resuscitation. The purpose of this focus group interview is to explore and describe the current practises and problems regarding neonatal resuscitation in your district hospital. The result of this discussion will aid in developing strategies to sustain a quality improvement initiative in neonatal resuscitation. Your contribution will help to create change in your hospital. The researcher will also audiotape the discussions after consent from the participants were given.

4) RISK AND DISCOMFORT INVOLVED

There are no risks in participating in the study. All information received will be kept highly confidential and will not be used against participants. The focus group interview will be held at your hospital for your convenience. The focus group interview can take 1-2 hours.

5) POSSIBLE BENEFITS OF THIS STUDY

Although you will not benefit directly from the study, the results of the study will enable us to implement strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng. In future these strategies can make difference in the lives of many babies and their parents; furthermore, it can aid in the reduction of morbidity and mortality rates and also help in the attainment of South Africa's MDG 4.

6) WHAT ARE YOUR RIGHTS AS A PARTICIPANT?

Your participation in this study is entirely voluntary. You can refuse to participate or stop at any time during the study without giving any reason. Your withdrawal will not affect you in any way.

7) HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received written approval from the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria and copies of the approval letters are available if you wish to have one.

8) INFORMATION AND CONTACT PERSON

The contact person for the study is Carlien van Heerden. If you have any questions about the study please contact her cell 083 7537028 or send an email to mariuscarlien@absamail.co.za. or alternatively the research ethics office of the Faculty of Health Sciences at the University of Pretoria Tel. 012 354 1330 or 012 354 1677 or send an email to manda@med.up.ac.za

Alternatively you may contact her supervisor Dr C Maree at the Department of Nursing, Faculty of Health Sciences, University of Pretoria, Tel 012 354 2125.

9) COMPENSATION

Your participation is voluntary. No compensation towards your transport expenses will be given for your participation.

10) CONFIDENTIALITY

All information that you give will be kept strictly confidential. Once we have analysed the information no one will be able to identify you. Research reports and articles in scientific journals will not include any information that may identify you or your hospital.

CONSENT TO PARTICIPATE IN THIS STUDY

I confirm that the person asking my consent to take part in this study has told me about nature, process, risks, discomforts and benefits of the study. I have also received, read and understood the above written information (Information Leaflet and Informed Consent) regarding the study. I am aware that the results of the study, including personal details, will be anonymously processed into research reports. I am participating willingly. I have had time to ask questions and have no objection to participate in the study. I understand that there is no penalty should I wish to discontinue with the study and my withdrawal will not affect me in any way. I have received a signed copy of this informed consent agreement.

Participant's name (Please print)

Participant's signature:

Date.....

Investigator's name(Please print)

Investigator's signature

Date.....

Witness's Name(Please print)

Witness's signature

Date.....

Annexure L: Interview Schedule for focus group with the doctors (Cycle 1)

Research Topic: Strategies to sustain a quality improvement initiative in neonatal resuscitation.

Purpose of the focus group: the purpose of this focus group is to examine the existing situation regarding neonatal resuscitation and its influencing factors such as staff, equipment and facilities, transport etc.).

INTRODUCTION:

My name isand I am going to be the moderator for this focus group. I encourage you to participate actively in this focus group. All comments are welcome whether it is positive or negative. Can I please ask that we give everyone a fair chance to speak and one at a time please? I am interested in everyone's opinion and everyone's input is important. No one will be judged on their opinions, views or experiences.

Opening question:

- **Tell us who you are, how long you have been working at this hospital and explain your role in the maternity section you are working in?**

Introduction question:

- I want you to think back to previous experiences of neonatal resuscitations that you were involved in here at this hospital. **What is your opinion regarding neonatal resuscitation at this hospital?**

Transition question:

- **What is working regarding neonatal resuscitation in this hospital (positives).**
- **What is not working regarding neonatal resuscitation at this hospital (challenges)**

Key questions:

- **What is your opinion regarding the practise of neonatal resuscitation at this district hospital?**
 - ✓ **Communication** during and after resuscitation
 - ✓ Are you familiar with the **new ILCOR guidelines**?
- **What is your opinion regarding staffing at this district hospital?**
 - ✓ What is your opinion **regarding training of staff** in neonatal resuscitation?
 - ✓ What is your opinion regarding the **competence** of staff in neonatal resuscitation?
- **What is your opinion regarding the management (organisation) at this district hospital?**
 - ✓ What is your opinion regarding **amount of staff** in the working force?
 - ✓ What is your opinion regarding **equipment and facilities**?
 - ✓ What is your opinion regarding **transport**?
 - ✓ What is your opinion regarding **communication** about issues concerning neonatal resuscitation?
 - ✓ What is your opinion regarding **sustainability of quality improvement initiatives** in this hospital?

Ending question:

- **What suggestions can you make to improve on the practise of neonatal resuscitation, staff and organisation at this hospital?**
- **Does anyone want to add anything that was not discussed?**

Thank you very much for your participation!!

Annexure M: Participant information leaflet for the nominal group technique

INFORMATION LEAFLET AND INFORMED CONSENT FOR NON-CLINICAL RESEARCH (e.g. educational, health systems or non-clinical operational research)

TITLE OF STUDY: Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng.

Dear Participant

1) INTRODUCTION

You are invited to participate in a research study. This information leaflet will help you to decide if you want to participate. Before you agree to take part you should fully understand what is involved. If you have any questions that this leaflet does not fully explain, please do not hesitate to ask the investigator Me Carlien van Heerden.

2) THE NATURE AND PURPOSE OF THIS STUDY

Neonatal resuscitation is a competence that must be learned, practised and mastered by every person delivering and/or caring for a neonate in order to decrease neonatal morbidity and mortality. The neonatal mortality rate remains high in district hospitals and many of the causes is modifiable and preventable. Lack of equipment and staff etc. are some of the modifiable causes.

