A Competency-Based Curriculum Framework to Standardise Genetics Education in an Advanced Midwifery Programme

A Dissertation Submitted to the

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ABSTRACT

Title: A Competency-Based Curriculum Framework to Standardise Genetics Education in an Advanced Midwifery Programme

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Education in genetics empowers health care professionals to be able to differentiate between hereditary genetic components of diseases. Knowledge, skills and competence in genetics are required among nurses and advanced midwives because of profound implications of the field on the health of society and its influence that prevails throughout human lifespan commencing before pregnancy through to old age. However, genetics content in most nursing curricula remains underrated. Further genetics competencies by the year 2012 were developed in only three countries despite a call that was made over five decade ago to adequately include genetics in nursing curricula.

The purpose of this study was to develop a competency-based curriculum framework to standardise genetics education in an advanced midwifery programme. The framework could be used as an innovation that assists in the integration of sufficient genetics in an advanced midwifery programme. This study used sequential explanatory mixed methods design in phase one, firstly a survey of current genetics education, and secondly to obtain perceptions of educators regarding a competency-based curriculum framework to standardise genetics education for the advanced midwifery programme. Quantitative data were collected from 32 educators of the advanced midwifery and data was analysed through the descriptive analysis. Qualitative data were collected by means of focus group discussions and in-depth interviews employing individual face-to-face and one-on-one telephone interviews with 19 participants. Thematic analysis, according to Braun and Clarke, was used to examine the data.

Phase one findings show a random genetics education in the advanced midwifery programmes. Genetics outcomes are not planned and learners exit the programme with inadequate genetics knowledge, skills and competencies. Genetics content and teaching times vary greatly with a complete lack of assessment criteria for genetics education in almost all nursing schools. Educators in the programme do not attend any in-service education on genetics and their genetics knowledge is deeply insufficient. Other health problems, such as human immune-deficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), are afforded priority attention over genetics in the nursing curricula. Lastly, a lack of a curriculum framework to standardise genetics education in the advanced midwifery programmes was hailed to be the main identified challenge.

In phase two, a stakeholder workshop with 17 participants was held to present phase one results followed by two nominal group technique meetings. The purpose of the two meetings was to identify and reach consensus on needed genetic competencies as the third study objective was addressed. In order to address the final research objective, a curriculum framework that could standardise genetics education in the advanced midwifery programme was developed. Dimensions for curriculum framework according to Lee, Steketee, Rogers and Moran 2013 underpinned the development. Further research should survey other nursing programmes to assess inclusion of genetics.

Keywords: Nursing, advanced midwifery programme, genetics, genomics and curricular

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ACCRONYMS

AIDS	Acquired immune-deficiency syndrome
ANA	America Nurses Association
BCUR	Bachelorettes Curationis
CHE	Council for Higher Education
DNA	Deoxyribonucleic Acid
FUNDISA	Forum of University Nursing Deans of South Africa
HET	Higher Education and Training
HGP	Human Genome Project
HIV	Human immune-deficiency virus
IMCI	Integrated management of childhood illnesses
ISONG	International Society for Nurses in Genetics
MCWH	Maternal, Child, Women's Health and Nutrition
MCUR	Master Curationis
NEI	Nursing Education Institution
NDoH	National Department of Health
PHC	Primary Health Care
PMTCT	Prevention of mother to child transmission
RSVP	To respond to an invitation
SANC	South African Nursing Council
SAQA	South African Qualification Authority
UK	United Kingdom
US	United States of America
WHO	World Health Organisation

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CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Education in genetics empowers health care professionals to be able to differentiate between the hereditary genetic components of diseases (Canadian Nurses Association 2005:2). Knowledge, skills and competence in genetics are desirable among nurses and advanced midwives because of its profound implications in the field on the health of society and the influence it has that prevails throughout the human lifespan commencing before pregnancy through to old age (Lashley 2007:4; Burke and Kirk 2006:228). This requires genetics to be an integral part in the training of all professional registered nurses and midwives including advanced midwives. Genetics knowledge, skills and competence changes the manner in which assessment, diagnosis and treatment of certain conditions are performed.

Genetics is the science of single human biological variations in relation to human health and disease (Stevenson and Waite 2011:593; Connor and Ferguson-Smith 1997:1). Genomics is the study of all genes in the human genome and their interactions with the environment and other psychosocial and cultural influences (Williams, Prows, Conley, Eggert, Kirk and Nicol 2011:50). Nurses and advanced midwives require genetics knowledge, skills and competence to be able to assess and provide accurate diagnosis and interventions in their daily practice during interaction with clients and patients across their lifespan. However, literature reflects that nurses have limited genetics knowledge and skills; that is why Lea, Williams, Cooksey, Flanagan, Forte and Blitzer (2006:

218) were of the view that much was desired to ensure that all nurses were empowered with genetics knowledge, skills and competence.

Competence is a specific knowledge, skill judgement and personal attributes required for a person with advanced education to practice safely and ethically in clinical settings (Canadian Nurses Association 2008:21). Competence is also understood to be a noticeable, quantifiable, performance-based product that reflects achievement of a particular knowledge component and application of a psychomotor skill on the part of a learner (Greco, Tinley and Seibert 2012:4). Genetics education in nursing across many countries is a challenge because, according to Godino and Skirton (2012:174), only three countries in the world have developed genetic competencies in nursing and South Africa is not one of those. This indicates that many nursing education systems globally lag behind with regard to adequate teaching of genetics as competencies in the field are absent.

A need for genetic competencies in an advanced midwifery programme was the researcher's interest so that apparent, calculable performance-based outcomes are attained at the end of training. This could enhance advanced midwives' knowledge, skills and competence in screening, preventing, diagnosing and intervening in their clinical practice. Genetics knowledge and competence is required of all nurses, midwives and advanced midwives because, according to Jenkins and Calzone (2007:10) and Greco, et al (2012:4) all diseases and conditions have a genetic component. Nursing education systems remain responsible to ensure that nurses and midwives are empowered with adequate genetics knowledge to be able to provide holistic care desired by patients and clients in clinical and primary health care (PHC) settings.

A situational analysis to assess the current state of genetic education among educators in advanced midwifery programmes at nursing

education institutions (NEIs) (colleges and universities) in South Africa was essential to evaluate the level of genetics education in the country. The evaluation was executed because, according to Godino and Skirton (2012:174), there is some presence of genetic education in the nursing curricula in South Africa.

It was deemed important to determine the current educational practices in advanced midwifery programmes regarding genetics by means of a situational analysis conducted in NEIs among educators. The development of a competency-based curriculum framework to standardise genetics education for the advanced midwifery programmes was necessary.

1.2 PROBLEM STATEMENT

Genetics nursing competencies are only available in three countries namely Italy, the United Kingdom and the United States of America (Godino and Skirton 2012:174). The aforementioned authors surveyed ten international countries including South Africa and findings showed that only three countries mentioned earlier had developed genetics competencies in nursing. The appropriate accommodation of genetics in the nursing curricula for South Africa is estimated to take up to few years (+ or – 2). This argument is based on conclusions on the opinions of nursing leaders in genetics education (Godino and Skirton 2012:174). Based on the lack of a competency-based curriculum framework for genetic education at NEIs in South Africa, it could take even longer. The basis for this fact is that there are limited indications regarding how South African NEIs are addressing adequate accommodation of genetics.

The South African Human Genetics Policy Guidelines (2001:29) stipulate that genetics is a component of the nursing curriculum, however, teaching of genetics differs among NEIs and depends on availability of knowledgeable educators in nursing colleges. The Policy Guidelines show

that there are imbalances among NEIs regarding the teaching of genetics in the country. It is the role of NEIs to provide sufficiently trained professionals with knowledge, skills and competence available at the end of each training programme. It is reported in Bloland, Simone, Burkholder, Slutsker and De Cock (2012:4) that "…programs that specifically aim to improve the knowledge, skills, and effectiveness of those already within government service (i.e., "in-service" programmes) are critical to ensure short- to mid-term impact." In-service programmes are important but the differences stated by the South African Human Genetics Policy Guidelines are a worrying factor, which is why assessment of the current genetics education situation among NEIs in the country was pertinent.

It is not clear if any process is being followed to develop genetics competencies required by advanced nursing practitioners in South Africa. Further there are limited nursing studies in that field and there is scarcity of a competency-based curriculum framework to be used for identification of current genetics education in the country. According to Prows, Glass, Nicol, Skirton and Williams (2005:197) a need to increase genetics content in the curricula of nursing schools in South Africa was raised but since then there has been limited evidence suggesting that nursing schools have responded or are responding to that call (which was a recommendation from a research study done by Nicol, the third of the aforementioned authors).

Macro-curriculum designers for the South African Nursing Council (SANC) describe the courses that make up the curriculum in the form of course outlines or guides, including clinical learning experiences in programmes (Bruce, Klopper and Mellish 2011:185). The aforementioned authors further pointed out that clinical learning should follow prescriptions of the professional regulatory body as these are requisites for professional

competency. Currently theoretical and practical education for genetics teaching in advanced midwifery programmes lack clarity. It is against this background that a competency-based curriculum framework to standardise genetics education for the advanced midwifery programme was conceived. The purpose of developing the curriculum framework was perceived to be a guide that could be used to ensure sufficient genetics education in the advanced midwifery programme.

1.3 SIGNIFICANCE OF THE STUDY

The completion of the Human Genome Project (HGP) in 2003 brought about recognition of genetic contributions to the burden of diseases. Realisation that almost all diseases have a genetic basis compels health care professionals, including nurses, to have a mind-shift moving from the status quo of ignoring the role of genetic predisposition as a contributory factor to causes of diseases. Accordingly all health care professionals require skills and competencies in foretelling, handling and determining certain genetic conditions.

The pledge of nursing education is to produce cadres of nurses that are sufficiently empowered in all aspects including skills and competencies in genetics knowledge. This pledge remains unachieved due to the fact that sufficient genetics education finds limited recognition in most nursing curricula including in South Africa. According to Godino and Skirton (2012:174), genetics competencies are essential components of practice for all registered nurses. In order to empower nurses with adequate genetics knowledge, a curriculum framework that standardises genetics education could assist NEIs if it is implemented. Therefore nurses could be able to predict and determine certain genetic conditions as genetics competencies and skills are employed in clinical practice.

A competency-based curriculum framework that could standardise genetics education might provide an explicit and context-based curricular guide. Consequently the developed framework could add to the science of nursing as enhancement and advancement regarding sufficient genetics could lead result in competencies and skills among learners if implemented. Furthermore measurement of the attainment of genetics competencies and skills at the end of training in advanced midwifery could be comprehended. Upon programme completion graduates could provide holistic care inclusive of genetics services in clinical and PHC settings.

1.4 AIM, OBJECTIVES AND QUESTIONS

1.4.1 Aim of the study

The aim of the study was to develop a competency-based curriculum framework to standardise genetics education for an advanced midwifery programme. A situational analysis, using mixed methods (quantitative and qualitative) design, was employed to determine the current theoretical and practical situation regarding genetics education in an advanced midwifery programme. Further, to obtain opinions of educators in the advanced midwifery programmes regarding a competency-based curriculum framework to standardise genetics education.

1.4.2 Research objectives

The objectives of this study were to:

- Determine the current theoretical and practical genetics education status in advanced midwifery programmes at nursing schools in South Africa.
- Explore and describe perceptions of advanced midwifery educators regarding a competency-based curriculum framework that

standardises genetics education in the advanced midwifery programmes.

- Identify genetic competencies necessary for inclusion in a competency-based curriculum framework that standardises genetics education for an advanced midwifery programme, and finally
- Develop a competency-based curriculum framework that standardises genetic education in an advanced midwifery programme.

1.4.3 Research questions

There were four research questions at which the thesis was directed for answering namely:

- What is the status of the current theoretical and practical genetics education in the advanced midwifery programme at nursing schools in South Africa?
- What are the perceptions of advanced midwifery educators regarding a competency-based curriculum framework that standardises genetics education in the advanced midwifery programme?
- What genetics competencies are necessary for inclusion in a competency-based curriculum framework that standardises genetics education for the advanced midwifery programme?, and finally
- How could the competency-based curriculum framework that standardises genetics education in the advanced midwifery programmes be developed?

1.5. PARADIGMATIC APPROACH

Paradigmatic approach is described as a way of thinking about and making sense of complexities of the world and it helps to sharpen and

guide the focus of the researcher on an interesting phenomenon (Tashakkori and Teddlie 2010:112; Polit and Beck 2004:17; Polit and Beck 2008:12). Thinking patterns advances throughout a person's life. Interaction with others in the environment is an on-going process during which socialisation takes place (Hart 2010:2).

Paradigms are not true or false statements and paradigms make certain assumptions about the nature of social reality and offer a different way of looking at human social life (Babbie 2004:35). Further paradigms are belief systems that are a reflection of and guide the decisions of the researcher (Armitage 2007:2). Paradigm philosophy encompasses all of the research methods including actions (Creswell and Plano Clark 2011). In this study, the researcher used pragmatic assumptions because different research methods were applied. The researcher used quantitative and qualitative designs and a workshop using nominal group techniques as she assumed that all were necessary in this study to answer the posed research questions. The assumptions were carried out logically following pragmatic paradigm perspectives to develop competencies in this study.

1.6 PHILOSOPHICAL ASSUMPTIONS

Pragmatism philosophy points out that our beliefs are rules for actions and that the researcher has to determine what conduct is capable of producing actions (Kincaid 2006:13). Actions have interests in what is (current) and what might be (future) and those actions are a way to change current existence (Goldkuhl 2004:1). Pragmatism's view "approaches all theoretical and philosophical problems as problems that in final analysis are related to actions." (Kilpinen 2008:1). Pragmatists use what works as it is not restricted to any philosophy (Goldkuhl 2004: 2).

Pragmatism further attracts several notions, because various applicable and useful methods are employed with an appreciation of "both objective and subjective knowledge." (Creswell and Plano Clark 2011:43). The aforementioned authors are of the view that numerical and in-depth data could be collected respectively to bring about information. Pragmatist researcher has an interest in what difference the information does have in practice because pragmatism is interested in change (Goldkuhl 2004: 8). The researcher assumed that information could be obtained through different research methods if well applied in a study, also that new information could bring about change and improvement in nursing education and practice. The quantitative and qualitative research designs were employed in phase one of the study to address the researcher's pragmatism style. The researcher's paradigmatic approach in this study was based on three aspects, namely ontology, epistemology and methodology, and these are discussed below.

1.6.1 Ontological assumptions

Ontology refers to the nature of reality during the conduct of research (Creswell and Plano Clark 2011:42). In order to obtain reality, a solitary or numerous methods could be employed in research in order to gain various outlooks of the phenomenon of interest. This study followed a pragmatist assumption in which both numerical and in-depth data, including a workshop, were used to obtain information. Further information on different methods used is found in chapter three.

1.6.2 Epistemological assumptions

Epistemology deals with the nature of knowledge and how we could know and explain something (Botma, Greeff, Mulaudzi and Wright 2010:40). The researcher believed that knowledge could be obtained through questionnaires, focus group discussions and in-depth individual interviews

as this was what would work best to address research questions numbers one and two as the researcher's approach was from the viewpoint of a pragmatist. Obtaining information through different methods helped the researcher to know and explain current genetic education. This information brought about valuable input that helped to develop a competency-based curriculum framework that could be used to standardise genetics education for an advanced midwifery programme.

1.6.3 Methodological assumptions

Methodological assumptions refer to how evidence is best obtained (Polit and Beck 2012:13). Pragmatism is considered to be the best philosophical foundation for justifying that the truth is "what works" best to answer a research problem (Maree 2007:263). However, in pragmatism the assumption is that the researcher has a freedom of choice regarding methods, techniques and procedures of research that best meet the purpose (Creswell 2003:11). In this study a quantitative, qualitative and workshop (with nominal group technique meeting) approaches were employed due to the fact that pragmatism could encompass different research methods. These approaches are described in detail in chapter three of the current study.

1.7 DEFINITION OF CONCEPTS

In order to facilitate a better communication and understanding for this report, specific concepts (terminologies) that are frequently used are explained.

1.7.1 Advanced midwifery and neonatal nursing

According to the SANC (Government Notice. No. R. 212 as amended by No. R. 74) people who obtain the aforementioned qualification are registered for a Diploma in Post Basic Midwifery and Neonatal Nursing

Science (SANC, Act No 50 of 1978). A person who has this qualification is considered to be a clinical nurse specialist who is responsible for the promotion of the health of an individual, family, groups and a community as an active member of inter-sectoral, multi-professional, multi-sectoral, multi-disciplinary health teams (SANC, Act No 50 of 1978 as amended). An advanced midwife as a clinical nurse specialist is expected to offer holistic care that include genetics in daily practice as the field is experienced throughout human lifespan.

1.7.2 Curriculum

A curriculum is a planned learning experience to be provided to learners by educational institutions (Uys and Gwele 2005:1). According to Iwasiw, Goldenberg and Andrusyszyn (2009:5) a nursing curriculum is "the totality of philosophical approaches, curriculum outcome statements, overall design, courses, teaching-learning strategies, delivery methods, interactions, learning climate, evaluation methods, curriculum policies and resources." In addition a context-relevant curriculum is the one which is responsive to learner needs, current and projected societal needs, health, community circumstances and imperatives of the nursing profession, and is consistent with the mission of the educational institution (Iwasiw, et al 2009:5). A competency-based curriculum framework that is envisaged for this study could serve as an opportunity for NEIs if implemented to prepare graduates to offer holistic care (including genetics) in clinical and PHC settings.

1.7.3 Framework

A framework is a coordinated approach that permits flexibility and allows new roles to develop and is necessary to ensure that the public has access to consistent, high quality nursing services (Canadian Nurses Association 2008:20). A curriculum framework "serves as a broad outline

for courses, stating only principles." (Bruce, et al 2011:166). The competency-based curriculum framework developed for this study offer opportunity for NEIs to adequately address genetics in advanced midwifery programmes. This could provide a chance for graduates upon study completion in advanced midwifery programmes, to be able to provide holistic care to healthcare consumers.

1.7.4 Standard of care

In health care sciences standard of care is a measure against which the professional person's conduct is compared (Freshwater and Maslin-Prothero 2005:569). The aforementioned authors further stated that standard of care comprises lists of activities that a professional person could perform or not perform in like circumstances. The envisaged curriculum framework planned for this study, if implemented, could offer a list of activities in the form of competencies that should be attained by learners. Attained competencies could assist nurses to provide care that could be measured as a standard of care that is comparable.