The aim of this study is to develop strategies to sustain a quality improvement initiative in neonatal resuscitation in your district hospital. You as a participant are a very important source of information on the current strategies, policies and practises in place regarding neonatal resuscitation in your district hospital in the area you are working.

3) EXPLANATION OF PROCEDURES TO BE FOLLOWED

At this stage in the study we are asking you to participate in a nominal group technique discussion. A nominal group technique discussion is a structured process where ideas are formulated, discussed and prioritised by means of voting. The purpose of this discussion is to reach consensus on strategies to sustain a quality improvement initiative in neonatal resuscitation. Some of the ideas generated can be written on paper and be kept anonymous. The result of this discussion will aid the researcher and the steering group in formulating and

refining strategies for your district hospital specific to address the sustainability of a quality improvement initiative in neonatal resuscitation. Your contribution will help to create change in your hospital. The researcher will also audiotape the discussions.

4) RISK AND DISCOMFORT INVOLVED

There are no risks in participating in the study. All information received will be kept highly confidential and will not be used against participants. The group discussion will be held at your hospital for your convenience. The group discussion can take up to 4 hours or until consensus is reached so it will take up some of your time.

5) POSSIBLE BENEFITS OF THIS STUDY

Although you will not benefit directly from the study, the results of the study will enable us to implement strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng. In future these strategies can make difference in the lives of many babies and their parents; furthermore, it can aid in the reduction of morbidity and mortality rates and also help in the attainment of South Africa's MDG 4.

6) WHAT ARE YOUR RIGHTS AS A PARTICIPANT?

Your participation in this study is entirely voluntary. You can refuse to participate or stop at any time during the study without giving any reason. Your withdrawal will not affect you in any way.

7) HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received written approval from the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria and copies of the approval letters are available if you wish to have one.

8) INFORMATION AND CONTACT PERSON

The contact person for the study is Carlien van Heerden. If you have any questions about the study please contact her cell 083 7537028 or send an email to mariuscarlien@absamail.co.za.

Alternatively you may contact her supervisor Dr C Maree at the Department of Nursing, Faculty of Health Sciences, University of Pretoria, Tel 012 354 2125 or the research ethics office of the Faculty of Health Sciences at the University of Pretoria Tel. 012 354 1330 or 012 354 1677 or send an email to manda@med.up.ac.za.

9) COMPENSATION

Your participation is voluntary. No compensation towards your transport expenses will be given for your participation.

10) CONFIDENTIALITY

All information that you give will be kept strictly confidential. Once researcher in collaboration with the steering group have analysed the information no one will be able to identify you. Research reports and articles in scientific journals will not include any information that may identify you or your hospital.

CONSENT TO PARTICIPATE IN THIS STUDY

I confirm that the person asking my consent to take part in this study has told me about nature, process, risks, discomforts and benefits of the study. I have also received, read and understood the above written information (Information Leaflet and Informed Consent) regarding the study. I am aware that the results of the study, including personal details, will be anonymously processed into research reports. I am participating willingly. I have had time to ask questions and have no objection to participate in the study. I understand that there is no penalty should I wish to discontinue with the study and my withdrawal will not affect me in any way. I have received a signed copy of this informed consent agreement.

Participant's name(Please print)

Participant's signature:

Date.....

Investigator's name(Please print)

Investigator's signature

Date.....

Witness's Name(Please print)

Witness's signature

Date.....

Annexure N: Participant information leaflet for a focus group interview with steering group, midwives and stakeholders

INFORMATION LEAFLET AND INFORMED CONSENT FOR NON-CLINICAL RESEARCH (e.g. educational, health systems or non-clinical operational research).

TITLE OF STUDY: Strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng.

Dear Participant

1) INTRODUCTION

You are invited to participate in a research study. This information leaflet will help you to decide if you want to participate. Before you agree to take part you should fully understand what is involved. If you have any questions that this leaflet does not fully explain, please do not hesitate to ask the investigator Me Carlien van Heerden.

2) THE NATURE AND PURPOSE OF THIS STUDY

Neonatal resuscitation is a competence that must be learned, practised and mastered by every person delivering and/or caring for a neonate in order to decrease neonatal morbidity and mortality. The neonatal mortality rate remains high in district hospitals and many of the causes is modifiable and preventable. Lack of equipment and staff etc. are some of the modifiable causes.

The aim of this study is to develop strategies to sustain a quality improvement initiative in neonatal resuscitation in your hospital. You as a participant are a very important source of information on the current strategies, policies and practises in place regarding neonatal resuscitation in your district hospital in the area you are working.

3) EXPLANATION OF PROCEDURES TO BE FOLLOWED

At this stage in the study we are asking you to participate in a focus group interview. Your colleagues from the maternity section in your hospital will participate in the focus group interview. During the focus group interview the participants share the experiences, perceptions, attitudes and their views with each other and this generates more and new ideas. The researcher or moderator will ask specific questions during the focus group

interview. You will be asked questions regarding neonatal resuscitation. The purpose of this discussion is to evaluate and reflect upon the strategies to sustain a quality improvement initiative in neonatal resuscitation that was implemented in your hospital. The result of this discussion will aid in refining strategies for your district hospital specific to address the sustainability of a quality improvement initiative in neonatal resuscitation. Your contribution will help to create change in your hospital. The researcher will also audiotape the discussions after consent from the participants were given.

4) RISK AND DISCOMFORT INVOLVED

There are no risks in participating in the study. All information received will be kept highly confidential and will not be used against participants. The focus group interview will be held at your hospital for your convenience. The focus group interview can take 1 4 hours.

5) POSSIBLE BENEFITS OF THIS STUDY

Although you will not benefit directly from the study, the results of the study will enable us to implement strategies to sustain a quality improvement initiative in neonatal resuscitation in a district hospital in Gauteng. In future these strategies can make difference in the lives of many babies and their parents; furthermore, it can aid in the reduction of morbidity and mortality rates and also help in the attainment of South Africa's MDG 4.

6) WHAT ARE YOUR RIGHTS AS A PARTICIPANT?

Your participation in this study is entirely voluntary. You can refuse to participate or stop at any time during the study without giving any reason. Your withdrawal will not affect you in any way.

7) HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received written approval from the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria and copies of the approval letters are available if you wish to have one.

8) INFORMATION AND CONTACT PERSON

The contact person for the study is Carlien van Heerden. If you have any questions about the study please contact her cell 083 7537028 or send an email to mariuscarlien@absamail.co.za. or alternatively the research ethics office of the Faculty of Health Sciences at the University of Pretoria Tel. 012 354 1330 or 012 354 1677 or send an email to manda@med.up.ac.za

Alternatively you may contact her supervisor Dr C Maree at the Department of Nursing, Faculty of Health Sciences, University of Pretoria, Tel 012 354 2125.

9) COMPENSATION

Your participation is voluntary. No compensation towards your transport expenses will be given for your participation.

10) CONFIDENTIALITY

All information that you give will be kept strictly confidential. Once we have analysed the information no one will be able to identify you. Research reports and articles in scientific journals will not include any information that may identify you or your hospital.

CONSENT TO PARTICIPATE IN THIS STUDY

I confirm that the person asking my consent to take part in this study has told me about nature, process, risks, discomforts and benefits of the study. I have also received, read and understood the above written information (Information Leaflet and Informed Consent) regarding the study. I am aware that the results of the study, including personal details, will be anonymously processed into research reports. I am participating willingly. I have had time to ask questions and have no objection to participate in the study. I understand that there is no penalty should I wish to discontinue with the study and my withdrawal will not affect me in any way. I have received a signed copy of this informed consent agreement.

Participant's name(Please print)

Participant's signature: Date.....

Investigator's name(Please print)

Investigator's signature Date.....

Witness's Name(Please print)

Witness's signature Date.....

Annexure O: Interview schedule for the focus group with the steering group and stakeholders – (Cycle 3)

Research Topic: Strategies to sustain a quality improvement initiative in neonatal resuscitation.

Purpose of the focus group: the purpose of this focus group is to evaluate the changes that occurred in the maternity section as a result of the strategies that were implemented to sustain a quality improvement initiative in neonatal resuscitation.

Introduction:

My name is and I am going to be the moderator for this focus group. I encourage you to participate actively in this focus group. All comments are welcome whether it is positive or negative. Can I please ask that we give everyone a fair chance to speak and one at a time please? I am interested in everyone's opinion and everyone's input is important. No one will be judged on their opinions, views or experiences.

Opening question:

- **Tell us who you are, how long you have been working at this hospital and explain your role in the maternity section you are working in?**

Introduction question:

- **What is your opinion regarding the changes that occurred regarding neonatal resuscitation at this hospital?**

Six strategies were implemented which address key areas where challenges were experienced. These were strategies regarding neonatal resuscitation training, staff resources, equipment and stock, staff attitude, transport and protocols.

Transition question:

- **Which strategies to sustain the quality improvement initiative in neonatal resuscitation worked? (What were the positives?)**
- **Which strategies to sustain a quality improvement initiative did not work? (What were the challenges or negatives?)**

Key questions:

- **Which strategies to sustain a quality improvement initiative in neonatal resuscitation should be continued with?**
 - ✓ *Strategy to address Neonatal resuscitation training*
 - ✓ *Strategy to address challenges regarding staff*
 - ✓ *Strategy to address challenges regarding equipment and stock*
 - ✓ *Strategy regarding staff attitude*
 - ✓ *Strategy regarding transport for transfer of critical ill patients*
 - ✓ *Strategy addressing protocols*

Ending question:

- **What can be done differently?**

Thank you very much for your participation!!

Annexure P: Strategy document

STRATEGIES TO ADDRESS TRAINING IN THE MATERNITY SECTION OF THIS DISTRICT HOSPITAL

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
1. Creating resuscitation training opportunities	To empower staff, new appointees. To reduce mortality and morbidity For staff to have confidence in nursing neonates	In –service training Workshops On the spot teaching Train the trainer (Helping Babies Breathe) Attending PIPP meetings	Monthly On appointment of new staff When necessary	Operational managers RN's Doctors	Performance management (Employees performance) Reductions of morbidity and mortality	June 2014 (September 2014 final evaluation)
2. Placement and orientation of staff	To keep staff motivated To keep staff on board and familiarise them with guidelines	Placement according to need and speciality Through placement and orientation	On appointment	Operational managers RN's Doctors Colleagues	Performance management	6 months after appointment (September 2014 final evaluation)
3. Enforcement and support regarding neonatal resuscitation training	To empower staff. For support For progress and development	Training Drills Mentoring and support Monitoring and evaluation Feedback	Training -monthly Drills monthly Feedback monthly Mentoring and support (continuously) Monitoring and evaluation every three months.	Operational managers Doctors Colleagues	Performance management	After 6 months (September 2014 final evaluation)

STRATEGIES TO ADDRESS EQUIPMENT AND STOCK IN THE MATERNITY SECTION OF THIS DISTRICT HOSPITAL.