1.7.5 Genetics and genomics

Genetics is "the study of heredity and the variations of inherited characteristics" (Stevenson and Waite 2011:593; Lewis 2012:2). Connor and Ferguson-Smith (1997:1) describe genetics as the science of human biological variations in relation to human health and disease. Genomics is "the study of all genes in the human genome, their interactions with the environment, and other psychosocial and cultural influences." (Williams, et al 2011:231). This study is important and comes at the right time because research in genetics/genomics is part of the goal of the university where the researcher is employed. A competency-based curriculum framework to standardise genetics/genomics education for an advanced midwifery is necessary to empower learners with necessary knowledge.

1.7.6 Heredity

Heredity is a tendency by which an offspring have the nature and characteristics of its parents that may be physically and or mentally inherited genetically (Stevenson and Waite 2011:666; Lewis 2012:2). Some physical and mental inheritance is undesirable. Transmission of undesirable genetic make-up could be prevented through application of genetic skills as these are used to screen, prevent, diagnose and intervene where necessary in clinical and PHC settings.

1.7.7 Competency

Competency is an observable, measurable, performance-based outcome that reflects achievement of a particular knowledge component and application of a psychomotor skill (Greco, et al 2012:4). A need to identify measurable genetics outcomes was a strong motivation to conduct this study. Jenkins and Calzone (2007:10) and Greco, et al (2012:4) were of the view that nurses with genetics competence might provide care with "prevention, screening, diagnosis, prognostic, selection of treatment and monitoring of treatment effectiveness" because all diseases and conditions have a genetic component. This further encouraged this research in order to make it clear on which genetics competencies are achieved by advanced midwifery learners at the end of their training.

1.8 RESEARCH DESIGN

The research design comprised methods used and is described in greater detail in chapter three. This study was planned in two phases. Phase one followed explanatory sequential design (quantitative and qualitative), while phase two was a workshop with stakeholders at which two nominal group technique meetings were held. The sequence of research process used in pursuit of the research topic is summarised as follows:

1.8.1 Phase one (theoretical framework)

Diffusions of innovations theory according to Rogers was employed to guide the study. Diffusion refers to the methods used to transfer new innovation (improvement) among a particular group of members over a period of time (Rogers 1995:185); Rogers 2003:5). The theory focuses on how ideas or processes are rejected, or accepted and adopted, by individuals or organisations to enhance integration of new improvements. An innovation is defined as an idea perceived to be found among members (Rogers 2003:12). In this study, a competency-based curriculum framework for standardising genetics education is perceived to be a new innovation.

Rogers' diffusion of innovation theory is characterised by five stages namely: knowledge, persuasion, decision, implementation and confirmation (Rogers 2003:185). The first three stages were considered in this study. The first stage of knowledge was employed in phase one of this study and the mixed methods design was followed. The first objective in this study sought current information (knowledge) about genetics in an advanced midwifery programme by means of quantitative design. Self-administered questionnaires were distributed among educators to obtain information about current genetics education engaged in NEIs. The information obtained served as new knowledge required about genetics before development of a competency-based curriculum.

The second objective, which is qualitative, was used as a follow-up to confirm quantitative results. The focus group discussions, in-depth individual face-to-face and one-on-one telephone interviews were performed among similar participants. The information obtained for quantitative and qualitative methods served to provide current genetics knowledge about the advanced midwifery programmes, resulting in an

accomplishment of a knowledge stage of Rogers' diffusions of innovations theory as results were available.

Persuasion and decision stages were employed in phase two, which are briefly described under 1.8.2 of this chapter. In consultation with study leaders implementation and confirmation stages were set aside to be employed during post-doctoral studies.

1.8.2 Phase two

Phase one results were consolidated for presentation to a stakeholder workshop in phase two of the study. Presentation of the results was an opportunity to inform stakeholders about current genetics education in the advanced midwifery programmes. Since validation of the results took place, a prospect for the dissemination of information was a chance for the knowledge stage to be realised according to Rogers' diffusions of innovation theory as new information was presented in the workshop. Two nominal group technique meetings were held during the workshop. It was during these meetings that a persuasion stage was implemented where consensus was reached regarding genetics competencies necessary for inclusion in the envisaged competency-based curriculum framework. Further a decision to adopt identified competencies and the proposed amount of time to be dedicated for genetics education was accepted in the workshop. Inputs generated from phase two were important to aid in the development of a competency-based curriculum framework that standardises genetics education in the advanced midwifery programme.

1.9. ETHICAL CONSIDERATIONS

Ethics is concerned with the protection of humans in research to ensure that participants incur no danger as they partake in research studies (Schneider, Whitehead, Elliot, Lobiondo-Wood and Haber 2007:81).

Permission to do research was obtained from the research ethics committee at the University of Pretoria. In addition permission was also obtained from heads of nursing departments at selected colleges and universities. The participants themselves also provided their voluntary participation in the study. To guarantee the protection of participants the researcher adhered to the principles of respect for autonomy, confidentiality and beneficence.

1.9.1 Respect for autonomy

According to Schneider, et al (2007:83) respect for autonomy is consent with the realisation that individuals have rights to make decisions based on their own views without being forced or intimidated in any form as their decisions are observed. Research participants have rights to voluntarily decide whether to take part in the study or not without any risk of punishment as researchers are displaying humble attitudes at all times. Participating individuals in this study were given adequate information regarding the research and it was emphasised that participation was voluntarily. This was further supported by an attached information leaflet to inform participants about the respect on their autonomy (see appendix A).

1.9.1.1 Informed consent

"Informed consent means that participants have adequate information about the research, comprehend that information and have the ability to consent to or decline participation voluntarily." (Polit and Beck 2012:157). This principle was adhered to throughout the research process as participants were offered information through the information leaflet regarding voluntary participation in this study. Participants were further assured verbally that they have the right to discontinue participation without any explanation, if they so wished, during the research process.

1.9.2 Confidentiality

Confidentiality is the maintenance of information received from participants in privacy (Schneider, et al 2007:86). Participants were identified by numbers in quantitative and by group numbers in qualitative reports. This was done to maintain confidentiality to protect participants in this study.

1.9.3 Beneficence

Researchers are expected to do good, minimise harm and maximise benefits to participants (Schneider, et al 2007:88; Polit and Beck 2008:170). To avoid harm the principle of beneficence was followed throughout the research process as participants were never exposed to physical and psychological harm or distress and their privacy and rights were protected.

1.10 OUTLINE OF THE STUDY

1.10.1 Chapter 1: Introduction and background of the study

Chapter one dealt with rationale for the study based on identification of the genetic gap in the advanced midwifery programme, problem statement and the significance of the study. The aim and objectives were addressed as research questions were achieved through employing research methodology which is well described in chapter three.

1.10.2 Chapter 2: Literature review

In chapter two the literature pertaining to theoretical and practical limitation of genetics in the curricula of nursing schools were reviewed. Attention was given more on advanced midwifery programmes in South Africa as this is a clinical field practiced by specialist practitioners providing holistic independent service within multidisciplinary teams.

Advanced midwives are mostly first contacts with patients, clients and communities across human lifespan in public healthcare facilities.

Through the literature search it became clear that in South Africa, the Human Genetics Policy recommendation for genetics education in nursing was inadequately implemented both in under and post-graduate nursing studies. Realisation through interaction with stakeholders and study participants that Policy Guidelines of 2001 lacked adequate implementation in nursing was also new information that further enhanced the knowledge stage according to Rogers' diffusion of innovations theory.

1.10.3 Chapter 3: Research methodology

In this chapter explanatory sequential design is described in detail regarding answering of the research questions. This entailed phases one and two. Phase one comprised of quantitative and qualitative research designs (explanatory sequential design), while phase two was a workshop with nominal group technique meetings. Population, sampling, data collection, data analysis, validity, reliability and trustworthiness are also described.

1.10.4 Chapter 4: Quantitative results

In chapter four, phase one step one results regarding current genetics education in advanced midwifery programmes in NEIs in South Africa are presented. Descriptive analysis was implemented to analyse data obtained from returned questionnaires. The results revealed teaching variations across NEIs and advanced midwifery curricula were said to be too full to accommodate adequate genetics content, which resulted in a haphazard kind of genetics education in South Africa. Genetics competencies are absent consequently, learners lacking skills to screen

and diagnose genetic disorders at the end of training. A detailed report is found later in chapter four.

1.10.5 Chapter 5: Discussion of quantitative results

Discussion of quantitative results is presented in chapter five. Literature control to confirm or disagree with results of the current study is also described in this chapter. A full report regarding discussion of quantitative results is presented later in chapter five.

1.10.6 Chapter 6: Qualitative results

In chapter six results of phase one step two are presented. Thematic analysis was used to analyse three types of data sets. The results represent the perceptions of advanced midwifery educators regarding a competency-based curriculum framework to standardise genetics education in an advanced midwifery programme. Detailed information about the results is provided later in chapter six.

1.10.7 Chapter 7: Discussion of qualitative results

In chapter seven, discussion of phase one, step two results are presented. The literature is used throughout the discussion to confirm or contrast some of the results. The perceptions of participants revealed that current theoretical and practical content including identification of outcomes, teaching approaches and assessment methods were unplanned. Learners in an advanced midwifery programme exit with lack of knowledge, skills and competence to offer holistic care in clinical and PHC settings in South Africa. The rest of the discussion is provided later in chapter seven.

1.10.8 Chapter 8: Workshop, nominal group technique meetings and development of a competency-based curriculum framework

In chapter eight the phase two process is presented. The process is characterised by three levels. The first level comprised of a workshop with stakeholders where phase one results are presented. The results of phase one served as new information presented to stakeholders in the workshop accomplishing the knowledge stage.

The second level was formulation of two nominal group technique meetings. Nominal group technique meetings were arranged with one group facilitated by the researcher and another group by a colleague who is a lecturer in the nursing department. At this level the persuasion stage was accomplished as consensus was reached regarding genetics competencies and the amount of teaching times for genetics education.

The third level, which was the last for phase two, followed presentation of results in the workshop from two nominal group technique meetings. During this process discussions ensued and culminated in a decision to accept specific genetics competencies and the proposed amount of teaching times necessary for genetics education. During this last level the decision stage, according to Rogers' diffusion of innovation theory, was achieved. The information generated from phase two was used to develop a competency-based curriculum framework to standardise genetics education for an advanced midwifery programme.

1.10.9 Chapter 9: Conclusions, Recommendations and Limitations

Chapter nine dealt with conclusions drawn and implications observed for advanced midwifery programmes in South Africa. Recommendations for future research emanating from this research are provided, together with limitations of the study.

1.11 CONCLUSION

South Africa is characterised by some challenges facing the healthcare system compounded by a shortage of skilled healthcare practitioners. Advanced midwives provide healthcare in most clinical and PHC settings as specialist practitioners and their genetic knowledge, skills and competencies are critical to benefit clients and patients across their lifespan. For these practitioners to provide holistic care, nursing education needs to provide adequate genetic education to prepare practitioners during training to be able to provide essential services that include genetics healthcare in daily practice. Holistic care could be realised if advanced midwives are able to earlier assess and diagnose genetics conditions and offer the best relevant interventions. Such interventions could relieve certain burdens of genetic diseases and conditions on individuals and the healthcare system. A detailed literature review is described in the next chapter.

CHAPTER 2: LITERATURE REVIEW

2.1 OVERVIEW OF THIS CHAPTER

In chapter two the literature review with regard to genetics in general, and its relevance to nursing and midwifery education, was conducted. The purpose of the literature review was to provide a clear understanding concerning genetics education in nursing, particularly in an advanced midwifery curriculum. It was important to express the established knowledge on the study topic through the literature review. This assisted in preventing reproduction of what other scholars had already pursued under a similar topic.

The literature review provided justification for undertaking this study based on evidence which revealed that nurses lacked adequate genetics knowledge, skills and competence regarding the application of genetics in clinical practice. The search established the knowledge base limitation, which was already attributed to the scarcity in various curricula of nursing schools which reported insufficient training of nurses in genetics as narrow tuition is persistently offered (Calzone, et al 2009:6).

The persistent limitations of genetics in the nursing curricula proved to be a global challenge. However on certain continents genetics in nursing seems to be far behind with regard to recognition of the importance of genetics in the nursing system. Findings from a systemic review showed one study in Africa and no study was found in South America dealing with the competence of nurses regarding genetics (Skirton, O'Connor and Humphreys 2012:2395). Most research that evaluated genetics knowledge or skills or competencies was conducted in some nursing

systems of developed nations. Godino and Skirton (2012:174) conducted a literature review and found that globally genetics competencies were developed in only three countries. The aforementioned authors conducted a systemic review of peer-reviewed papers published between January 2001 and September 2011 on nurses only.

The literature was searched to investigate the degree of genetics in advanced midwifery curricula. The research questions were used to guide the review in investigating what literature existed in addressing factors and practices that promote genetic education in the curricula in nursing and midwifery. Further, related concepts addressing/enhancing the knowledge, skills and competences in the teaching of genetics in promoting pro-activeness in predicting and dodging certain hereditary diseases, through the employment of genetic competence, skills and techniques were discussed. Comprehending the perspective of current genetics education in advanced midwifery programmes, with particular reference to the South African context, was imperative.

This chapter further describes the theory used to guide the development of a competency-based curriculum framework to standardise genetics education in the advanced midwifery programmes. It was considered important to search the literature in an endeavour to obtain existing genetics information in nursing and midwifery before the framework was developed.

2.2 LITERATURE SOURCES

The literature search was conducted manually and electronically to obtain sources relevant to the topic of this study. Various data sources were used to search for the relevant literature. Accredited journals and books were accessed through Google scholar. These were consulted to obtain articles necessary for information generation. To further compile more

genetics information, books from the local library of the university, where the researcher is employed were used. The aforementioned literature sources were used to build evidence on genetics education in other countries and in South Africa. Finally, the Policy Guidelines (2001) in South Africa was used to obtain information about genetics education in the country.

Keywords used for searching the literature were genetics, genomics, education, nursing, midwifery, curricula and competencies.

2.3 GENETICS CONCEPTS

It was clear in the literature that, for us to understand the phenomenon under study, genetics and genomics concepts needed to be understood. The rationale for a literature search was to obtain information regarding genetics concepts (theory and practice) used in nursing education, particularly in an advanced midwifery programme. Concepts are conceived thoughts which could be empirical (realistic or pragmatic) or abstract (mental or intangible), and abstract concepts are those that are not observable, requiring clarification (George 2011:3). According to Anfara and Mertz (2006:xv) concepts "are words that we assign to events" for the purpose of differentiating one experience from another. Because empirical concepts are pragmatic in nature, it becomes possible to familiarize one to make them realistic. Concepts could be concrete as these might be limited to a specific circumstance. It means a concept could be scientific and could be controlled. Transformation could take place in anything that is scientific and could be controlled.

Genetic concepts in nursing and midwifery education could be viewed as primitive concepts which are concrete (scientific). According to Parahoo (2006:156) explanation and interpretation of concepts in any research provide additional generation of knowledge. In line with the knowledge

stage, according to diffusion of theory of Rogers, genetics concepts were sought to bring forth knowledge.

2.3.1 Genetics services

Genetics services were traditionally used for genetic diagnosis and counselling of patients or families affected by rare genetic conditions (Godino, Turchetti and Skirton 2012:1125). Genetics is the life science or scientific study of heredity, or science which is interested in the mechanism of passing biological traits from one generation to the next as expressed in an individual, or inherited traits and their variations (Lewis, 2012:2). Stevenson and Waite (2011:593) stipulated that genetics is "the study of heredity and the variations of inherited characteristics," while Lewis (2012:2) defined genetics as the "study of inherited traits and their variations." The aforementioned definitions suggest that certain patterns of health might either be desirable or not, or are heritable as traits within specific families.

Lewis (2012:2) states that some traits are determined solely by genes while others have environmental components. Studies in the genetics field help us to be able to intervene and curb certain undesirable traits as the directional or tracing is available. Influencing the midwifery curricula to include a considerable amount of common genetics concepts may empower learners. This could in turn benefit society as certain hereditary problems might be addressed earlier.

"The complete set of genetic instructions characteristic of an organism, including protein-encoding genes and other DNA sequences, constitutes a genome." (Lewis 2012:2). Genome is the total genetic complement of an individual genotype which is a person's genetic constitution in total (Lashley 2007:328). In genetics the emphasis is placed on a single gene which may contain one or multiple alleles. Regularities of alleles could be

used to design a descendant's genotype (Bradley, Johnson and Pober 2006:54). Alleles could be dominant or recessive and an individual could carry only two alleles of a gene, however, many genes have multiple alleles carried by members of a population (Bradley, et al 2006:54). The changes in deoxyribonucleic acid (DNA) sequence that distinguish alleles are due to the mutation of a gene and some mutations cause diseases while others provide variations (Lewis 2008:4).

A gene is composed of the long molecule DNA, which is a unit of heredity referred to as biological instructions that tell cells in our body about how to manufacture certain proteins which control the characteristics of our individuality such as our hair and eye colour, shape of our body parts, our talents, personality traits and health (Lewis 2008:2). Chromosomes are made up of strings of DNA groupings which are genes that determine every aspect of an individual while genes, like chromosomes, are paired (Winship 2003:9). As chromosomes are inherited from each parent, a pair of genes is also inherited for each function from each parent resulting in humans carrying an estimated 40 000 genes which are carried in 24 different human chromosomes (Winship 2003:13).

Genes for human genetic disorders exhibit segregation and independent range and it is possible for certain human traits to be predictable, making it possible to provide genetic intervention for those at risk of transmitting genetic disorders to their offspring (Bradley, et al 2006:56). Heritable diseases addressed through genetic education are sometimes rare and mostly single gene disorders, which are could be anticipated (Bradley, et al 2006:56). This is where genetic education is important for healthcare professionals so that they could provide relevant education to consumers of healthcare services in their clinical and PHC settings. Genetics education is more paramount for those practicing traditional or cultural

practices, such as consanguineous marriages, as these groups require sensitisation regarding genetic disorders that could be exhibited in their children. This is where interventions, such as genetics counselling and pedigree construction for human genetics, should form part of an advanced midwifery syllabus for learners to be able to analyse traits through several family generations.

2.3.2 Genomics

Genomics is considered to be the new field that deals with more common illnesses influenced by many genes at a time as genes interact with each other and the environment (Lewis 2008:3). Genomics is "the study of all genes in the human genome, their interactions with the environment and other psychosocial and cultural influences." (Williams, et al 2011:231). According to Human Genomics Strategy Group (2012:3) genomics "is application of specific technologies to analyse wider sets of genetics information, in fact, about the entire genome." The aforementioned report states that genomics offer the capability for the determination of tendencies and risk for illness and the ability to diagnose and plan treatment and care on broad disorders. It is required of advanced midwives to have genetics capabilities to be able to determine genetics tendencies and risk factors for genetic disorders in clinical and PHC settings.

Heredity is a tendency by which an offspring have the nature and characteristics of its parents which could be physically and/or mentally inherited genetically (Stevenson and Waite 2011:666). Some physical and mental inheritances are undesirable. It is obviously necessary to prevent undesirable physical and mental inheritance.

2.4 INFLUENCE OF GENETICS ON HEALTH

2.4.1 Genetics on the individual, the family and the population

There are two terms that distinguish alleles present or expressed in an individual known as genotype and phenotype respectively (Lewis 2008:4). Lewis (2012:4) further indicate that a dominant allele has the effect if present in one copy of a chromosome, while a recessive allele must be present in both chromosomes to be expressed. Individuals are genetically connected into families because a person contains half of his or her genes in common with his or her parent/sibling and one quarter with each grandparent. That is why, when identifying carriers of genetic disorders in families at risk, it is also important to avert or prevent certain genetic diseases. Knowing a family pedigree is important during healthcare provision in clinical settings because it assist in identification of transferable traits in families.

Drawing a family pedigree, assist in indication to individuals that are likely to inherit traits in a family. Haydon (2005:48) pointed that, when individuals make decisions about themselves and their families, they need to be aware that knowledge of being at risk of genetic disorders may have implications for life insurance, mortgages and employment, and that the risk becomes greater if one is diagnosed or a predictive test becomes positive. Nursing education should include such concepts as pedigree in its syllabus so that all consumers of healthcare are earlier identified regarding the risk of heritable genetic disorders. This happens if nursing education becomes responsive in providing genetics teaching. Genetics education empowers nurses to be able to provide health care that includes gene and physical mapping, sequencing of DNA base pairs of the human genome, especially those associated with human disease,

establishment of ethical, legal and social implication programmes and developing improved technology for genomic analysis (Lashley 2007:5).

Genetic matters relevant to nursing include understanding common heritable variants in human populations, identification of genetic contributions to disease and drug response, developing new therapeutic approaches to illness and policy options for appropriate use of genomic information in research, understanding relationships between genomic, race and ethnicity, and defining appropriate uses of genomics (Lashley 2007:7).

A population is a group of interbreeding individuals and in genetics a population is a large collection of alleles distinguished by their frequencies (Lewis 2008:5). Lewis (2008:5) provided an example of people from the Swedish population who would have a greater frequency of alleles that specifies light hair and skin than people from the Ethiopian population who tend to have dark hair and skin thus constituting a population gene pool. Population genetics is relevant in healthcare, forensics and other fields as reported in Lewis (2008:18).

2.5 BURDEN OF GENETIC DISEASE TO FAMILY AND COMMUNITY

Some genetic disorders cause psychological distress to families because of psychological, emotional and financial implications. Kingston (1994:1) pointed out that genetic disorders place considerable health and economic burdens on affected individuals, their families and the society. Health disorders lead to repeated hospitalisations during which increased healthcare consumption occurs. Morbidities and mortalities are also a problem in any family or affected community. Because genetic influences are identified in every part of human lifespan, from prenatal through to old age, it is critical for all healthcare professionals to understand genes

and their interactions in humans to be able to manage patients with common disorders, perform risk assessment, provide genetic education, interpret results and offer counselling (Lashley 2007:3).

Certain disorders could be prevented if healthcare professionals are ready to provide genetic education. Health care professionals, including advanced midwives, need education as they interact with patients and their families in their daily practice. This education could help families to make informed decisions. Genetic diseases place a social burden on the family because certain genetic disorders lead to isolation and a threatened family self-concept if the family is unable to cope with an intolerant public attitude towards a disorder (Lashley 2007:5). Therefore, genetics education is required in advanced midwifery programme for them to be able to prepare learners for genetics healthcare.

2.6 GENETIC EDUCATION IN NURSING AND MIDWIFERY

Education in genetics and genomics indicates that knowledge of the field has profound implications on both the society and health, and their influence prevails throughout the human lifespan commencing before pregnancy through to old age (Lashley 2007:4; Burke and Kirk 2005:228). Educating advanced midwives in this field is necessary as it introduces programmes to control the spread of genetic diseases and congenital disorders as most diseases have a genetic basis (Vural, Tomatır, Kurban and Taşpınar 2009:231; Calzone and Jenkins 2007:10; Lashley 2007:4). That is why Lashley (2007:73) and Christianson and Modell (2004:254) pointed out that prevention of genetic problems begin with the educating the public and healthcare professionals.

In South Africa advanced midwives form part of specialist nursing and their competence in genetics is not clear as a standardised curriculum framework in the field could not be found. Further the level of

competence among nurse educators of advanced midwifery in transferring knowledge to their learners is also not clear. Kirk, Tonkin and Burke, (2007:180) pointed out that, in the United Kingdom, the focus is to facilitate the integration of genetic education into all levels of education of doctors, nursing professionals, pharmacists and dieticians.

Benjamin, Anionwu, Kristoffersson, Kate, Plass, Nippert, et al (2009:485) state that the inclusion of genetics in the post-basic and advanced nursing curricula appears in only 19 of 38 higher education institutions in the United Kingdom (UK) with differences in time allocation for genetic teaching. "Educators in the US and UK independently applied elements of genomic nursing competencies in developing champions networks" that assist colleagues with integration of genomics into the curriculum (Williams, et al 2011:233). On the other hand the UK also took a national approach to meet the challenges of preparing existing nursing faculties in genetics by creating a National Genetics Education and Development Centre to provide a focal point for genetic education and training (Williams, et al 2011:234).

In the United States of America, 49 North Eastern Nursing Schools showed a complete lack of genetic and genomic content in nursing curricula (Collins and Stiles 2011:102). To address the gap of inclusion of genetic education the U.S Faculty Champion Initiative was designed to assist educators in their schools of healthcare. These educators attend an introductory programme that helps them to develop innovative approaches to address genetic and genomic education preparation of their faculties (Williams, et al 2011:233). Godino and Skirton (2012:173) state that there was slow accommodation of adequate teaching of genetics and genomics.

Scientists and educators, including those in nursing, need to use genetic knowledge to discover the causes of disease and develop new techniques

for the prevention and treatment of diseases (Hetteberg and Prows 2004:83). Advanced midwives, as part of healthcare professionals, interact with the public in different health care settings and they need genetic and genomic knowledge, competencies and abilities as part of their daily practice. Advanced midwives face challenges because of deficiencies in genetic and genomic skills and competencies due to a lack of a standardised framework in a nursing curriculum at advanced and diploma level that has not fully integrated genetics and genomic competencies (Kirk, Calzone, Arimori and Tonkin 2011:110; Maradiegue, et al 2005:473). Advanced practice nurses have limited genetic and genomic competencies, skills and abilities because the content of the field is not an integral part of nursing school (Thompson and Brooks 2010:1; Maradiegue, et al 2005:473; Vural, et al 2009:225-226).

2.7 GENETICS COMPETENCIES IN MIDWIFERY EDUCATION

Competency is defined as a skill, knowledge and ability necessary to perform a certain job (Freshwater and Maslin-Prothero 2005:141). Advanced midwives that have genetic and genomic competence will be able to deliver care that include "prevention, screening, diagnosis, prognostics, selection of treatment and monitoring of treatment effectiveness" because all diseases and conditions have a genetic and genomic component (Jenkins and Calzone 2007:10). Competence in genetic and genomic education emphasises demonstration of skills and knowledge.

Competence in genetics is critical to equip nurses and advanced midwives with those competencies and skills to enable them in their clinical practice to identify individuals and families that might be affected by genetic problems across their lifespan. To be able to control the spread of genetic

and genomic diseases and congenital disorders, because most diseases have a genetic basis, advanced midwives need education in the field (Vural, et al 2009:231; Jenkins and Calzone 2007:10; Lashley 2007:4).

Advanced midwives are professionals who obtained a post-basic qualification registered as a Diploma in Post Basic Midwifery and Neonatal Nursing Science (SANC, R212 as amended by R74). A person that has this qualification is considered to be a clinical nurse specialist who is responsible for the promotion of the health of an individual, family, groups and community as an active member of inter-sectoral, multi-professional, multi-sectoral, multi-disciplinary health teams (SANC R212 as amended). In this study, a person who has obtained this qualification will be referred to as an advanced midwife and she/he has to demonstrate expert knowledge including genetics information.

According to Newcomb and Raudonis (2005:2) there are necessary categories for essential competencies for professional nurses to address genetic problems. These include the professional practice domain and professional responsibilities domain. Professional practice include programmes such as assessment using genetic knowledge, identification of clients that will benefit from genetic services, referral for genetic counselling and testing and provision of education, care and support (Newcomb and Raudonis 2005:7).

Professional responsibilities addressed in genetics include advocating for clients to access genetic services, incorporating genetic technologies and information into registered nurse's practice, provision of genetic information and service based on clients' culture, religion and literacy, including advocating for the right to autonomous informed genetics-related decision making (Newcomb and Raudonis 2005:2).

An advanced practice nurse is a practicing nurse who has acquired expert knowledge, is able to make complex decisions, is skilled and has competencies in the context of her speciality field (Freshwater and Maslin-Prothero 2005:16). Advanced midwives also have expert knowledge and are expected to make complex decisions including under genetic circumstances. However, competencies of advanced midwives regarding their adequate genetic knowledge could not be found.

2.8 GENETICS EDUCATION IN SOUTH AFRICA

According to the Human Genetics Policy Guidelines of South Africa the first department of genetics was officially established in the country in 1972 and the National Department of Health (NDoH) created a network of genetics nurses with at least 16 posts for those nurses to serve the country (Policy Guidelines 2001:9). These genetics nurses were trained by NDoH as it was responsible for provision of training courses offered annually to genetics nurses. For the nursing and midwifery profession, training opportunities were offered only to genetics nurses in the country.

Academic departments provided lectures to undergraduate medical and nursing learners (Policy Guidelines 2001:29). Although lectures of that nature are said to be provided to learners, there is limited clarity regarding the genetic content and the number of periods (hours) used for genetics education in the undergraduate nursing studies. Further, evidence confirming whether lectures empowered undergraduate learners through genetics education could not be found, while evidence indicating theoretical and practical assessment is also lacking.

Towards the end of 1970s, there was a need to increase genetic content in the nursing curricula in South Africa (Lemkus, van der Merwe and Op't Hof 1978:494). The intention was to ensure that all nurses including midwives were empowered in genetic knowledge, competence and skills.

It is not clear why nursing remained unresponsive to the call for inclusion of adequate genetics in the nursing curricula in South Africa. Perhaps barriers that prevented inclusion of adequate genetics in the nursing curricula should have been investigated.

According to Op' t Hof, Esterhuysen, van der Merwe, van den Burgh and Lomberg (1984:39) an annual two-week course on human genetics was presented from 1978 to nurses, genetic nurses, educators in nursing and other healthcare professionals on an annual basis by NDoH in South Africa. These presentations were offered since 1980 to specific groups of health care professionals. However, lack of indications or suggestions to confirm the presence of sufficient genetic content in nursing curricula continues to exist.

Towards the end of 1990s, in her MCur study, Mcanyama (1999:47) recommended that all healthcare practitioners in the country required knowledge in genetics to enable them to be competent in providing relevant genetic healthcare to healthcare consumers. Ehlers (2002) called for a nursing policy to address genetics in nursing that could also assist in assessing nursing core competencies in South Africa. Years later Prows, et al 2005:198) pointed out that genetics content in nursing curricula was lacking and, in her MCur study, Glass (2004:97) stated that fourth year diploma learner nurses reported insufficient knowledge in the field at the end of their training.

2.8.1 Summary of South African literature regarding genetics in nursing

The information for inclusion of genetics in nursing and midwifery programmes for South Africa proved to be limited and those found dated as far back as 1978. Three South African articles reported a need to increase genetics knowledge in nursing (1978), that undergraduate

learners lacked genetics knowledge (1984) and evaluation of core competencies in the nursing curricula (2002) respectively. In 2005 an international article also reported that genetics content in nursing training was scarce. This information was supported in the two Masters' degree dissertations published in South Africa. Otherwise the Policy Guidelines for South Africa also recommended a need to address adequate genetics education in the curricula of nursing schools. Table 2.1 depict literature sources on genetics information in South Africa.

Table 2.1 Summary of papers read referring to genetics education in South Africa

Authors and reference	Title	Comments for South Africa
Godino and Skirton 2012	A systematic review of nurses' knowledge of genetics	Adequate accommodation of genetics/genomics is estimated to take place between one to five years (in 2012) in South Africa
Prows, et al 2005	Genomics in Nursing Education	No surveys were done regarding genetics content in nursing curricula in South Africa (in 2005)
Glass 2004.	An assessment of the genetics knowledge of final year diploma nursing students	Genetic content in the current nursing curricula is too limited (in 2004)
Ehlers 2002.	Republic of South Africa: Policies and Politics Guide: Nurses' Application of Genetic Technology in Public Health Settings	Genetic content need evaluation to assess for core competencies in the curricula
Policy Guidelines 2001	Human genetics policy guidelines for the management and prevention of genetic disorders, birth defects and disabilities	In undergraduate curricula, genetics teaching varies and depends on facilities and staff availability. Post-basic nurses receive no genetics education
Mcanyama 1999.	A study of community genetics at Umlazi township of KwaZulu-Natal	Health care professionals require specialised genetics education.
Op't Hof, et al 1984.	Knowledge and attitudes of the South African Public with regards to Congenital and Inherited Disorders	According to Slayen, quoted in Op't Hof et al. 1984, undergraduate first year learners in a South African university lacked basic genetics education.
Lemkus, et al 1978.	Genetic and Congenital Disorders: Knowledge and Attitudes of the Public, Nurses and Medical Practitioners in South Africa	Increase genetics content in nursing curricula.

Based on available literature, calls for inclusion of adequate genetics training in nursing curricula in South Africa date far back to before 1978. Two articles reported narrow genetics content (1978 and 2004); undergraduates nursing curricula lacked genetics content subsequently limited knowledge (1984); healthcare professionals require genetics knowledge; evaluation of genetics content was required to assess core competencies (2002); and lack of surveys to assess genetics content in

nursing in South Africa (2005). The latest international article (2012) article reported that it could take between one and five years for South African nursing curricula to adequately accommodate genetics. Since the year 2012 to date (2015) the literature to indicate sufficient accommodation of genetics in nursing and midwifery programmes is still scarce. There has been a lack of surveys in South Africa to evaluate advanced midwifery programmes regarding genetics content and competencies. The current study is the first to survey educators in advanced midwifery programmes regarding genetics knowledge, skills and competencies attained by learners in at the end of training.

2.8.2 Policy Guidelines (Human Genetics) of South Africa

The Policy Guidelines on Human Genetics in South Africa (2001:11) contain various goals and objectives and among those 2.3 states:

> "To develop a medical genetic component of health services through capacity building, re-orientation of health professionals, training of PHC workers, particularly midwives, nurses and others concerned with Maternal, Child and Women's Health".

The Policy Guidelines stipulate that the NDoH is responsible for training and standardisation of curriculum courses including genetics curricula of basic nursing at NEIs in South Africa. In order to address the above-stated objective, training of midwives and curricula standardisation was a priority for NEIs in the country. The policy further states that curriculum teaching varies at NEIs and post-basic practicing nurses, including advanced midwives receive no training in medical genetics (Policy Guidelines 2001:31).

Despite the availability of various annual medical genetic courses indicated in the Policy Guidelines in South Africa, evidence to suggest

attendance of such courses by educators in advanced midwifery programmes is lacking. These courses are available to post-basic nurses, including educators in advanced midwifery programmes. Literature revealed a lack of surveys in nursing in the country to evaluate core competencies and genetics content in nursing (Ehlers 2002:151; Prows, et al 2005). It was deemed important to perform a situational analysis to obtain first-hand information from key informants regarding genetics teaching in advanced midwifery programmes. The description of the context of genetics education based on educators in the advanced midwifery programmes is referred to in Chapter five, section 5.4 later in this study.

In South Africa only common genetic disorders and birth defects are recognised as components for genetics education to be included in the basic midwifery curriculum for the four year Diploma in Comprehensive Nursing (General, Community, Psychiatry) and Midwifery, and the BCUR undergraduate nursing programme (SANC, Reg. 425 of 2003). On the other hand genetics teaching varies according to facilities and educator availability in the country (Policy Guidelines 2001:29). These variations confirmed the lack of a common curriculum framework that could standardise genetics education in South Africa.

2.9 INFLUENCE OF GENETICS ON HEALTHCARE

The influence of the Human Genome Project (HGP) has brought about an increase in knowledge of genetic conditions. This has also sensitised a need for a shift from being illiterate regarding genetics knowledge because human genome research has created new medical and nursing roles and has expanded health opportunities for individuals, families and communities (Lea, et al 2006:121). The knowledge in this field equips all healthcare professionals with relevant and updated knowledge so that they are proactive in preventing and addressing hereditary related

conditions. However, curriculum adaptations to include satisfactory genetics in nursing schools remain limited. Adequate genetics content should form an integral part of all curricula in healthcare education.

Healthcare consumers remain unattended as healthcare providers are less informed on genetics applications in clinical and PHC settings. Genetic education further involves genetic language, obtaining accurate history over three generations, recognition of the possibility of a genetic problem in an individual or a family, the ability to refer for genetic evaluation and or counselling and skills in interpretation of genetic tests (Lashley 2007:7). Application of genetics education might be realised if curricula of the advanced the midwifery programme could include and employ adequate genetics theory and practical education that has explicit learning outcomes, teaching content, teaching times and assessment criteria.

2.10 THEORY APPLICATION

According to Rogers (2003:12) the knowledge stage is realised when a person recognises an existence of an idea and that person becomes inquisitive in relation to that particular idea as more light is sought. Seeking information regarding genetics education in nursing and midwifery programmes in the literature created information about South African genetics information in the nursing curricula which responded to the "what" question of the knowledge stage. The information displayed in table 2.1 provides information about genetics education in South Africa.

Innovation in ensuring adequate genetics content forming part of advanced midwifery curricula needs to be welcomed to guide and provide perspectives in the field that is relevant locally, nationally and internationally. A competency-based curriculum framework could be an educational innovation that requires the use of evidence for educational improvement with adequate information so as to ensure that advanced

midwives acquire knowledge and skills to operate in complex health care environments (Anema and McCoy 2010:16). The innovation according to the aforementioned authors encourages a paradigm shift in bringing forth the required change as that innovation is perceived to be new to a particular group.

According to Robinson (2009:1) the purpose of diffusion of innovations is to clarify the manner in which new ideas are accepted by members of a particular population to achieve transformation. For transformation to realise, there are five specific qualities that regulate accomplishment of an innovation.