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
1. Needs assessment and procurement of equipment	<p>Staff knows what equipment is needed.</p> <p>Improved service delivery</p> <p>Budget for buying new equipment.</p> <p>Good quality equipment to last long and produce good results.</p> <p>Procurement to buy equipment needed</p> <p>For repairing and servicing equipment</p>	<p>Consult with staff</p> <p>Needs assessment and equipment priority list</p> <p>Prioritise purchase and repair of equipment</p> <p>Procurement of good quality equipment</p> <p>Budget for procurement and maintenance of equipment</p> <p>Evaluation of quotes for best equipment from different companies.</p>	Continuously	<p>Operational managers</p> <p>RN's</p> <p>Procurement manager</p> <p>Hospital management</p>	<p>Minutes of equipment meeting</p> <p>Follow-up with procurement</p> <p>Check equipment list for equipment availability</p> <p>Availability of quotations</p> <p>Minutes of budget meeting</p> <p>List of procured equipment, repaired, maintained and condemned.</p>	<p>Biannually</p> <p>when necessary</p>

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
2. In-service training of staff on use of equipment	Staff should be able to use equipment properly in order to get the best results and to prevent damage. For optimal functioning of equipment to provide quality care	In-service training of staff using equipment In-service training on maintenance of equipment (maintenance plan and book) Training and development	In-service training of staff on arrival of new equipment in the unit Continuous education of staff	Training and development department Supplier of equipment Operational managers RN's Colleagues	Confidence of staff in the use and maintenance of equipment. In-service education book Attendance of training registers Equipment having date of last service/maintained or service record.	Continuous (final evaluation September 2014)
3. Equipment control	To control loss To keep track of movement of equipment and equipment available. To replenish used items To be ready for emergencies	Inventory (inventory book) Movement (borrowing book) Daily checks of emergency equipment (box with emergency equipment)	Monthly inventory Borrowing book to be filled when equipment is borrowed by another unit Twice daily checking of emergency equipment (box remains sealed when seal is broken check and replace)	Operational managers RN's	Inventory book up to date Borrowing book complete and follow ups done on equipment. Daily checklist complete Emergency equipment in good working order and available.	Continuous Monthly checks (final evaluation September 2014)

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
4. Maintenance plan regarding servicing of equipment	<ul style="list-style-type: none"> For equipment to be in good working order and condition To be able to replace and condemn irreparable equipment. 	<ul style="list-style-type: none"> Service plan and manual Service, repair and replace broken equipment (Maintenance request book, repair book, condemning book) 	<ul style="list-style-type: none"> Continuously 	<ul style="list-style-type: none"> Operational manager RN's Maintenance department 	<ul style="list-style-type: none"> Proper functioning and fully maintained equipment in the unit. No broken equipment in the unit or in the condemning book Broken equipment repaired and maintained. 	Every three months (final evaluation September 2014)
5. Stock control	<ul style="list-style-type: none"> To have enough stock To prevent wastage of stock like near expiring of medication or redundant stock or equipment To order stock for the right purpose. 	<ul style="list-style-type: none"> Back up stock Give away stock Needs assessment and prioritizing of stock. Write VA2 to the supplier e.g. pharmacy to redistribute medication Stock taking to see utilisation of stock 	<ul style="list-style-type: none"> Weekly 	<ul style="list-style-type: none"> Operational managers RN's ?? stock controller 	<ul style="list-style-type: none"> No stock outs No emergency orders made No overstocking done No wastage of expired stock. 	Monthly (final evaluation September 2014)

STRATEGIES TO ADDRESS STAFF ATTITUDE IN THE MATERNITY SECTION OF THIS DISTRICT HOSPITAL.

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
1. Task team to address staff attitude 1.1. Goal of the task team 1.2. Who will be part of the task team	To address attitude of staff towards patients, work and amongst each other To help them deal with patients in a humane manner To increase confidence of staff in their abilities.	Teaching Batho Pele principles to the staff and implementing it. Through customer care training Patient satisfaction plus employee of the month certificate/incentive	Monthly	Hospital task team Operational manager Saving babies research steering committee	Client satisfaction surveys Less complaints More staff complemented by patients and relatives	June 2014 Final evaluation September 2014
2. Staff support regarding staff attitude 2.1. Communication 2.1.1. Mechanisms of communication 2.1.2. Climate meetings 2.1.3. Meetings between staff and management 2.1.4. Feedback 2.1.5. Identify gaps in communication	To address issues of concern and problems encountered To correct and support each other To get to know your colleague To promote teamwork and meet objectives of the unit and maternity department	Communication book Ward meetings Memos Circulars Policies and standards Workshops In-service training	Monthly Continuous if the need arise Debriefing when needed after neonatal or maternal death	Operational managers Management All categories of staff Doctors HRD OHN EAP/EWP	Minutes of meetings filed Circulars read and signed by staff Attendance registers Motivated and happy self-confident staff Performance of staff	Continuously Quarterly Final evaluation September 2014

<p>2.2. Training</p> <p>2.2.1. <i>Recognition and incentives</i></p> <ul style="list-style-type: none"> • Motivation to go for training example recognition and incentives. <p>2.3. Support systems</p> <p>2.3.1. <i>Debriefing</i></p> <p>2.3.2. <i>Support from management and addressing concerns</i></p> <ul style="list-style-type: none"> • Example staff allocated according to acuity. <p>2.3.3. <i>Mentoring and coaching</i></p> <p>2.3.4. <i>Teambuilding and teamwork</i></p>	<p>To get the best out of the staff</p> <p>To motivate staff</p> <p>To promote empowerment of staff and confidence of staff in their nursing care abilities</p> <p>To offer emotional support to staff</p> <p>To reflect on past mistakes and find ways to prevent the same mistakes in the future.</p> <p>To support staff and teach them coping mechanisms.</p> <p>To create a conducive atmosphere for positive thinking and happiness.</p>	<p>Conference/seminars</p> <p>Psychologist</p> <p>Debriefing</p> <p>Delegation</p> <p>PMDS</p>			<p>Performance management</p> <p>Personal that is not burned out</p> <p>Improved teamwork</p> <p>Personal have developed coping mechanisms</p> <p>PMDS</p>	
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Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
3. Professional conduct 3.1. Code of conduct 3.2. Batho Phele principles 3.3. Customer care 3.4. Confidence (knowledge and skills)	To promote professionalism For customer care To evaluate quality care given to patients To increase confidence of staff in their nursing care abilities	Adherence to code of conduct SANC & PSA Batho Pele principles	Continuous	Operational managers RN's EN's ENA's	Professional and self-confident staff Few complaints by customers	Quarterly Final evaluation September 2014

STRATEGIES TO ADDRESS SHORTAGE OF STAFF IN THE MATERNITY SECTION OF THIS DISTRICT HOSPITAL.