- **Relative advantage**.

The more ease with which a particular population identifies with a new idea, results in earlier or quicker acceptance of that idea as it appeals to that population (Robinson 2009:2). A competency-based curriculum framework could be identified as innovation necessary to bring about transformation in nursing, particularly in advanced midwifery programme as genetics could then be satisfactorily addressed.

- **Compatibility**

According to Robinson (2009:2) compatibility "is the degree to which an innovation is perceived as being consistent with the values, past experiences, and needs of potential adopters." Values could be the identification of importance of genetics in nursing education. The understanding is that genetics education remains inadequately accommodated in nursing and midwifery curricula. A standardised competency-based curriculum framework is required across NEIs in South Africa for genetics education to be valued in nursing as congruent programme could then be offered.

- **Simplicity**

Ease with regard to the implementation of an innovation, best describes simplicity (Robinson 2009:2). An innovation which is easier to comprehend could lead to quicker innovation acceptance (Robinson 2009:2). A competency-based curriculum framework to standardise genetics education should be communicated with effortlessness for it to be comprehended with easiness.

- **Trialability**

Trialability is concerned with the pre-testing of an innovation before its full-scale implementation (Robinson 2009:2). Trialability in this study could be addressed during implementation of a competency-based curriculum framework to address any obstacle in the application process which will be employed during post-doctoral studies.

- **Observable results.**

The benefits that come from a new idea encourages the acceptance of that particular innovation as misconceptions are reduced, resulting in consideration of an innovation (Robinson 2009:2). The profit of adequate genetics education in nursing is the empowerment of graduates at the end of training for them to deliver a holistic care in clinical and PHC settings required by healthcare consumers. If implemented, a competency-based curriculum framework could ensure genetics competencies and skills that are apparent among learners as genetics is well addressed in nursing curricula.

2.11 SUMMARY OF CHAPTER 2

The literature revealed that it had been recommended more than four decades ago that nursing curricula in South Africa should accommodate

sufficient genetics training, as pointed out in Lemkus, et al (1978:494) and Mcanyama (1999:47). Further, the Policy Guidelines (2001) for Human Genetics, which is the current point of reference regarding genetics education in the country, was useful for determining genetics education in nursing in South Africa. Additionally the Policy Guidelines of 2001 further recommended that assessment of genetics in the nursing curriculum of undergraduate nurses should be realised so that standardisation of genetics content and teaching could be set (Policy Guidelines 2001:29). Furthermore, the Policy Guidelines (2001:30) also proposed that post-basic nurses should be trained to recognise and manage common genetic disorders and birth defects.

The review of literature regarding genetics education reported in this chapter serves as an opportunity for the provision of knowledge regarding the quest for integration of adequate genetics teaching in nursing curricula in South Africa as was proposed more than four decades earlier. It was imperative to conduct a literature search in order to generate knowledge (theory) regarding current genetics education in nursing, particularly in South Africa. The required knowledge was firstly necessary to guide identification of appropriate research methodology for this study, and secondly to obtain information on genetics education in nursing in South Africa. Parahoo (2006:156) pointed out that a theory (an idea or knowledge) is the product of "intellectual and physical labour and patience."

The journey undertaken to conduct the literature search for this study provided knowledge regarding the level of genetics education in nursing elsewhere and in South Africa. Application of the knowledge stage, according to the diffusions of innovations theory of Rogers, was instrumental as the guiding process to firstly generate the information required, and secondly to avoid duplication of curriculum framework

development. The literature search provided clarity; mainly that: 1) some authors already have called (last four decades) for nursing curricula, particularly in South Africa to adequately include genetics; 2) genetics education in South Africa is randomly provided in NEIs; and 3) a standardised curriculum framework for genetics is lacking in education in nursing programmes in South Africa.

2.11 CONCLUSION

In this chapter the literature regarding genetics education in nursing was obtained resulting in knowledge generation, particularly with regard to the South African state of genetics education. Furthermore the influences of genetics on human health were discussed. In the next chapter the research methodology is described.

CHAPTER 3: RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

The purpose of this study was to explore the genetics teaching activities included in the curricula of advanced midwifery programmes and, based on the findings, develop a competency-based curriculum framework to standardise genetics education for the programme. A situational analysis regarding current theoretical and practical teaching of genetics through numeric data was essential. It was also imperative to obtain perceptions of current educators in advanced midwifery programmes as it was necessary before the process of embarking on the development of a curriculum framework.

Combining the quantitative and qualitative methods was useful as each complemented the other, especially in the field of genetics education in an advanced midwifery programme where inadequate information existed. The sequential explanatory mixed methods design was used where both quantitative and qualitative data were collected and analysed separately. The indication for using sequential explanatory mixed methods was that it allowed the researcher to respond to confirmatory and exploratory questions.

In this chapter the demonstration of the manner in which the intentions of the study were realised is described. Research-related factors, such as the research design and methodology, research questions and objectives, data collection and analysis procedures, influenced the realisation of the study purpose.

3.2 RESEARCH DESIGN AND METHODS

The research design concerns the type of study undertaken to respond to the research questions while applicable methods were used to collect and analyse the data. The explanatory sequential design was followed, firstly to receive current genetics education using quantitative design, and secondly to use qualitative design to confirm quantitative results.

In quantitative studies, the researcher depends on numerical data because, according to Driscoll, Appiah-Yeboah, Salib and Rupert (2007:26), "quantitative data provide a deep understanding of survey responses and statistical analysis can provide detailed assessment of patterns of responses." The positivist stance followed in phase one, step one, in this study was to bring forth numeric data about theory and practical content that is currently taught as part of genetics in the advanced midwifery programmes. The positivist stance further reflected a notion that genetic activities existed and emerged from responses received from questionnaires for this study (Gerrish and Lacey 2010:130). The questionnaire contained variables for investigation that led to achievement of reliable results described later in chapter four.

Alternatively, qualitative rich data, as in words from participants, were used because it was not given that the truth was located somewhere waiting to be uncovered through surveys. In an endeavour to uncover the truth discussions and interviews brought forth views of participants that assisted in locating the meaning with regard to genetics education in the advanced midwifery programme. Pragmatism uncover the truth through multiple approaches which is why various methods were used to collect and analyse data, as mentioned earlier in this report (Creswell and Plano Clark 2011:41). Words from participants enhanced identification of patterns which were supported by observations made data collection. In

line with the pragmatist stance, knowledge was created through opinions and meaning attached by participants as they were interviewed from their natural settings on their perceptions regarding a competency-based curriculum framework to standardise genetics education in an advanced midwifery programme.

Regarding the explanatory sequential design, both quantitative (numeric) and qualitative (textual) data were collected separately, applying what is termed the "two-phase approach" by Creswell, quoted in de Vos (1998:360). The combination of a quantitative and qualitative data collection approach enhanced methodological triangulation resulting in better understanding of the phenomenon of interest, which was the theory and practice of genetic education in an advanced midwifery programmes (Maree 2007:266; de Vos 1998:359). The explanatory sequential design was applied separately to obtain both numeric data and views/opinions of participants in a single study.

The use of an explanatory sequential design (could also be referred to as a two-phase approach) became possible as the researcher applied pragmatist philosophy which, according to Creswell and Plano Clark (2011:3), embraced various possible research methods in research projects. The explanatory sequential design assisted in obtaining existing data in its entirety regarding genetics in the advanced midwifery programmes. Pragmatism was considered the best philosophical foundation for justifying the combination of these designs in a single study, as applying a pragmatist stance by the researcher was encouraged by the belief that the truth was what worked best to answer the research questions (Maree 2007:263). Further it was also worth collecting and analysing both quantitative and qualitative data separately in this study.

The reason for employing explanatory sequential design was to gain benefits from quantitative and qualitative strands. In addition Martin

(2008:160) praised this method as it addresses methodological deficiencies brought about by a single design. It was important to use the mixed methods approach to also validate and confirm the results of the current study. Implementing explanatory sequential design enhanced triangulation due to various data collections for the same phenomenon precisely during qualitative strand.

3.2.1 Explanatory sequential mixed methods design

According to Creswell and Plano Clark (2011:71) explanatory sequential design is a research design characterised by two steps that are practiced one after the other (following each other). Often the quantitative step is performed first, followed by the qualitative step to follow up the results of the first step. The explanatory sequential design was selected for this study as this design addresses quantitative and qualitative research questions in two separate steps. Step one followed quantitative methods and step two employed qualitative methods. In both steps data was collected and analysed separately. However, the quantitative results were followed up by employing qualitative design to confirm quantitative results. For example, genetics concepts addressed during an advanced midwifery programmes but through qualitative design brought to light that genetics concepts were superficially addressed resulting in limited empowerment of learners.

Priority refers to the importance given to either quantitative or qualitative methods in answering the research questions of which both methods had equal priority in responses to research questions in this study (Creswell and Plano Clark 2011:65). Each design was planned with an explicit main research question and relevant methods were employed to address the specific main objective in each design. Mixing of results occurred during the integration of interpreted results as it involved drawing conclusions of what was learned in the mixed methods design, while presenting results

in chapter eight of this study (Creswell and Plano Clark 2011:67; Maree, 2007:269).

The quantitative surveys were used to collect data. The findings from the surveys were confirmed through qualitative design that resulted in rich findings for the single study. The mixed methods design provided comprehensive overview of genetics education, and the rich descriptions of perceptions of educators of the advanced midwifery programmes were generated. The quantitative results are presented in Chapter four, while qualitative findings are presented in chapter six. Integrated findings are presented in Chapter eight.

3.3 PHASE 1

3.3.1 Research questions were:

- What is the current theoretical and practical genetics education in an advanced midwifery programme at nursing schools in South Africa?
- What are the perceptions of advanced midwifery educators regarding curriculum framework to standardise genetics education for advanced midwifery?

3.3.2 Population

The target population of phase one was educators of an advanced midwifery programmes at nursing education institutions (NEIs) in South Africa. A list on the SANC website (www.sanc.co.za), with all public NEIs in South Africa, was used to identify nursing schools involved in teaching an advanced midwifery programmes. Universities offering the advanced midwifery programmes were identified through the Forum of University Nursing Deans of South Africa (FUNDISA) booklet. The booklet contained some names of advanced midwives from universities in South Africa. After

ethical approval the sample was recruited telephonically and through word of mouth to take part in this study.

3.3.3 Sample selection

The inclusion criteria set for phase one was as follows:

- Nurse educators who were currently facilitating the advanced midwifery programmes at NEIs; and
- Nurse educators who have qualified as advanced midwives from any South African NEI.

The exclusion criteria were as follows:

- Nurse educators who do not have the advanced midwifery qualification and were currently not facilitating the advanced midwifery programme.

3.3.4 Sampling technique

Although non-probability sampling is believed to be mostly used in qualitative research, this type of sampling was used for all steps in phase one for this study because the characteristics of the sample was predetermined during research planning (Botma, et al 2010:126). This population was considered to be relevant as they were experts in facilitation of an advanced midwifery programme and rich information was required (Gerrish and Lacey 2008:145). The non-probability in the form of purposive sampling was used for this study.

Purposive sampling might give rise to sampling bias and representation of the sample could limit generalisability of the results (Brink, van der Walt and van Rensburg 2008:135). Despite the mentioned disadvantage of this technique, purposive sampling was considered appropriate so that the sample with rich information concerning genetics in advanced midwifery

programmes could be selected. This was done so that educators currently involved in facilitating the programme (advanced midwifery) were selected to determine the current genetic information through surveys and provide perceptions of educators through interviews.

3.3.5 Description of the sample

In South Africa there are nine provinces of which two lacked universities at the time of data collection but had nursing colleges. Although nursing colleges were found in those two provinces, both colleges were not offering advanced midwifery programmes at the time of data collection. Of the remaining seven provinces, one province had a university and nursing colleges, but none of those provided advanced midwifery programmes. Further, in two other provinces, advanced midwifery programmes were found to be offered in each university.

The sample size was determined by availability of NEIs that offered advanced midwifery programmes and the respondents found in those NEIs were requested to take part in the study. The sample was chosen based on the belief that educators who have facilitated advanced midwifery programmes for a period of two or more years could have interacted with planning of the curriculum for the subject. These kinds of respondents could yield information required for the study.

The sample for phase one was divided into two (quantitative and qualitative). Those who took part in the quantitative design were represented by 32 respondents. Six universities in four provinces and five nursing colleges from three provinces constituted the quantitative sample. The qualitative part of the study was represented by 19 participants of whom 16 (84%) were from four nursing colleges in three provinces. At least three (16%) participants agreed to take part in individual face-to-

face interviews and they came from three universities in two provinces. Data were collected to the point of saturation as no new information was obtained. The sample for phase two was represented by 17 participants and all came from one province. The distribution and some characteristics of participants of phase two is presented in figure 8.2 in chapter 8.

The biographic information of the sample is described under each step in phase one. For the quantitative sample the initial sample was 40 respondents identified from NEIs in six provinces of South Africa. The questionnaires were sent to 40 respondents and only 32 were returned.

3.3.6 Research setting

The research settings for this study were at the advanced midwifery educators' workplace where questionnaires were sent for them to complete. Focus group discussions, individual in-depth face-to-face and one-on-one telephone interviews took place at participants' area of employment.

3.4 QUANTITATIVE DATA COLLECTION (PHASE 1 STEP 1)

The intention of step one was to assess current theoretical and practical genetic content and competencies in the advanced midwifery programme. Data was collected between July and December 2013. Data was collected through a measurement instrument developed in this study as none existed.

3.4.1 Measurement instrument

The measurement instrument in the form of a structured questionnaire was the technique used to collect quantitative numeric data and it was helpful in reducing the interviewer influence during data collection as it

was self-administered by respondents. According to Maree (2007:93) and Botma, et al (2010:140) questions should be in the same pattern for all respondents in questionnaires. This is different in qualitative studies where varieties of responses from participants lead to probing by the researcher. The measurement instrument used to collect data in this study was developed by the researcher in consultation with study leaders and the services of an experienced biostatistician was utilised for verification of established items on the instrument. The biostatistician checked and verified the variables forming the content of the instrument and provided an approval note attached as (appendix B).

The measurement instrument was needed because of a lack of any existing instrument for data collection under the context of this study. The content of the developed instrument comprised of 30 items used for data collection. The instrument was developed in English, which is the language mostly used at NEIs in South Africa.

The first six items were about the biographical information of respondents (Section A) while the remaining 24 items (Section B) measured the information about genetic education in an advanced midwifery curriculum. This was a self-administered questionnaire with closed-ended questions in which respondents selected their preferred responses. The information leaflet formed the front page followed by a consent form with a questionnaire (appendix A). The questionnaire was structured follows:

Table 3.1 Depict the structure of the questionnaire

Section A	Items 1 to 6 deal with biographic information of participants.
Section B	Items 7 to 12 are about genetics education.
Section B1	Item 13 is about care delivery knowledge in genetics education outcomes.
Section B2	Item 14 deals with professional and ethical practice related to genetics education outcomes.
Section B3	Items 15 to 30 are about personal and professional development in genetics education outcomes.

The questionnaire comprised of 11 pages and it took at least 20 minutes (based on the pilot study) to answer, which was acceptable because participants should not be exposed a very long questionnaires that required to be answered in more than 30 minutes (Bruce, Pope and Stanistreet 2008:166). All 30 items on the questionnaire were responded to. The advantage of structured questionnaires was maintenance of consistency because the sample responded to questionnaires without any assistance from the researcher in this study.

3.4.2 Distribution of questionnaires

Forty questionnaires were sent to respondents through various methods including e-mail, courier and hand delivery for self-reports as a form of data collection. Thirty-two questionnaires were completed and returned while eight were never returned. Self-reports were possible because the population for this study was literate and all participants were professionals practicing at post-secondary NEIs in South Africa.

Questionnaires with responses from the sample were returned through e-mail, post, courier, and some were collected by the researcher from the sample's area of work. The e-mail address of the departmental secretary was provided to enhance anonymity. These were placed in the box which was emptied once a week by the researcher. For those questionnaires returned by post, the researcher's self-addressed stamped return envelopes were included when questionnaires were sent so that they could be returned. Table 3.2 depict the biographic information of participants.

Table 3.2 Biographic information of participants (n=32)

Variable	Range	Frequency	Percentage (%)
Age	40 – 45	3	9.375
	46 – 50	9	28.125
	51 - 55	9	28.125
	56 - 60	6	18.75
	› 61	2	6.25
	Did not disclose	3	9.375
	Total	32	100
Gender	Females	**32**	**100**
	Males	0	0
Highest qualification with speciality	PhD	6	19
	MCur	10	31
	BCur	14	44
	Diploma	2	6
	Total	**32**	**100**
Number in years of obtaining post-basic qualification (advanced midwifery)	2 – 5	2	6.25
	6 -10	15	46.8
	11 - 15	6	18.7
	16 - 20	7	21.6
	› 21	1	3.12
	Missing	1	3.12
	Total	**32**	**100**
Number in years teaching advanced midwifery	2 - 5	1	3
	6 - 10	25	78
	11- 20	5	16
	21 - 25	1	3
	Total	**32**	**100**
Institution of teaching	Colleges	26	81
	Universities	6	19
	Total	**32**	**100**

3.4.3 Pilot study

For this study, the questionnaire was pilot-tested with two similar participants to examine its reliability and validity before its full implementation in the main study. The findings of the pilot study revealed no need to adjust the questionnaire except to clarify question 28, which initially read as follows:

"Which material do you use to prepare genetic lessons"?

After the pilot study, question 28 read as follows:

"List the material you use to prepare the genetics lessons".

Participants who took part in the pilot test were excluded from the main study. The key components used to assess performance of measurement instruments are validity and reliability (Bruce, et al 2011:173).

3.4.4 Validity

The measurement instrument was validated to be having applicable concepts as the service of an experienced biostatistician was sought in this study. Inferences made from responses confirmed the validity of the measurement instrument in this study because Creswell (2009:235) attest that validity refers to an instrument that brings forth meaningful inferences from outcomes of a particular measurement instrument. There are different categories of validity namely: content, construct and face validity.

3.4.4.1 Content validity

The instrument in this study covered adequate questions to reflect representativeness of the study to achieve content validity (de Vos, Strydom, Fouché and Deport 2002:167). Genetic concepts formed part of the questions on the measurement instrument of the study.

3.4.4.2 Construct validity

Construct validity refers to "how well the items in the questionnaire represent the underlying conceptual structure." (Gerrish and Lacey 2010:372). To achieve construct validity in this study Consensus Panel on Genetic/Genomic Nursing Competencies 2008 was used to assist in the creation of items on the measurement instrument. Concepts used in genetics education were used to achieve construct validity.