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
1. Ensure optimal functioning of available staff	To render quality care To cover the ward To shorten length of stay??? For effective utilisation of staff To cover shortage of staff	Utilizing staff effectively and optimally - through delegation and off duties, leave plan Placement according to interest and skill Introduce overtime system	Daily	Operational managers Nursing service manager RN's	Enough staff to render quality care to the patients To complete tasks in time	Monthly
2. Retention strategy	To prevent staff turn over To have the same people you have trained and to develop loyalty To establish and understand reasons for exiting the service To retain and motivate staff To develop staff	Retention plan Exit interviews – one to one interviews Incentives/reward committed staff (performance management) – recognise good performers PMDS Support professional growth-through training and development Strategic planning	Annually Exit interviews to be held with each resignation	Operational manager Nursing service manager	Low staff turnover Rewards and incentives given to top performing staff. Workshop and training attendance	Monthly Final evaluation September 2014

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
3. Budget for staff	<p>For appointing staff according to the needs of the maternity section</p> <p>Decreased staff shortage</p> <p>For improved continuity of care</p> <p>Planning for overtime to decrease staff shortage</p> <p>To motivate staff and boost their moral</p>	<p>Permanent post</p> <p>Temporary post</p> <p>Overtime</p> <p>Incentives</p> <p>Annual budget and planning for staff needed</p>	Continuously	<p>Operational managers</p> <p>Finance department</p> <p>Management</p> <p>Human resources</p>	<p>Filling vacant posts</p> <p>Decreased shortage of staff</p> <p>Performance management and development system and awards.</p>	<p>Every two months</p> <p>Final evaluation</p> <p>September 2014</p>
4. Recruitment of staff	<p>To render quality care.</p> <p>Efficient and effective utilisation of staff</p> <p>To fill vacant posts with staff that has the required qualifications and can add to the knowledge and skill pool of the unit</p>	<p>Needs assessment according to workload indicators</p> <p>Staff planning according to identified needs</p> <p>Advertise to recruit new staff (example colleges) – walk ins, headhunting and internal advertisement</p> <p>Faster process for recruitment</p>	When post needs to be filled	<p>Human resources</p> <p>Finance</p> <p>Management</p>	<p>Quality care rendered</p> <p>Decreased shortage of staff</p> <p>Vacant posts are filled</p> <p>Planned services are rendered as needed.</p>	<p>Quarterly</p> <p>Final evaluation</p> <p>September 2014</p>

STRATEGIES TO ADDRESS TRANSPORT FOR TRANSFER OF PATIENTS TO AND FROM THE MATERNITY SECTION OF THIS DISTRICT HOSPITAL.

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
1. Task team addressing challenges regarding transport management and Emergency staff)	To address issues and challenges relating to emergency services and the provision of transport for patients to other facilities Decreased neonatal mortality due to challenges experienced with transfer of patients to other facilities.	Meetings to address issues and challenges	Monthly	Gauteng EMS Hospital management Operational managers of the NICU and labour ward Paediatrician/doctors	Issues of concern addressed and smooth operations of the EMS. Available transport Decreased neonatal mortality due to challenges related to transfer of patients.	End of June 2014 Final evaluation September 2014
2. Availability of equipped transport and competent EMS staff	EMS team should be able to render quality and sufficient care to the patient being transferred according to the patient's needs. EMS service should have sufficient and fully functional equipment to provide in the needs of the patient For save transfer of patients	Ambulance or alternative (car/private ambulance) Dedicated transport for maternal and neonatal emergencies. Appropriate and adequate equipment on ambulances Trained EMS staff	Monthly	EMS management Hospital management Operational managers of the NICU and labour ward Paediatrician/doctors	Less incident reports Statistics of referrals	End of June Monthly evaluation Final evaluation September 2014

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
3. Communication regarding transport	<p>For improved communication between the referring hospital and the EMS service</p> <p>Smooth operation of EMS</p> <p>Availability of the appropriate equipment and staff in order to render quality care of the patient being transferred</p> <p>Improved response time</p>	<p>Arrangement of transport (checklist)</p> <p>Follow-up</p> <p>Recordkeeping</p> <p>Statistics</p> <p>Incident reports</p>	Monthly	<p>EMS management</p> <p>Hospital management</p> <p>Operational managers of the NICU and labour ward</p> <p>Paediatrician/doctors</p> <p>RN's</p>	<p>Improved communication regarding transport</p> <p>Less incident reports</p>	<p>Every three months</p> <p>Final evaluation September 2014</p>

STRATEGIES TO ADDRESS PROTOCOLS IN THE MATERNITY SECTION OF THIS DISTRICT HOSPITAL

Strategy	Why?	How?	How often?	Who is responsible?	Monitoring and evaluation	By When?
1. Task team addressing protocols	<p>For evidence based practise</p> <p>To ensure utilisation of the protocols</p> <p>To ensure that objectives are met</p> <p>For easy understanding and reference</p> <p>To improve the quality of care</p>	<p>Revise protocols (review and update protocols)</p> <p>Oversee implementation and adherence -audits</p> <p>Ensure comprehensiveness, transparency and user friendliness of protocols – flow charts</p>	Continuously	<p>Nursing service manager</p> <p>Doctors</p> <p>Operational managers</p> <p>RN's</p> <p>All nursing staff</p>	<p>Auditing</p> <p>Protocols and flow charts will be available seen and displayed</p>	<p>Final evaluation</p> <p>September 2014</p>
2. Awareness of protocols	<p>To ensure utilisation of the protocols</p>	<p>Visible copies signed and understood</p>	Continuously	<p>Nursing service manager</p> <p>Doctors</p> <p>Operational managers</p> <p>RN's</p> <p>All nursing staff</p>	<p>Auditing</p> <p>Protocols and flow charts will be available seen and displayed</p>	<p>Final evaluation</p> <p>September 2014</p>