3.4.4.3 Face validity

Face validity relate to the appearance of the measurement instrument with regard to its contents and length of responding to questions (Bless, Higson-Smith and Sithole 2013:235). The measurement instrument in this study was reasonable in terms of duration for self-responding, as mentioned earlier, and no foul language was used. In addition, the measurement instrument had close-ended questions to assist participants to choose their preferred responses. Further, to achieve face validity, the measurement instrument had complied with between 10 to 12 pages per questionnaire as suggested by Bruce, et al (2011:173), as the one for this study contained only 11 pages inclusive of leaflet information and consent form. The more pages the questionnaire has, the more time will be consumed in responding to items, which is undesirable as respondents have a tendency of abandoning such a questionnaire without answering all questions (Bless, et al 2013:235.

3.4.5 Reliability

Reliability was achieved as the questionnaires were sent to various respondents in different NEIs in South Africa and the results were consistent and stable ensuring achievement of reliability (Creswell

2009:233). The measurement instrument was used on similar respondents and the results were identical, confirming reliability.

3.4.5.1 Internal consistency

Internal consistency addresses the extent to which all items on an instrument measure the same variables at a time (Brink, et al 2008:164). In collaboration with study leaders the developed instrument was analysed and was evaluated and was confirmed by an experienced biostatistician to ensure internal consistency (Appendix B).

3.5. DATA ANALYSIS

In mixed method research data analysis, like data collection, is done separately (Creswell and Plano Clark 2011:203). Quantitative raw data was required to form numerical codes for statistical analysis (de Vos, et al 2002:4) and the following steps were applicable in this study:

3.5.1 Preparing the data for analysis

This step entailed converting the raw data into a form useful for data analysis that includes scoring data by assigning numeric values to each response, cleaning data for entry errors and coming up with new variables as suggested by Creswell and Plano Clark (2011:204). In consultation with the biostatistician the researcher captured the information from each questionnaire on the Microsoft Excel sheet. Numeric values were assigned to each response in the questionnaire in preparation for statistical analysis. Responses which were irrelevant were removed from the Microsoft Excel sheet. The unrequired responses were from question number 10 that probed for number of hours dedicated for genetics education and some participants provided periods.

3.5.2 Exploring data

Exploring the data involved inspecting data and conducting descriptive analysis that included the mean, standard deviation and variance of responses to each item on an instrument for determination of general trends in the data (Creswell and Plano Clark 2011:206). The researcher, in collaboration with the biostatistician, explored data for its distribution and it was normally distributed to determine relevant statistics as suggested by Creswell and Plano Clark (2011:206). Descriptive statistics were generated for major variables. As new information was generated regarding genetics education in advanced midwifery programmes through quantitative design. This led to accomplishment of the knowledge stage according to Rogers' diffusions of innovations theory.

3.6. QUALITATIVE DATA COLLECTION (phase 1 step 2)

The aim of step two was to explore and describe the perceptions of advanced midwifery educators regarding a competency-based curriculum framework that could standardise genetics education for an advanced midwifery programme. Data were collected between October and December 2013 and the English language was used as medium of communication throughout the process. In this study multiple data, using focus group and in-depth interviews, were used and resulted in complementary strengths and non-overlapping weaknesses from the single data collection methods (Johnson and Onwuegbuzie 2004:18).

3.6.1 The interview schedule

An interview schedule (Appendix D) was designed as a semi-structured tool prepared to assist in facilitating the discussions and interviews during data collection. The main question was: "Explain your perceptions

regarding a competency-based curriculum framework that could standardise genetics education in an advanced midwifery programme."

3.6.2 Preparations and rules for interviews

Prospective participants were contacted telephonically to make appointments with them for focus group discussions and in-depth interviews where applicable. Over the phone dates and times for interviews were set as per agreement between the researcher and participants on either focus groups discussion or individual in-depth interviews. A notebook, pen and voice tape recorder were prepared and they were used during interviews.

During actual focus group discussions and individual in-depth interviews brief introduction of the purpose of the study was done and establishment of ground rules which were laid down and agreed on between the researcher and participants before interviews were commenced (Botma, et al 2010:213). The rules included switching off cell-phones and giving each other opportunity to respond to each question during interviews.

Permission to use a voice recorder was obtained from participants. The researcher facilitated discussions during the two focus group discussions and one group was facilitated by the moderator in the presence of the researcher, who was taking field notes. Participants were offered a card with a typed question for discussion. Probing was used to elicit further ideas without pressurising responses. Responses were tape-recorded and observations were done and recorded. Observations of non-verbal cues during interviews were written down as these were important, and were combined with oral information obtained from participants for data analysis (Maree 2007:92). The researcher transcribed the information from voice tape recorder soon after each interview.

3.6.3. Pilot study

The research question for step two was tested with two similar participants interviewed for the main study. The pilot study assisted in ensuring that the researcher became familiar with the questions (Maree 2007:102). For this study the pilot study was helpful in assessing the amount of time used during individual interviews and focus group discussions. The time required for individual interviews varied between 25 and 30 minutes, and for focus group discussions the time spent during discussions was one hour.

The biographic information of participants recruited to take part in the pilot study is depicted in table 3.3:

Table 3.3 Demographic profile of participants for pilot study (N=2)

Variable	Categories	Frequencies
Gender	Female	2
Age in years	40 – 50	2
Race	Black	1
	White	1
Institution	College	1
	University	1
Educational level	Bachelor and Specialization	1
	PhD	1

3.6.4 Main data collection

Focus group discussions were initially the only methods of data collection in this study. Due to the vastness of NEIs in each province challenges were experienced as participants were unable to meet at pre-arranged meetings. In consultation with the study leaders, permission was sought to do individual interviews as participants were available on an individual basis. Individual in-depth interviews provided an opportunity to disclose

certain personal information that could have been withheld in focus group discussions. Data collection methods are depicted in table 3.4.

Table 3.4 Methods used for data collection

DATA COLLECTION METHOD	**NATURE OF DATA**	**PARTICIPANTS**
Face-to-face interview	Text	4
One-on-one telephone interview	Text	4
Focus group discussions (3 groups were held)	Text	11
		Total=19

3.6.4.1 Procedures for data collection

Focus group discussions were the initial primary method identified for collecting data. The reason for choosing focus group discussions is the opportunity for group dynamics created through interaction among members (Neale 2009:214). Obtaining perceptions from advanced midwifery educators, the researcher employed probing and paraphrasing throughout the data gathering process.

Although focus group discussion was identified first, the NEIs had few participants to make a group for discussion. The number of participants in NEIs ranged between one and five per institution. Other barrier to a desired number of participants in the group was the unforeseen change in the daily plan at NEIs and that affected meetings. Further the vastness of NEIs within and between provinces made it impossible for participants to form groups for discussions. In consultation with study promotors it was agreed to do individual interviews and perform focus group discussions where possible with the same population identified for this study.

Semi-structured interviews were employed as it allowed adaptation during interviews based on the situation at the time. At least four participants

were interviewed face-to-face at their area of employment which, according to Speziale and Carpenter (2007:28), is considered to be the natural field for data gathering. In addition four telephone interviews were conducted. At least three focus group discussions were conducted as participants were able to meet at the same time without work pressures. The total number of participants who took part during this step was 19. At least 84% (n=16) of the sample were from nursing colleges, while 16% (n=3) came from universities. Distribution of the sample is presented in chapter six, figure 6.1.

3.6.5 Sample

The sample consisted of thee focus group discussions with a total of 11 participants. Individual in-depth face-to-face and one-on-one telephone interviews consisted of four participants each respectively. At least 19 participants took part in either focus group discussions or in-depth individual interviews. Their ages ranged between 43 and 65 years. All participants were females. Biographical information of participants is depicted in table 3.4.

Table 3.5 Biographical information of participants for qualitative study (n=19)

Variable	Range	Frequency	Percentage (%)
Age	40 - 45	3	9.3
	46 – 50	9	28
	51 – 55	9	28
	56-60	6	18.7
	›61	2	6
Gender	Male	0	0
	Female	19	100
Institution of teaching	College	16	84.2
	University	3	15.7

3.6.6 Focus group discussions

A focus group interview is a technique used in qualitative research to collect data where members with similar characteristics are encouraged to disclose their knowledge pertaining to the phenomenon of interest (Neale 2009:211). Focus group discussions were constituted by two groups which comprised of three participants each and one group with five participants. Group discussions were held at the place of employment of participants. Open-ended questions (as contained in the interview guide) were used to guide discussions and multiple responses were received (Neale 2009:213). The open-ended questions were useful to assess if adaptation in the curricula of advanced midwifery was necessary or not regarding genetics education. Semi-structured interviews were used as the researcher had a set of questions used for facilitation of discussions and interviews. The interview guide is attached as appendix D.

Focus group discussions were helpful because elaborative rich data was obtained as stimulation and recalling of information among participants took place (Speziale and Carpenter 2007:38). During discussions, some participants kept on relating to what the other participant had said earlier while emphasising a point. Past events and information was remembered as others were relating during discussions. The researcher was in attendance throughout the discussions ensuring that all group members took part in the discussion. Every member in each group was encouraged to give her own opinion of each question asked.

On the other hand Speziale and Carpenter (2007:39) stated that benefits of focus group discussion were more than disadvantages. Dominant members were present in two focus groups of which the researcher ensured that all other participants were given an opportunity to respond to each question posed as part of the ground rules set at the beginning of discussions. This helped to reduce one-sided input as cited in Neale

(2009:215). The researcher probed participants who were quiet so that their opinions were obtained. The researcher and moderator were cautious to ensure that all participants were given an opportunity to respond to all questions posed without compromising participation.

3.6.7 In-depth interview

The in-depth interview is a qualitative method used where the researcher interviews a participant to obtain "opinions, facts and stories that will shed light on the research topic or questions from the viewpoint of an expert." (Neale 2009:197). Using in-depth individual interviews, four face-to-face and four one-on-one telephone interviews were conducted as Neale (2009:197) recommend that various interviews are allowed, including telephone conferencing to generate information. Face-to-face interviews were done at the place of employment of each participant. Telephone interviews were conducted during office hours as participants were then phoned at their work place. Further information regarding the interview process is described in chapter six. The strength and weaknesses of in-depth interviews for this study is described in table 3.6.

Table 3.6 Strengths, weaknesses and application of in-depth interviews

Strengths	Criteria	Application
Contextual data	Flexibility of interview process	Meaning was brought forth through interviews. Participants were allowed to ask questions throughout interviews as and when necessary.
		Clarity was provided as brief introduction before interviews. This happened as a two-way process between the researcher and participants. Participants had an opportunity to get clarity on certain questions in this study.
		Probing for further input was used throughout interviews.
		Reflection on experiences enhances validity. Participants had an opportunity to reflect on their knowledge regarding genetic education in the advanced midwifery programme.
	Narration	Self-reporting by participants in this study reduced responses taken out of context. Information was verified with participants at the end of each interview.
Perspective of participant is a priority	Experienced participant	Quotations from participants reinforced validity of findings. These are included in chapter six
Insufficient knowledge about topic	Inductive	Generation of new ideas and theory was achieved through in-depth interviews. Information about the topic was lacking and interviews brought forth ideas needed.
Weaknesses	**Criteria**	**Application**
Subjective	Bias	The researcher positively indicated a need for information to improve genetic education in advanced midwifery which is currently lacking. The researcher concentrated on the positive because being negative enhances subjectivity leading to invalid and unreliable data.
Time-consuming and lengthy travelling	Access to participants	About 16 ethical permits were obtained and in the university a gatekeeper decided that participants were busy, denying the researcher an opportunity to interact with participants. Transcribing data was lengthy and the researcher had to write information word for word.
		Researcher travelled to far places to reach participants at their area of work.
		Phoning was also a major factor that consumed time and money to make arrangements for interviews.
Leading questions and failure to probe	Participant redundant	Interview scheduling was available to guide the interview process and probing was used to obtain further information.
Large unstructured narrative data	Difficult analysis	Each transcript was analysed individually and similar patterns from different transcripts were clustered

3.7 QUALITATIVE DATA ANALYSIS

Qualitative data analysis was done separately from quantitative data as suggested in Creswell and Plano Clark (2011:203) that each data should be analysed independently. Data from focus group discussions and in-depth individual interviews were transcribed word for word from the voice

tape recorder by the researcher. Observations written during interviews were also included during transcription of data. Data was organised before analysis.

3.7.1 Exploring data

Data were read through several times during which process general understanding of the data set was developed. Memos were written in the margins of transcripts (Botma, et al 2010:233). The memos were important first steps in forming broader categories such as codes and themes for data analysis as pointed out in Creswell and Plano Clark (2011:207). In addition tape-recorded information was listened to several times during transcription for comparison with field notes and voices on the voice recorder. This process was helpful as the researcher became familiarised with the data.

Further, dross (unhelpful information) was removed from the data by taking out information that was not related to the data such as 'like I said', 'like my colleague said', as these were not reducing or assisting data (Burnard 1994:1120). Furthermore, to prevent identification of participants in the data, names which were mentioned during interviews were removed from transcripts.

3.7.2 Preparing data for analysis

The researcher transcribed text data from focus group discussions and in-depth interviews and arranged it in files per transcript in preparation of analysis as advocated in Creswell and Plano Clark (2011:206). The transcripts were further checked by the researcher for accuracy through listening to the recorded voice tapes several times. Data was organised in a user-friendly manner by opening a folder for all transcripts. Interviews were assigned labels. Eleven in-depth interviews were assigned a P letter

with a numeric number of between one and eleven (P1 to P11). Each transcript was assigned a code such as P1, P2, etc. Three focus group transcripts were also assigned code numbers. Focus groups were assigned as focus group one, two and three. Participants in each group were also assigned a P letter followed by a numeric one up to five. In addition dates were also entered on each transcript for identification purposes.

3.7.3 Analysing the data

Thematic analysis was the preferred method of data analysis because it was useful in interpretation of meanings provided by participants for this study (Alhojailan 2012:40). The analysis was focused per question and responses to that particular question in all various data as Taylor-Powell and Renner (2003:2) stipulated that, by doing so, consistency is maintained and differences in the data is easily identified. It means the responses for a particular question were analysed at a time.

Different highlighters were used to identify similar codes and patterns in the data. Similar codes were highlighted with comparable colours and were grouped into broader themes as recommended (Creswell and Plano Clark 2012:298; Neale 2009:218). Subsequently the broader themes were grouped into larger perspectives that reflected findings providing answers to the research questions. This process was helpful as similar patterns and differences from transcripts were easily located. A descriptive summary of what each transcript reflected in response to each question was prepared. Findings are presented in chapter six where a detailed report regarding thematic analysis is described.

The service of an independent analyst was used to test the reliability of the coding and to reduce the risk of subjectivity and bias as proposed in Neale (2009:218). Results obtained from qualitative data served as new information generated from the data. The knowledge stage of diffusions of

innovations theory, according to Rogers, was further enhanced as new ideas surfaced.

3.8 MEASURES TO ENSURE TRUSTWORTHINESS

Trustworthiness as alternative construct for validity and reliability in qualitative research was addressed through five principles namely: truth value, applicability, consistency, neutrality and authenticity (Botma, et al 2010:232). These principles are described as follows:

3.8.1 Truth value

Truth value was established through the discovery of experiences of participants as prolonged engagement with participants during data collection was employed (Botma, et al 2010:233). This led to understanding of participants' perspectives regarding genetic education in the advanced midwifery programme. The interview schedule was used as a guide in all interviews and member checking was used to ensure credibility. Preliminary findings were taken to participants to verify if findings reflected their views, and confirmation of results was obtained.

3.8.2 Applicability

Applicability refers to the degree to which findings could be generalised using transferability strategy (Botma, et al 2010:233). Data saturation, thick description and purposive sampling were used to ensure applicability of findings in other settings. Thick and dense description of the methodology, peer assessment of the study and the use of the co-coder were applied to ensure applicability of results (Botma, et al 2010:233).

3.8.3 Consistency

Consistency refers to whether the findings were reliable if the inquiry was replicated with the same participants in a similar context following a

dependability strategy (Botma, et al 2010:233). Detailed description of data collection and the type of data collected, thick description of the used methodology, peer assessment of the study and the use of a co-coder were employed to ensure trustworthiness of the results.

3.8.4 Neutrality

Neutrality entailed freedom from bias during the research process, reporting of findings and descriptions of results which are solely from the participants and research conditions which followed a confirmability strategy (Botma, et al 2010:233). To ensure neutrality confirmability strategies such as triangulation, audit and reflexivity were employed. Mixed methods design was used to investigate the same phenomenon to attain triangulation, while transcripts were sent to an independent analyst and results were consistent.

3.8.5 Authenticity

Authenticity refers to the extent to which the researcher fairly and faithfully shows different realities (Botma, et al 2010:234). The experiences of participants were reported precisely to ensure authenticity in this study. In addition, verbatim quotes were presented as evidence for authenticity.

3.9 PHASE TWO

3.9.1 The objective of phase two

The first objective of phase two was to:

- Identify genetic competencies necessary for inclusion in the curriculum framework to standardise genetics education for advanced midwifery programme.

Based on the findings from phase one, there was a need to present findings to stakeholders in the workshop to make them aware of limitations concerning the level of genetics education in the advanced midwifery programmes. The workshop comprised experienced professionals in basic midwifery, advanced midwifery education, genetics education and scholars who were conversant with negative implications to learners and consumers if the status quo of genetics teaching remained.

3.9.2 Population

Nineteen participants (19) were identified to take part in the workshop and only 17 attended. According to Truong (2014:34), when "too few participants are involved is a study, then there are typically some concerns about the conclusions that can be drawn from data collected from those individuals." On the other hand, too many participants suppress active participation. The population comprised of experts in advanced midwifery education including those with adequate information regarding genetics practices in clinical settings.

3.9.3 Selection of participants invited to the workshop

The planned population comprised six nurse educators of the basic and advanced midwifery programmes from the universities and one from a nursing college. In addition two practicing advanced midwives with clinical settings experience, one from a tertiary hospital and the other coming from a district hospital participated in the workshop. Two educators responsible for curriculum development in nursing and midwifery education, both from universities took part in the workshop.

Two representatives (one registered nurse and one geneticist) from NDoH (South Africa), who were adequately informed about genetics education and the influence of genetics on the society participated in the study. A community representative and one consultant from private sector also

participated in the workshop. A medical doctor from a university, teaching genetics participated in the workshop. The final composition of participants who took part is described under 8.3.1 in chapter eight.