Annexure Q: Master Score system



Choose the **factor level** that comes closest to your situation and tick the area to the left of it

Factor description	Identify (✓)	Factor level
<p>Benefits beyond helping patients</p> <ul style="list-style-type: none"> In addition to helping patients, are there other benefits? Does the change reduce waste, duplication and added effort? Will it make things run more smoothly? Will staff notice a difference in their daily working lives? 	<input type="radio"/>	<p>The change improves efficiency and makes jobs easier</p> <p>The change improves efficiency but does not make jobs easier</p> <p>The change does not improve efficiency but does make jobs easier</p> <p>The change neither improves efficiency nor makes jobs easier</p>
<p>Credibility of the evidence</p> <ul style="list-style-type: none"> Are benefits to patients, staff and the organisation visible? Do staff believe in the benefits? Can all staff describe the benefits clearly? Is there evidence that this type of change has been achieved elsewhere? 	<input type="radio"/>	<p>Benefits of the change are immediately obvious, supported by evidence and believed by stakeholders</p> <p>Benefits of the change are not immediately obvious, even though they are supported by evidence and believed by stakeholders</p> <p>Benefits of the change are not immediately obvious, even though they are supported by evidence. They are not believed by stakeholders</p> <p>Benefits of the change are neither immediately obvious, supported by evidence nor believed by stakeholders</p>
<p>Adaptability of improved process</p> <ul style="list-style-type: none"> Can the process overcome internal pressures and continually improve? Does the change continue to meet ongoing needs effectively? Does the change rely on an individual or group of people, technology, finance etc to keep it going? Can it keep going when these are removed? 	<input type="radio"/>	<p>The process can be adapted to other organisational changes and there is a system for continually improving the process</p> <p>The process can be adapted to other organisational changes but there is no system for continually improving the process</p> <p>The process is not able to adapt to other organisational changes but there is a system for continually improving the process</p> <p>The process is not able to adapt to other organisational changes and there is no system for continually improving the process</p>
<p>Effectiveness of the system to monitor progress</p> <ul style="list-style-type: none"> Does the change require special monitoring systems to identify improvement? Is this data already collected and is it easily accessible? Is there a feedback system to reinforce benefits and progress and initiate action? Are the results of the change communicated to patients, staff, the organisation and the wider NHS? 	<input type="radio"/>	<p>There is a system in place to identify evidence of progress, monitor progress, act on it and communicate results.</p> <p>There is a system in place to identify evidence of progress and act on it, but the results are not communicated</p> <p>There is a system in place to identify evidence and monitor progress. The results are communicated but no one acts on them</p> <p>There is no system in place to identify evidence of progress or to monitor progress nor act on it or communicate it</p>
<p>📍 Identify your factor level score by going to the Process master score system at the back of this document</p>		
Process total score		Date: _____



Sustainability



Staff

Choose the **factor level** that comes closest to your situation and tick the area to the left of it

Factor description	Identify (✓)	Factor level
<p>Staff involvement and training to sustain the process</p> <ul style="list-style-type: none"> Do staff play a part in innovation, design and implementation of change? Have they used their ideas to inform the change process from the very beginning? Is there a training and development infrastructure to identify gaps in skills and knowledge and are staff educated and trained to take change forward? 		<p>Staff have been involved from the beginning of the change and adequately trained to sustain the improved process</p> <p>Staff have been involved from the beginning of the change but not adequately trained to sustain the improved process</p> <p>Staff have not been involved from the beginning of the change but they have been adequately trained to sustain the improved process</p> <p>Staff have neither been involved from the beginning nor adequately trained to sustain the improved process</p>
<p>Staff behaviours toward sustaining the change</p> <ul style="list-style-type: none"> Are staff encouraged and able to express their ideas and is their input taken on board? Are staff able to run small-scale tests, e.g. Plan, Do, Study, Act, (PDSA cycles) based on their ideas, to see if additional improvements should be recommended? Do staff think that the change is a better way of doing things that they want to preserve for the future? 		<p>Staff feel empowered as part of the change process and believe the improvement will be sustained</p> <p>Staff feel empowered as part of the change process but don't believe the improvement will be sustained</p> <p>Staff don't feel empowered by the change process but believe the improvement will be sustained</p> <p>Staff don't feel empowered by the change process or believe the improvement will be sustained</p>
<p>Senior leadership engagement</p> <ul style="list-style-type: none"> Are the senior leaders trustworthy, influential, respected and believable? Are they involved in the initiative, do they understand it and do they promote it? Are they respected by their peers and can they influence others to get on board? Are they taking personal responsibility and giving time to help ensure the change is sustained? 		<p>Organisational leaders take responsibility for efforts to sustain the change process. Staff generally share information with, and actively seek advice from, the leader.</p> <p>Organisational leaders don't take responsibility for efforts to sustain the change process. Staff generally share information with, and seek advice from, the leader</p> <p>Organisational leaders take responsibility for efforts to sustain the change process. Staff typically don't share information with, or seek advice from, the leader</p> <p>Organisational leaders don't take responsibility for efforts to sustain the change process. Staff typically do not share information with, or seek advice from, the leader</p>
<p>Clinical leadership engagement</p> <ul style="list-style-type: none"> Are the clinical leaders trustworthy, influential, respected and believable? Are they involved in the initiative, do they understand it and do they promote it? Are they respected by their peers and can they influence others to get on board? Are they taking personal responsibility and giving time to help ensure the change is sustained? 		<p>Clinical leaders take responsibility for efforts to sustain the change process. Staff generally share information with, and actively seek advice from, the leader</p> <p>Clinical leaders don't take responsibility for efforts to sustain the change process. Staff generally share information with, and actively seek advice from, the leader</p> <p>Clinical leaders take responsibility for the efforts to sustain the change process. Staff typically do not share information with, or actively seek advice from, the leader</p> <p>Clinical leaders don't take responsibility for efforts to sustain the change process. Staff typically do not share information with, or actively seek advice from, the leader</p>
<p>Identify your factor level score by going to the Staff master score system at the back of this document</p>		<p>Date:</p>
<p>Staff total score</p>		