3.9.4 Inclusion criteria

- Nurse educators of the advanced midwifery programme from NEIs who were involved in the facilitation and teaching of the programme at the time of the study.
- Practicing advanced midwives from tertiary and district hospitals were recruited as they have the experience on how genetics issues are addressed in clinical settings.
- Nurse educators experienced in curriculum development, who have been in education for more than five years, were considered as curricula experts.
- Geneticist and genetics nurses from the NDoH in South Africa responsible for genetics education in the country.
- A nurse expert with a PhD who was previously involved in coordination of genetics coordination in South Africa.
- A medical doctor teaching genetics to undergraduate learners at the university.
- Private sector was also represented by one person.
- A community representative was also invited to take part in the workshop because, according to Bruce, et al (2011:66) the community should also be involved in issues of health and education.

3.9.5 Organising the workshop

Planning of the workshop was done by the researcher. The agenda, which formed part of the invitation letter, was prepared and sent to all

prospective participants. The invitation letters were sent through e-mail, fax and hand delivery. The venue of the workshop was the Tshwane Learning centre, which was then reserved and prepared for the workshop. The centre is large enough with ample space and resources to conduct workshops. Resources include a plenary hall, side halls for nominal group technique meetings, data projector, laptop, flip charts and electrical extension cords. Pens, writing pads and refreshments were organised by the researcher. One colleague (educator) acted as an assistant organiser for workshop logistics.

3.9.6 Invitation of participants to the workshop

Letters of invitation were sent through email to participants who were requested to indicate their availability for the workshop in the form of an RSVP by the due date. Other invitation letters were hand-delivered to participants at their workplace due to lack of e-mail facilities. The invitations were extended to all participating NEIs so that at least a maximum number could attend the workshop or, if others drop out at a crucial moment, the workshop could still continue.

3.9.7 The workshop

The workshop was a gathering of participants with experience in advanced midwifery curricula, teaching, curricula experts, genetics nurses, geneticist and clinical experts in maternity in the person of registered nurses. Further, one person present in the workshop was offering sessions on genetics to undergraduate. The language used for the workshop was English as most training in South African NEIs is done in that language.

Besides presenting the results of phase one in the workshop, nominal group technique meetings to reach consensus on genetics competencies

necessary for inclusion in the envisaged curriculum framework to standardise genetics in the advanced midwifery programme formed part of the workshop. As the theoretical framework identified for this study, the first three stages of diffusions of innovations theory according to Rogers were executed.

3.9.6.1 Knowledge stage

Presentation of results from phase one served as awareness knowledge as participants were made aware of current genetics education in the advanced midwifery programme. As the results were the first in bringing forth information regarding genetics education in the programme, stakeholders' knowledge was enhanced. Information contained in the Policy Guidelines of 2001 on variations in genetics education was confirmed through the findings of phase one in this study. The knowledge stage was an opportunity to bring stakeholder together to learn of differences in genetics education in the advanced midwifery programme.

According to Anema and McCoy (2010:2-3) a curriculum framework, if implemented, it could contribute to making a difference in preparing learners. For example, if common genetics content is followed in NEIs, it could result in empowered learners. During the workshop, advantages of genetics education were presented in an endeavour to improve knowledge among stakeholders as these benefit nursing education and practice, educators, learners and the community.

Lashley (2007:7), one of the pioneers of genetics in nursing contend that knowledge of genetics is important for humans across their lifespan. Lashley (2007:7) further reports that common heritable variants in human populations, and the identification of genetics contributions to disease and drug response, are well understood as new therapeutic approaches develop through adequate genetics education. The presented

information formed part of new information offered during the workshop plenary to enhance knowledge regarding genetics among stakeholders (Anema and McCoy 2010:198; Rogers 1995:162; Rogers 2003:169).

The presentation of phase one results required stakeholder input in the workshop to be able to make a decision on the necessary competencies to be considered for inclusion in the new curriculum framework. Further details about benefits of genetics to individuals, the community and learners were described. Following the presentation of phase one results that constituted the knowledge stage, stakeholders were divided into two groups for the next stage (persuasion) of diffusions of innovation theory according to Rogers.

3.9.6.2 Persuasion stage

The persuasion stage was an innovation-decision process whereby stakeholders decide if they favour new information based on presented information in the workshop (Rogers 1995:162; Rogers 2003:169). The benefit of genetics education encouraged the stakeholders to support the inclusion of specific genetic competencies in the advanced midwifery programme. During this stage two groups were formed to create nominal group technique meetings because reinforcement of information and consensus in groups, support a high chance of empowerment to group members (Anema and McCoy 2010:198). The process of nominal group technique meetings captured the persuasion stage because during these meetings, stakeholders persuade each other regarding necessary competencies that needed to be addressed in advanced midwifery programme if consensus is reached. At this stage favourable attitudes are formed towards improvement in genetics information among participants in each nominal group technique meeting (Anema and McCoy 2010:198).

- ***Nominal group technique meetings***

The nominal group technique meetings were formulated to discuss and reach consensus among group members regarding genetics competencies necessary for the advanced midwifery programme (Potter, Gordon and Hammer 2004:126). The aforementioned authors further state that nominal group technique meetings are useful in evaluating the existing post-graduate programmes due to its influence on academics, learners and key stakeholders. The nominal group technique meetings were relevant because the genetics outcomes and teaching content for the advanced midwifery programme were not previously evaluated in South Africa. In addition participants in nominal group technique meetings in this study had a right to propose additional information deemed relevant for inclusion in the envisaged curriculum framework. Input from participants formed part of the results from the two nominal group technique meetings.

- ***Preparation for conducting the nominal group technique meetings***

For this study two nominal group technique meetings were conducted in four phases namely: generating ideas, round robin, clarification of items and voting on ideas (Botma, et al 2010:252). Two rooms at Tshwane Learning centre were each used for a group meeting. Three questions were posed to elicit discussion and consensus was accomplished. Both rooms had tables to enable writing and there was enough space to write without disturbances. At least one group comprised of eight and the other had nine participants. Consent forms were signed before participation.

Steps of nominal group technique were followed in order to generate input

- Step one was to generate ideas and participants were requested not to interact with one another (Botma, et al 2010:251). A written question related to the genetics competencies was presented to group members and a pen and a paper was provided to write down ideas (Botma, et al 2010:251).

- Step two was a feedback session where group members shared ideas which were written down on a flip chart without discussion or rephrasing (Botma, et al 2010:251).

- In step three ideas were discussed and an opportunity was created for clarity-seeking questions. Group members offered responses and the facilitator summed up the inputs (Botma, et al 2010:252). All information was listed on the flip chart.

- In step four, each participant had an empty card to write ideas based on the list on the flip chart in order of priority from one to ten (Botma, et al 2010:252). Cards were then collected and ideas were read as points were assigned. Ideas which were highly rated were considered to be mostly favoured (Botma, et al 2010:252). The group then voted on ideas and consensus was reached on those competencies which were highly rated.

Advantages and disadvantages of nominal group techniques

The advantages of nominal group techniques are that a greater number of ideas are generated (Department of Health and Human Services 2006:2). It balances the influence, diminishes competition and pressure to conform, and encourages participation, and that the group prioritises

ideas democratically (Department of Health and Human Services 2006:2). In this study each participant was given an opportunity to indicate her/his own ideas from each posed question, which was an advantage in this study.

The disadvantages of nominal group techniques are that it requires preparation, there is a single meeting for a particular topic and it reduces time for discussions (Department of Health and Human Services 2006:2). The researcher planned and prepared for nominal group techniques in advance to prevent time limit. In addition a second lecturer was assigned to facilitate the second group while the researcher facilitated the first group.

3.9.6.3 Decision stage

Decision stage is the making of a commitment to adopt or reject the new idea (Rogers 1995:171; Rogers 2003:169). Rogers (1995:171) stipulated that adoption of new ideas is enhanced by the presence of influential people who have already adopted an innovation in the topic under discussion. In this study influential people who had satisfactory genetics knowledge in nursing were present to assist in advancing the genetics education agenda. Genetics nurses as experts in the field were divided between the two nominal group technique meetings as they were significant and valuable during discussions. Further a geneticist was also present and that enhanced acceptance of new ideas during nominal group technique meetings. The presence of expert in these meetings enhanced achievement of decision stage. Each group presented their ideas which were consolidated to create genetics competencies.

3.10 ETHICAL CONSIDERATIONS

Ethics is concerned with the protection of humans through reducing danger to the sample in research (Schneider, et al 2007:81). In this study participants were not exposed to any danger and their inputs were kept confidential. The real names of the sample were not stated in the report of this study. The sample was approached after ethical approval and participation was voluntary. Further permission was also obtained from the each person before they were enrolled in the study (Creswell and Plano Clark 2011:113). Ethical principles employed in this study are explained in chapter one under 1.9 and further depicted in table 3.6 in this chapter.

3.10.1 Phase one of the study

During step one of phase one respondents were provided with information leaflet (appendix A) attached to each questionnaire for voluntary participation and to make informed decisions. In step two the information leaflet (appendix A) was also explained before focus group discussions and in-depth interviews to allow participants an opportunity to decide whether they wanted to take part in the study or not. All participants signed the consent forms and those interviewed telephonically participated voluntarily as verbal consent was obtained.

3.10.2 Phase two of the study

Before commencement with nominal group technique meetings the researcher, who acted as the facilitator of the workshop, also acted as moderator for one group and a colleague acted as moderator for the second group. An information leaflet was provided to all members and the purpose of the study was explained. Stakeholders were further informed that participation was voluntary and a consent form was signed by every

member. For the researcher to guarantee the safety of participants, certain principles were adhered to namely: confidentiality, beneficence and informed consent. Table 3.6 depict ethical principles followed in this study.

Table 3.7 Ethical principles employed

PRINCIPLE	**CRITERIA**	**APPLICATION**
Confidentiality	Anonymity and privacy	Real names of participants were not used in the report.
		Participants were referred to as P1 etc. to protect their identity.
		Individual settings were not assigned particular findings (Schneider, et al 2007:86).
Beneficence	Protection	No experiment was part of this study, so no danger was envisaged.
		Psychological harm or distress was not done to participants.
		Participation was voluntary (Schneider, et al 2007:88; Polit and Beck 2008:170).
Informed Consent	Information	A leaflet detailing the nature of the study was provided to participants so that they were able to make informed decisions regarding participation or declining to participate (Polit and Beck 2012:157).

Permission was obtained from the following institutions:

Appendix G: Ethics approval from the University of Pretoria (UP)

Appendix H: Ethics approval from the Gauteng Department of Health on behalf of Nursing Colleges in Gauteng Province.

Appendix I: Approval from Ga-Rankuwa Nursing College

Appendix J: Ethics approval from Kwa-Zulu Natal Department of Health on behalf of colleges.

Appendix I: Permission from KwaZulu-Natal College of Nursing

Appendix K: Ethics from North West Department of Health

Appendix L: Mmabatho Nursing College

Appendix M: Ethical approval from the University of Johannesburg

Appendix N: Permission from the University of Kwa-Zulu Natal

3.11 SUMMARY

In Chapter three the research design and methodology used in this study were outlined. Two phases were used of which phase one was a combination of the quantitative and qualitative approaches as explanatory sequential design was employed. Quantitative data collection and analysis was conducted first, followed by qualitative data collection and analysis. Phase two comprised of a workshop with stakeholders at which phase one results were presented. Nominal group technique meetings were held in phase two. Three stages of diffusions of innovations theory according to Rogers were employed in chapter three.

3.12 CONCLUSION

Phase one results are presented in chapters four and six. Quantitative results are presented in chapter four and discussion of those results is in chapter five. Qualitative results are presented in chapter six, while discussion of the results is offered in chapter seven. Phase two process is presented in chapter eight.

CHAPTER 4: QUANTITATIVE RESULTS

4.1 INTRODUCTION

The previous chapter described research design, methodology employed and the process followed to address research question number two of the study. Data were analysed and interpreted in conjunction with literature. The results presented in this chapter conclude the process undertaken in phase one step one that addressed the first research question regarding current genetic education in an advanced midwifery programmes. It was important to do a situational analysis in order to understand current educational activities in advanced midwifery programmes.

Chapter four presents quantitative results by focusing on the following aspects: brief report on permission prior to data collection (section 4.2); sample and sampling technique (section 4.3); the questionnaire (section 4.4); data analysis (section 4.5); findings (section 4.6) and summary of findings (section 4.7). In chapter four, participants are referred to as respondents.

4.2 PERMISSION TO CONDUCT DATA COLLECTION

Permission to collect data was obtained from three Provincial Departments of Health in South Africa namely: Gauteng (Appendix G), Kwa-Zulu Natal (Appendix I) and North West (Appendix K) for conducting research at nursing colleges found in those provinces. Upon the provincial approval of the protocol, the researcher phoned heads of nursing colleges to request permission to do research. The research protocol and provincial

permits were sent to each nursing college and discussions were held between the researcher and head of departments explaining the purpose of the study and permission was then offered. Further, the research protocol served and received support at ethics committees in four universities where heads of nursing schools also provided written permission in support of the study. The researcher then distributed the questionnaires among educators of the advanced midwifery course only after institutional and individual (participants) permission was granted.

4.3 SAMPLE AND SAMPLING TECHNIQUE

Phase one, step one focused on educators of advanced midwifery programmes from NEIs in four provinces of South Africa. Forty (n=40) educators of an advanced programme were purposively selected and forty questionnaires were sent to those who agreed to take part in the study.

4.4 THE QUESTIONNAIRE

The questionnaire used for data collection is divided into section A, comprising of six items and section B that had 24 items (appendix A). Section A of the questionnaire required biographic information of respondents from item one to seven. Items eight to thirty required genetics information in the advanced midwifery programmes. The content of questionnaires was validated through the use of face and content validity. Pilot test was done to ensure face validity while content validity was further achieved through the expert review of items by biostatisticians (appendix B).

Forty questionnaires were distributed between July and October 2014 in order to obtain responses about current genetic education. Of the forty questionnaires, only 32 were returned providing a response rate of 80%. Thus eight (20%) questionnaires were not returned.

4.5 DATA ANALYSIS

The analysis was based on 32 returned questionnaires. Information from each questionnaire was captured using Excel 2010, which was converted into Stata 13 format before analysis. Descriptive analysis presented frequencies from which percentages for each variable were presented while mean and standard deviation were offered for continuous variables. The following section provides descriptive statistics about the sample and items responded to. A total of 32 questionnaires were received and all were analysed to represent quantitative data. Some items in the questionnaires were skipped, however all responses are presented graphically in this chapter.

4.6 RESULTS

4.6.1 Biographic information of the sample

Six items were included to describe the features of the sample. These items included gender, age, qualifications, years of experience, years after obtaining advanced midwifery (specialisation) and the type of NEI where respondents were employed. The distribution and percentages for the aforementioned variable are presented in figures.

4.6.1.1 Gender of respondents

Hundred percent (100%) of the sample were females as no questionnaires were received from males. Thus figure 4.1 present the results.

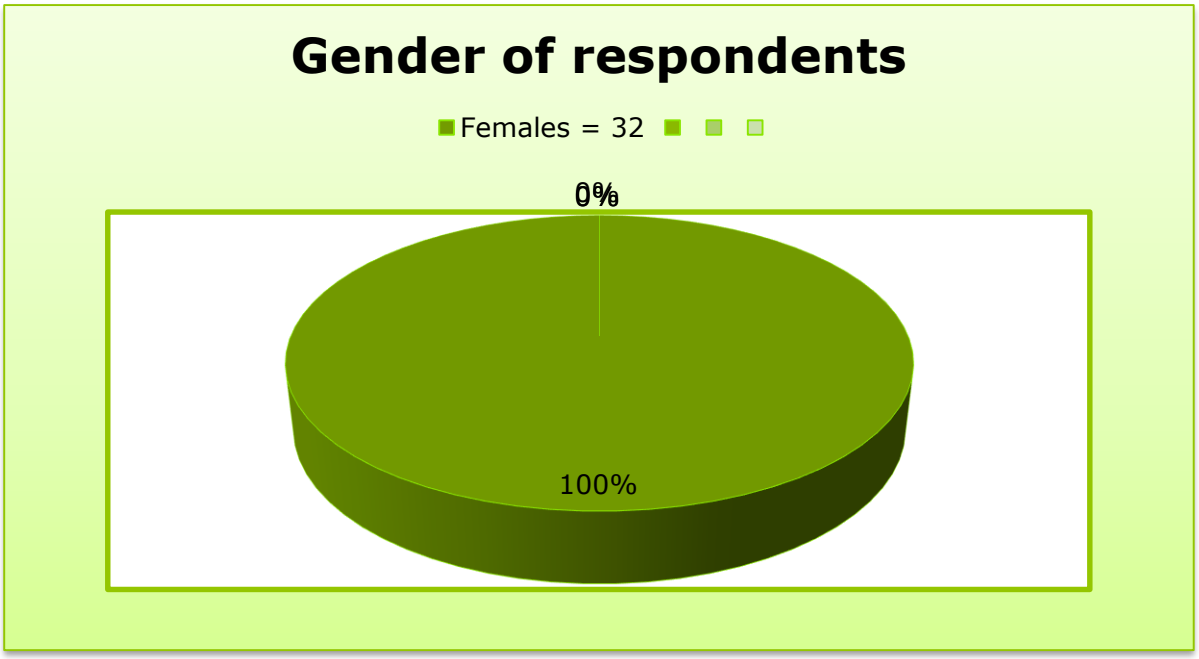

Figure 4.1 Gender of respondents (n=32)

Previous research indicated that nursing is a female dominated profession with midwifery "the most exclusively and disproportionately female specialities in the field of nursing." (Pilkenton and Schorn 2008:29). Hundred percent (100%) responses from females in this study confirm that nursing continues to be a female dominated profession.

4.6.1.2 Ages of respondents

The majority of the sample was between the ages of 46 – 50 (28%) and 51 - 55 (28%) years of age with median age of 52 years. Only nine percent (10%) of the sample fitted the younger age category of 40 – 45 years while 19% fitted in the category of 56 – 60 years range. The older age category was represented by six percent (6%) respondents while 9% did disclose their ages making it difficult for classification. The sample fitted various age categories and that could assist in sharing more light regarding genetics education in advanced midwifery programmes employed in NEIs. Table 4.2 presents age distribution of sample.

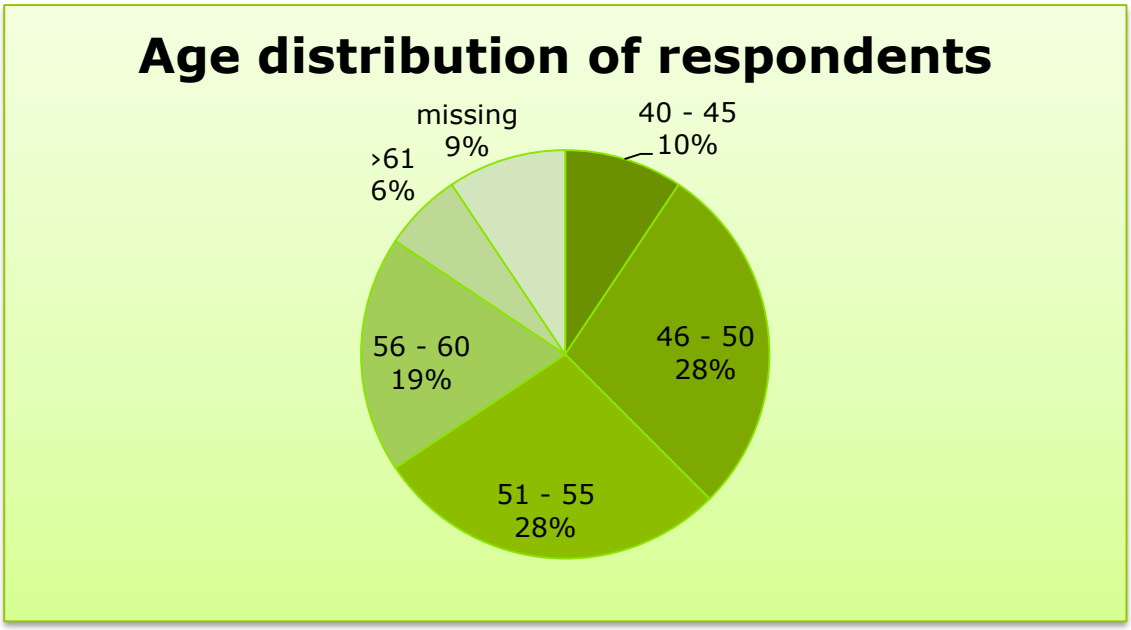

Figure 4.2 Age distribution of respondents (n=32)

The average age in the sample was 52 years with a standard deviation (SD) of 5.175. Only 38% of the sample was less than 50 years of age while 62% made up respondents in age range of above 50 years. This trend indicates an emerging shortage of educators in advanced midwifery programmes in future, more so because there are 0% respondents of below 40 years in the sample. It could reflect that nursing education produces insufficient number of younger midwives in post-basic diploma programmes or younger nurses choose other speciality areas rather than midwifery.

4.6.1.3. Qualifications of respondents

Forty-four percent (44%) of the sample had a bachelor's degree and post-basic diploma specialisation in midwifery. Thirty-one percent (31%) of the sample had master's degree (including specialisation), 19% had PhD while only six percent (6%) had diploma specialisation as their highest qualification. Thus figure 4.3 present results.

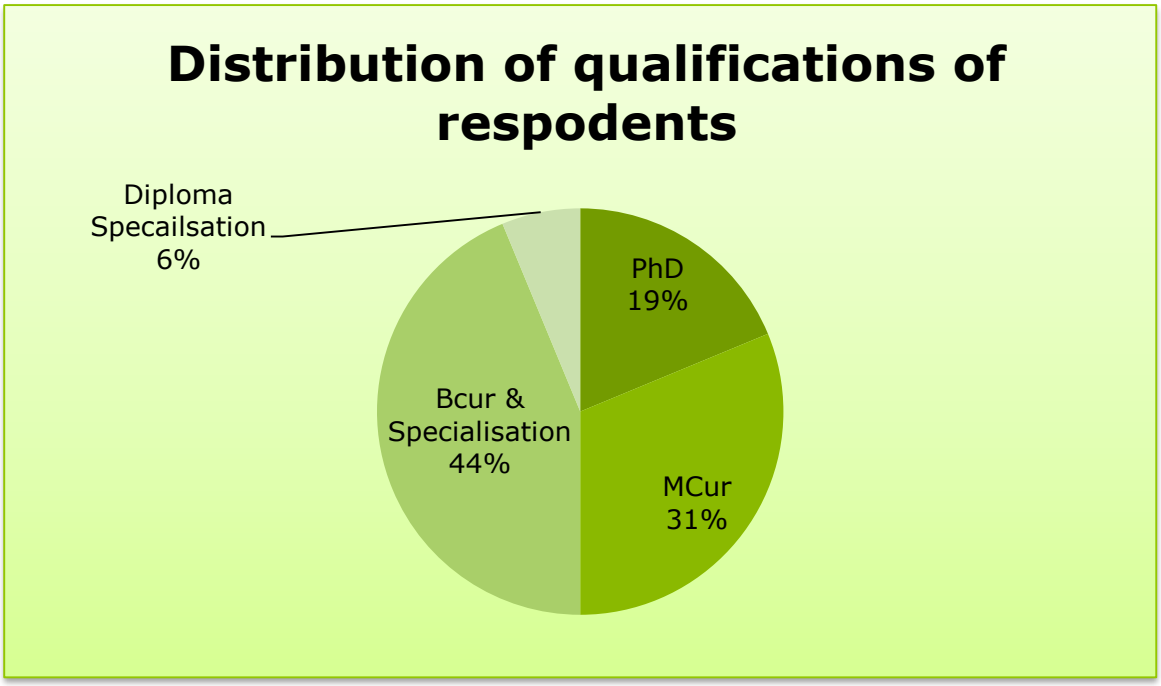

Figure 4.3 Distribution of qualifications of respondents (N=32)

The findings reveal diversity with regard to professional qualifications of respondents. It is a requirement to have a specialisation for one to be able to provide education in nursing and midwifery field in South Africa. In this study, all respondents received specialisation qualification in advanced midwifery.

4.6.1.4 Number in years of obtaining post-basic qualification (specialisation)

Forty-seven percent (47%) of the sample obtained their midwifery specialisation within the range of six to ten (6 – 10) years, while 19% obtained their qualification in the age range of between 11-15 years. Twenty-two percent (22%) of the sample obtained their qualification in the range period of 16-20 years while only 3% obtained the qualification more than 21years earlier. Figure 4.4 present the rest of the results.

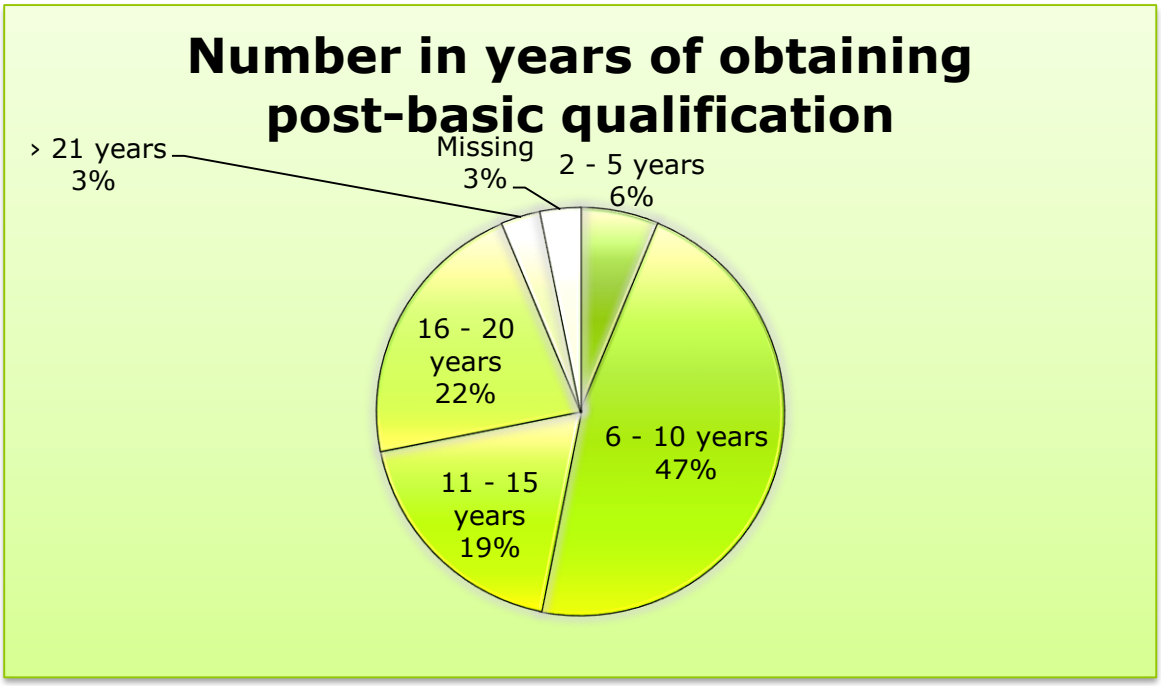

Figure 4.4 Number in years of obtaining post-basic qualification

The mean years of obtaining specialisation qualification was 11.6129 with a SD of 6.102. The variance in the number of years of obtaining specialisation (advanced midwifery) is ranging from two years to over 21 years. The variance in years assists in identification of number in years of professionals in advanced midwifery programmes from various NEIs in South Africa. Rich information about genetics education in the programmes is received from various generation groups. Fourteen years have passed since the inception of the Policy Guidelines for genetics particularly pertaining to genetics education in nursing, yet evidence of incorporation of genetics in nursing curricula remain slapdash.

4.6.1.5 Number in years of facilitating advanced midwifery programmes (n=32)

At least 44% (n=14) facilitated the advanced midwifery programmes between two to five (2 – 5) years while 31% (n=10) facilitated the same programmes between six and ten (6 – 10) years. Nineteen percent (19%), (n=6) facilitated the advanced midwifery programmes in the

range of 11 - 15 years with only 3% facilitated the programmes more than 20years. Table 4.4 illustrate the number in years of facilitating advanced midwifery programmes. Thus figure 4.5 presents the results.

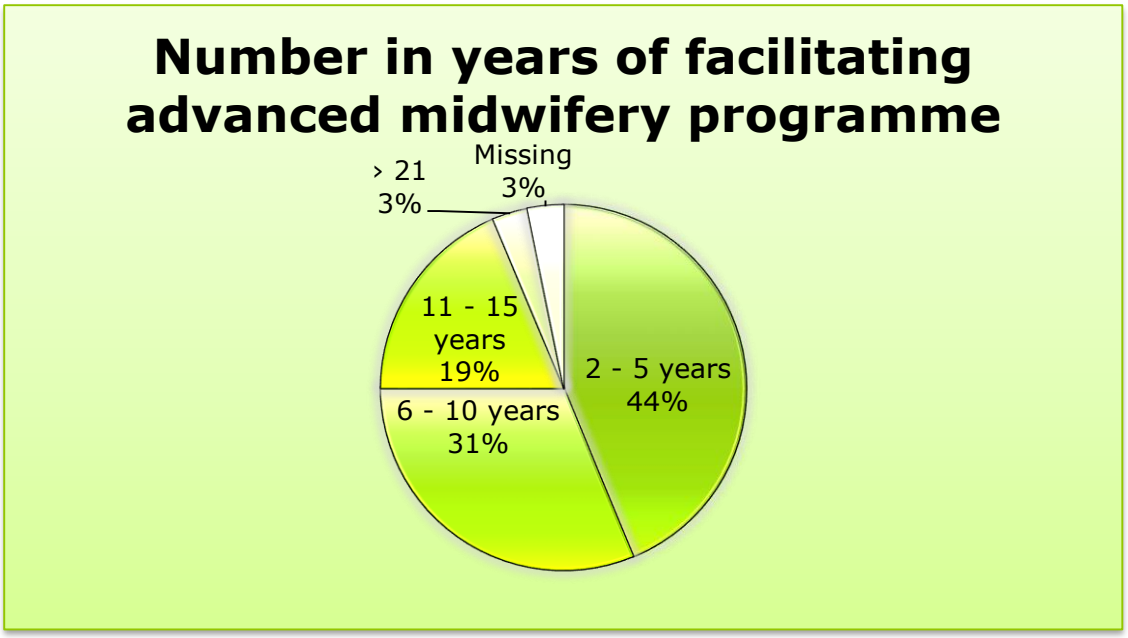

Figure 4.5 Number in years of facilitating advanced midwifery programmes (n=32)

The consecutive years of facilitating advanced midwifery programmes ranged from two to twenty one (2 – 21) years for this study. The mean score for this variable was 6.870 and a SD of 4.773 with majority (44%) falling within the novice group (five years and below). More respondents are falling in the novice group while the veterans group (10 years and above) were few as depicted in table 4.5. Novice facilitators were more than the veterans with regard to facilitation of the advanced midwifery programme. According to Rice (2010:2), under normal circumstances, educators with vast experience (10 years' experience) in the field provide adequate facilitation as opposed to beginners (first year) as they lack experience. The novice (5 years' experience) in the field always proved to be more efficient than veterans (Rice 2010:1).

4.6.1.6 Types of NEIs

Eighty one percent (84%) of the sample were employed in nursing colleges while 16% were from the universities. Figure 4.6 depict the results.

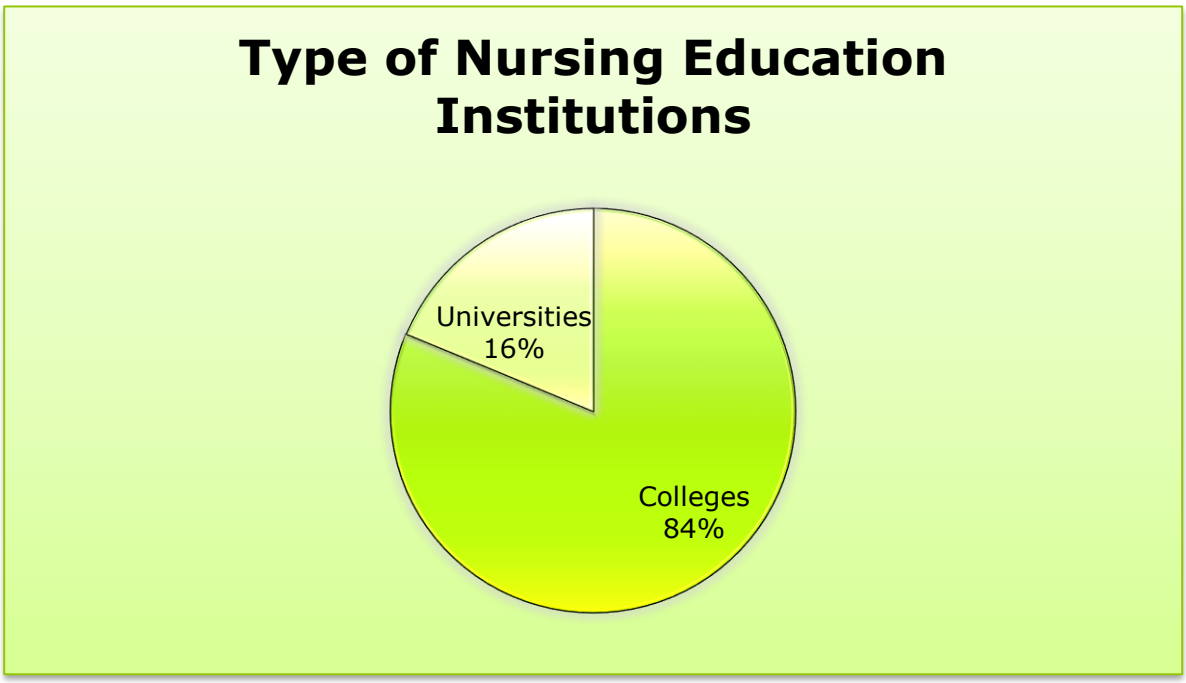

Figure 4.6 Type of Nursing Education Institutions (n=32)

Specific nursing colleges offer the advanced midwifery programmes on a full-time basis over a period of one year while specific universities offer the programmes over a period of two years on part-time basis. Advanced midwifery programmes offered at universities is coupled with research for graduates to obtain a Masters' degree. Both groups received the same qualification (specialisation) in advanced midwifery according to the country's authority (SANC) and the study sample was exposed to comparable examination questions. The Policy Guidelines of 2001 regarding genetics education in nursing in South Africa is equally applicable to both groups.

4.6.2 Findings on genetics education

Section B of the questionnaire comprised 24 items which represented genetics education (theory and practice) in advanced midwifery programmes. This section of the questionnaire was interested in determining the current theoretical and practical genetics education in advanced midwifery programmes as reported by programme implementers.

4.6.2.1 Inclusion of genetics in the curricula

Seventy five percent (75%) of the sample recorded that genetics is included in the curricula and 12% recorded that genetics is not included in their curricula. Thirteen percent (13%) skipped the item. Thus figure 4.7 present findings.

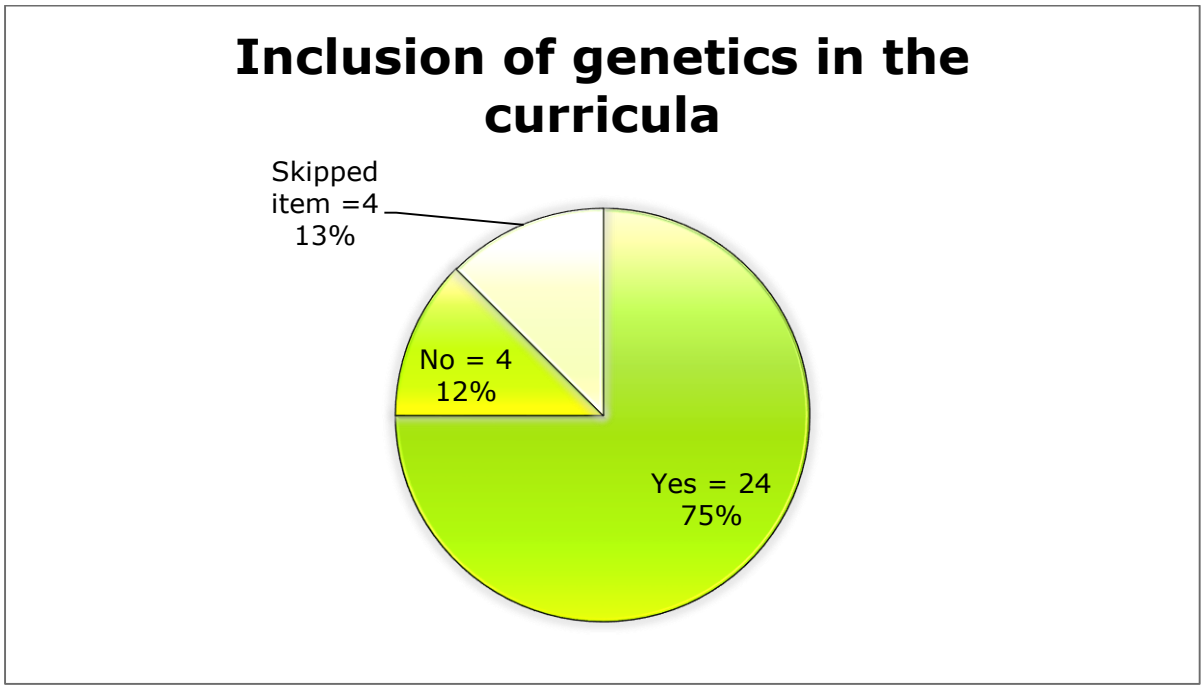

Figure 4.7 Inclusion of genetics in the curricula (n=32)

The variance in the inclusion of genetics in advanced midwifery curricula is noted in the results. Although 75% of the sample shows inclusion of genetics in their programmes, this is in contrast with the Policy Guidelines

(2001:29) as it stipulated that post-basic nurses receive no genetics education. Over three decades earlier Lemkus, et al (1978:25) hailed for the increase of genetics content in nursing curricula in South Africa, yet recently (in 2012) Godino and Skirton (2012:174) reported inadequate accommodation of genetics in nursing curricula in country. The lack of inclusion of genetics in nursing and midwifery curricula is also reported in Burke and Kirk (2006:232); Benjamin, et al (2009:484).