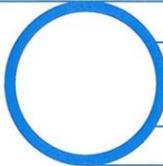
Organisation

Choose the **factor level** that comes closest to your situation and tick the area to the left of it

Factor description	Identify (✓)	Factor level
--------------------	--------------	--------------

Fit with the organisation's strategic aims and culture

- Has the organisation successfully sustained improvement in the past?
- Are the goals of the change clear and shared?
- Is the improvement aligned with the organisation's strategic aims and direction?
- Is it contributing to the overall organisational aims.
- Is change important to the organisation and its leadership?
- Does your organisation have a 'can do' culture?



There is a history of successful sustainability and improvement goals are consistent with the organisation's strategic aims

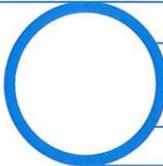
There is a history of successful sustainability but the improvement and organisations strategic aims are inconsistent

There is no history of successful sustainability but the improvement goals are consistent with the organisation's strategic aims

There is no history of successful sustainability and the improvement goals are inconsistent with the organisation's strategic aims

Infrastructure for sustainability

- Are there enough staff who are trained and able to work in the new way?
- Are there enough facilities and equipment to support the new process?
- Are new requirements built into job descriptions?
- Are there policies and procedures supporting the new way of working?
- Is there a communication system in place?



Staff, facilities and equipment, job descriptions, policies, procedures and communication systems are appropriate for sustaining the improved process

There is an appropriate level of staff, facilities and equipment, but inadequate job descriptions, policies, procedures and communication systems for sustaining the change

The levels of staff, facilities and equipment to sustain the change are not appropriate although job descriptions, policies, procedures and communication systems are adequate

The staff, facilities and equipment, job descriptions, policies and procedures and communication systems are all not appropriate for sustaining the change

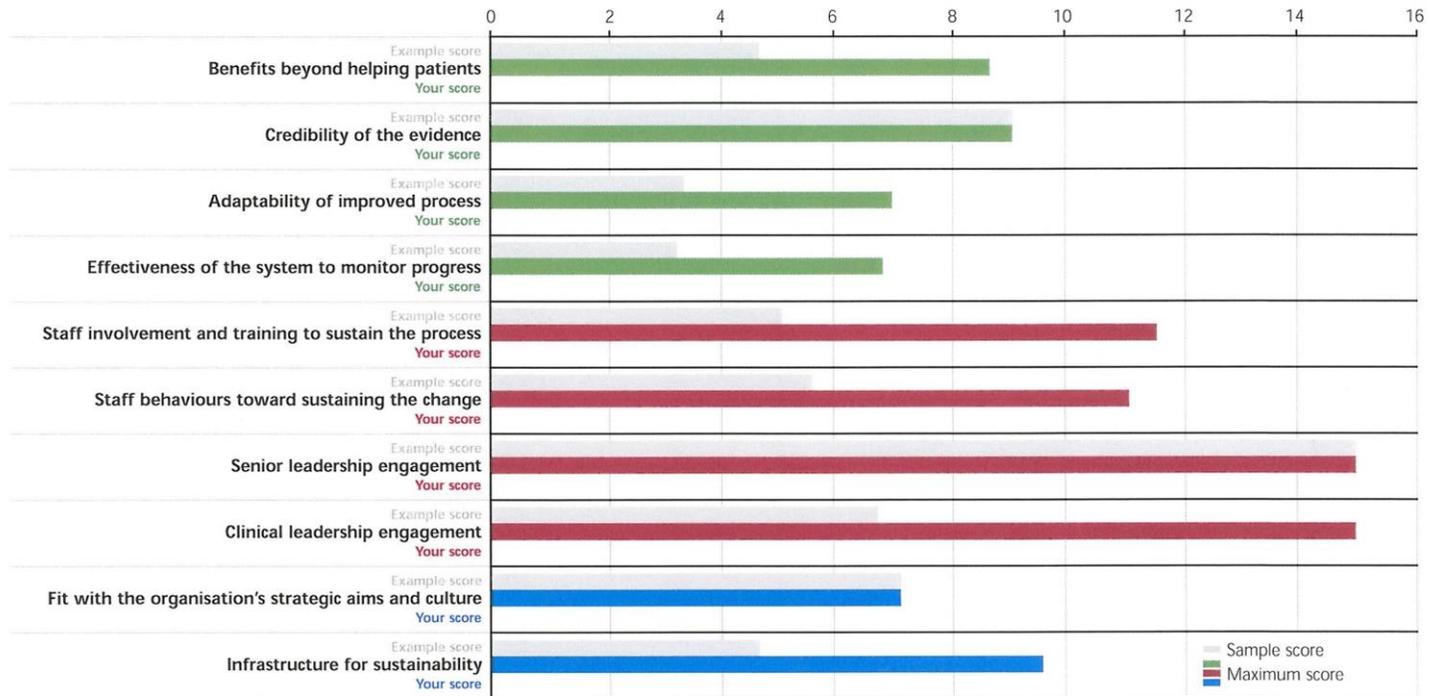
Identify your factor level score by going to the Organisation master score system at the back of this document

Organisation total score	
+	
Staff total score	
+	
Process total score	
=	
Sustainability total score	Date: _____

To calculate your score, use the master score system at the back of this document
Add the **Process**, **Staff** and **Organisation** scores together and place in the **Sustainability total score** box above.
Now go to the bar chart and portal diagram provided at the back of this document and plot your scores.



Score system portal diagram



Annexure R: Paper trail for nominal group technique discussion

Priorities for strategies to be addressed

1. ① Training. ✓ 5 2 1 1 1 1 2 1 2 (6)
2. ② Lack of maintenance of equipm. 2 3 2 2 2 3 5 1 2 4 (5)
3. ③ Staff attitude. 6 4 6 7 7 5 3 3 3
3. ⑤ Delay in transport 6
4. ④ Shortages of staff resources 1 6 5 5 5 4 7 4 4 3
5. ⑥ Protocols 3 5 4 4 3 2 2 5 5 5 (8)
6. Staff attitude 3 4 1 3 3 4 6 7 6 1 (8)
7. Culture of the organisation 7 7 7 6 6 7 4 6 7 7 (6)

Blue: from previous page
 Green: no. of votes.
 Red: Votes
 Black: final vote of priorities.

How can training be addressed?

Training

1. In-service training 211213111 1
- ↳ (on the spot) teaching ↳ Refresher courses
- In-house training.
2. Monitoring & evaluation 3434 36775 3
3. Mentoring + support 45332655 3
- ↳ Results training (in-house or outside)
4. Train the trainer 522544434 4
- ↳ Workshops
5. Orientation of new staff 135121226 2
6. Feedback on update 546467582 6
7. Drills 777656777 7
8. Staff rotation 88888868 8

- 1. In-Service training
- 2. Orientation of new staff
- 3. Mentoring + support
- 4. Train the trainer
- 5. Monitoring + evaluation
- 6. Feedback + updates
- 7. Drills
- 8. Staff Orientation.

Green: from previous page
Red: Notes
Blue: Priorities

Scanned by CamScanner

How can problems with equipment ^{and stock} be addressed?

1. Maintenance plan 14144444584 (4)
2. Daily checking 4341323333 (3)
3. In-Service Staff 2222232222 (2)
4. Determine the needs 3133111111 (1)
5. Give away stock 6666666666 (6)
6. Back up stock 555555545 (5)

Red: Clusters from previous page.
 Blue: Voting
 Green: Priorities

1. Determine the needs
2. In-service training of staff
3. Daily checking of equipment
4. Maintenance plan
5. Give away stock
6. Back up stock.

How can shortages of staff be addressed?

1. Hire Staff. 3886747668 ⑦
2. Promote prof. growth 54373853374 ③
3. Budget 265455545 ⑤
4. Retention strategy 6214
3424423
5. Placement acc. to skill + etc. 2
734
228
223 ②
6. Advertise to recruit 476563675
6 ⑥
7. Incentives 8578888887 ⑧
8. Utilize available staff. 1121111111 ①

Black: From previous page

Red: Vote

Green: Priorities

1. Utilize available staff.
2. Placement according to skill + interest
3. Promote professional growth
4. Retention strategy
5. Budget
6. Advertise to recruit
7. Incentives Hire staff.
8. Incentives

Scanned by CamScanner

How can problems with transport be addressed?

1. EMS car/alternative 222122222
Ambulance for babies and preg ②

② Task Team - meetings etc. 111311111 ①

③ Inform → follow up comm ③ 4444343
333

④ Amb. → qual staff + equipm. ④ 44 33324344

⑤ Keeping stats 555555555 ⑤

1. Green: from previous page

2. Blue: Vote

3. Red: Priorities

① Task Team

② EMS/Alternative Ambulance (pregnancy + babies)

③ Inform and follow up + communication

④ Qualified staff + equipment on ambulance.

⑤ Keeping stats.

How can hospital protocol be changed to benefit quality care regarding neonatal resuscitation..

1. Task team for formulation of protocols
(revised, address grey areas, implementation, adherence + transparency)
2. Awareness of protocols (visible copies)
(signed + understood)
3. User-friendly (

Find national std protocols
 - simplified
 - Visible, summarized copies in ward
 - Review regularly
 - Emphasis on coding of challenging pathology

1. Protocols should be available
 2. Placed where + displayed in easy access
 3. User friendly
 4.

Formulation & Review
 - Formulation & Review
 - Each Dept should have access to a ward protocol representative of all things
 - Visible to everybody

National guidelines
 Visible summarized in ward copies
 - Revision & regular updates

1. Task team to make a protocol
 2. Address grey areas
 3. User friendly

Formulation & Review
 - Formulation & Review
 - Implementation of program
 - User Friendly

Protocols to be followed according to be revised
 - Be visible
 - Be signed
 - Be reviewed regularly
 - Be reviewed jointly

Formulation of protocol
 - Awareness & signed by Implementation & Adherence
 - Displayed & Signed
 - Reviewed & Signed

4. How protocols should challenge for every 1st formulator
 - Be regularly updated & reviewed
 - Be reviewed in Res course

Annexure S: Professional editors letter

Suzette M. Swart

FULL MEMBER: Professional Editors' Group

15 April 2015

TO WHOM IT MAY CONCERN

I, Suzette Marié Swart (ID 5211190101087), confirm that I have edited the noted PhD research thesis. The accuracy of the final work is still the student's own responsibility.

STUDENT:

Ms CARLIEN VAN HEERDEN

TITLE:

STRATEGIES TO SUSTAIN A QUALITY IMPROVEMENT INITIATIVE IN NEONATAL RESUSCITATION IN A DISTRICT HOSPITAL IN GAUTENG

The edit included the following:

- Spelling
- Vocabulary
- Punctuation
- Grammar (tenses; pronoun matches; word choice etc.)
- Consistency in terminology, italisation etc.
- Sentence construction
- Suggestions for text with unclear meaning
- Logic, relevance, clarity, consistency
- Checking reference list against in-text sources

Thank you

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