4.6.2.2 Components for inclusion of genetics

Most (72%) of the sample recorded that genetics is included during the preconception teaching. Twenty-two percent (22%) recorded inclusion of genetics in antenatal care teaching and a much smaller number (6%) included it in neonatal teaching. Figure 4.8 present findings on the component for inclusion of genetics.

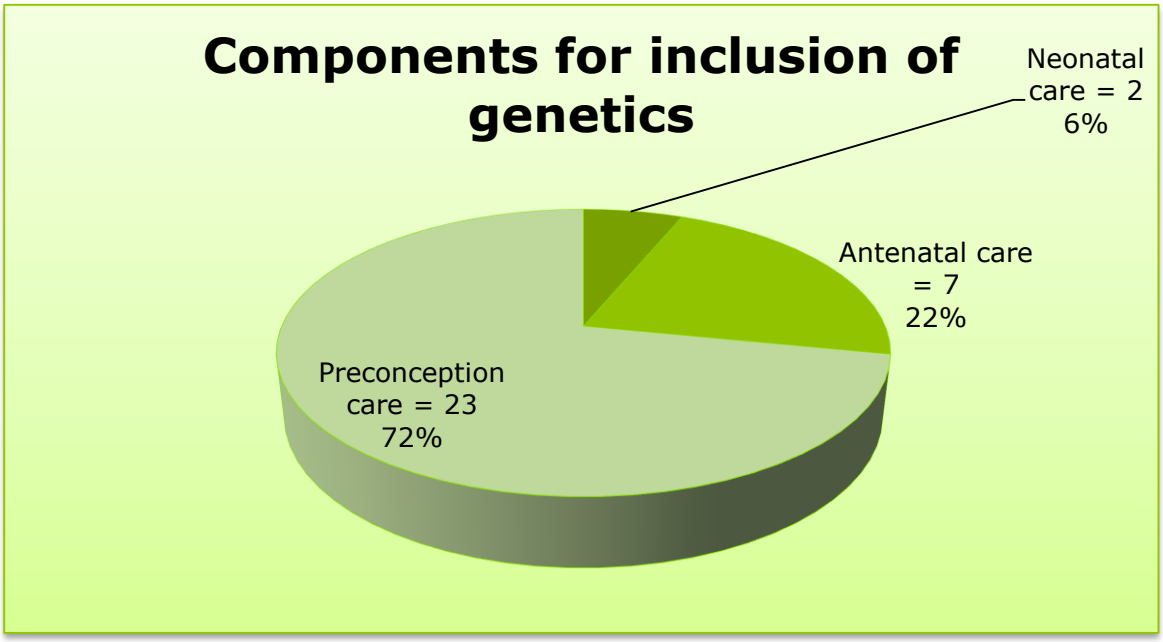

Figure 4.8 Components for inclusion of genetics (n=32)

The results show variance in components for inclusion of genetics in the advanced midwifery programmes and the lowest (6%) inclusion of genetics is in neonatal care teaching while the highest (72%) is in

preconception care teaching. Reason for this variance could be ascribed to the availability of an interested educator for that particular component particularly preconception teaching as this concept is scored higher (72%). This argument is based on the fact that the Policy Guidelines (2001:29) stipulated that genetics teaching depends on facilities and availability of educators in NEIs in South Africa. Availability of a knowledgeable educator on a particular genetic concept seemed to have enhanced teaching of that particular concept as the responsibility rested with that specific individual (Burke and Kirk 2006:232; Benjamin, et al 2009:484).

4.6.2.3 Number of teaching hours (periods)

Fifty percent (50%) of the sample recorded allocation of less than 10 hours, 16% recorded an allocation of between 11 and 20 hours, while 3% allocated between 41 and 50 hours and between 51 and 55 hours respectively. Twenty-eight percent (28%) skipped the item. Thus Table 4.1 presents the findings.

Table 4.1 Number of teaching hours (periods) (n=32)

Item	Frequency		Proportion	95	CI
Teaching periods	1-10	N=16	0.50	0.319	0.681
	11-20	n=5	0.156	0.053	0.328
	31-40	n=0	0		
	41-50	n=1	0.031	0.001	0.162
	51-55	n=1	0.031	0.001	0.162
	Missing	n=9	0.281	0.137	0.467

(95=%; CL=Confidence Interval)

Of significance here as well is the variance in teaching hours dedicated for genetics in advanced midwifery programmes where teaching hours ranged from one to 55 (1-55) periods. Reason for more periods could be the recognition of importance of genetics in the curricula by committing more hours. On the other hand, devoting fewer genetics periods in the advanced midwifery programmes could signal lack of recognition of

importance of genetics. Burke and Kirk (2006:232) also found differences in teaching hours that ranged between two and 72 hours for genetics in nursing and midwifery programmes in the United Kingdom.

4.6.2.4 Genetics concepts

The following concepts were listed in the questionnaire for the respondents to record those applicable in their teaching: preconception, family history taking, referral for genetic counselling, interpretation of genetic results, common heritable diseases, relationship between race and ethnicity, recognition of genetics problems and consanguinity. The results are as follows:

- **Preconception**

Seventy two percent (72%) of the sample identified preconception as the concept employed for genetics teaching. A few (3%) never identified this concept as part for teaching. Twenty five (25%) respondents skipped the item. Figure 4.9 present the findings.

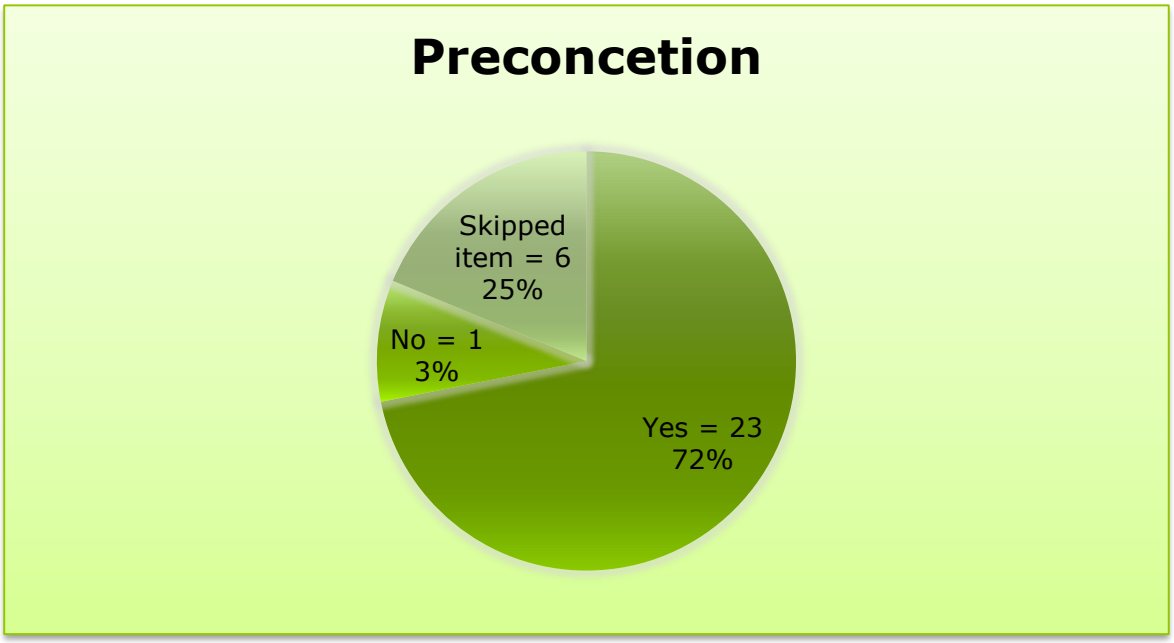

Figure 4.9 Preconception (n=32)

Although most (72%) of the sample identified preconception as the concept for genetics education teaching, possibly, only the theory part could be addressed because preconception services in South Africa are lacking. This is confirmed in the study by Kromberg, Sizer, and Christianson (2011:15) as it stated that preconception practice is lacking in country. Most women visit antenatal services during pregnancy for confirmation in South Africa. A kind of lack with regard to preconception service is also reported in Johnson, Atrash and Johnson (2008:S6) as it is stated that few nations have not accepted "new policies and programs to improve preconception health." On the other hand it is reported in the Best Start Resource Centre (2009:13) that family physicians recognised that they had a knowledge deficit in genetics to be able to offer preconception care.

- **Family's genetic history taking**

Eighty one percent (81%) of the sample recorded family history taking as the concept mostly addressed, six percent (6%) did not recognise it as the concepts addressed during genetics teaching. Thirteen percent (13%) skipped the item. Figure 4.10 present the results.

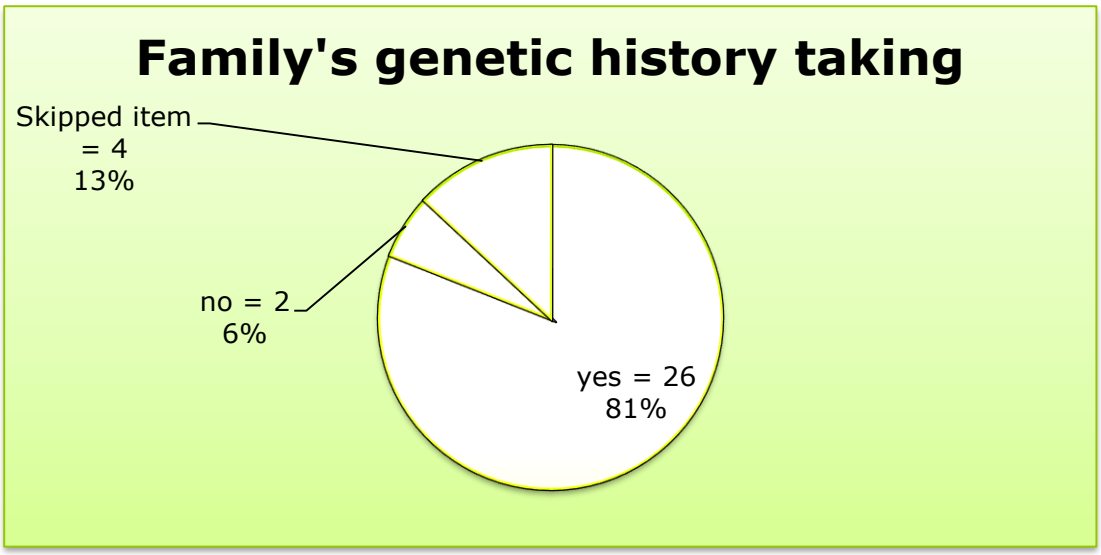

Figure 4.10 Family's genetic history taking (n=32)

Majority (81%) of the sample documented that family's genetic history is the concepts employed in genetics teaching. This is contrary to the Policy Guidelines (2001:31) document as it stipulated that genetics education is not done in post-basic programmes. Only 6% of the responses concur with the Policy Guidelines that indicated that genetics teaching is not implemented in post-basic nursing programmes, therefore the concept (family's genetic history taking) could not be adequately addressed. According to Bennett (1999:1) taking genetic family history and recording it as a pedigree is paramount for clinicians to recognise danger for genetic disorders.

- **Referral for genetic counselling**

Eighty one percent (81%) of the sample recorded referral for genetic counselling to be the concept addressed during genetics teaching. Thirteen percent (13%) could not identify this concept as part of their teaching. Six percent (6%) skipped the item. Figure 4.11 depicts the results.

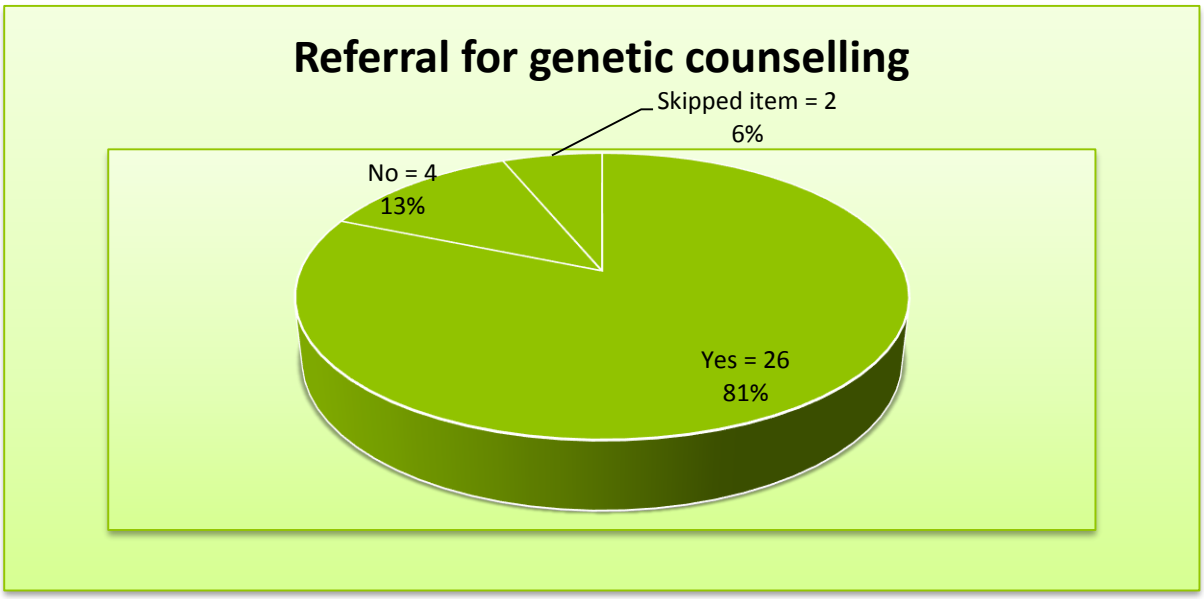

Figure 4.11 Referral for genetic counselling (n=32)

It is unexpected that most respondents (81%) indicated that their teaching includes referral for genetic counselling because post-basic nursing programmes include no genetics in the curricula. Gaff (2005:53) stated that health care clients who are at a disadvantage of genetics problems might not be referred as they may not be detected. Only 13% of respondents did not include genetics counselling and this is acceptable in line with the Policy Guidelines (2001:29). The Canadian Nurses Association (2005:3) stipulated that curricula of undergraduate and post graduate nursing programmes include insignificant genetic content.

- **Interpretation of genetic results**

Eighty one percent (81%) of the sample recognised interpretation of genetics results to be the concepts addressed during genetics teaching while 19% could not identify this concept as part of their teaching. Results are presented in figure 4.12.

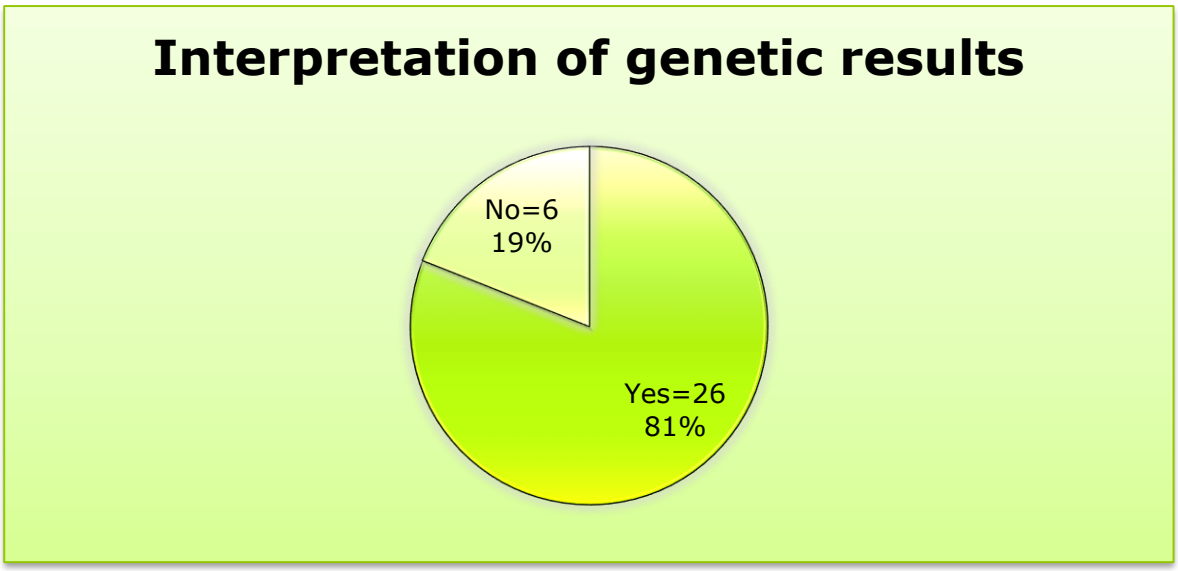

Figure 4.12 Interpretation of genetic results (n=32)

It is unexpected that a majority (81%) of the sample indicated that interpretation of genetics results forms part of their teaching despite the Policy Guidelines (2001:29) stipulating that post-basic nursing

programmes include no genetics education. It is only adequately trained professionals in genetics who could be able to analyse and interpret genetics results to detect heritable disorders that could be transmitted from parents to their offspring (BlueCross BlueShield of Minnesota 2014:1). The 19% of responses are consistent with the Policy Guidelines (2001:29) because post-basic nursing programmes in South Africa lacked genetics education.

- **Identification of common heritable disease**

Eighty one percent (81%) of the sample recognised identification of common heritable disease to be addressed during genetics teaching. Thirteen percent (13%) could not identify this concept as part of their teaching. Six percent (6%) skipped the item. In figure 4.13 results are presented.

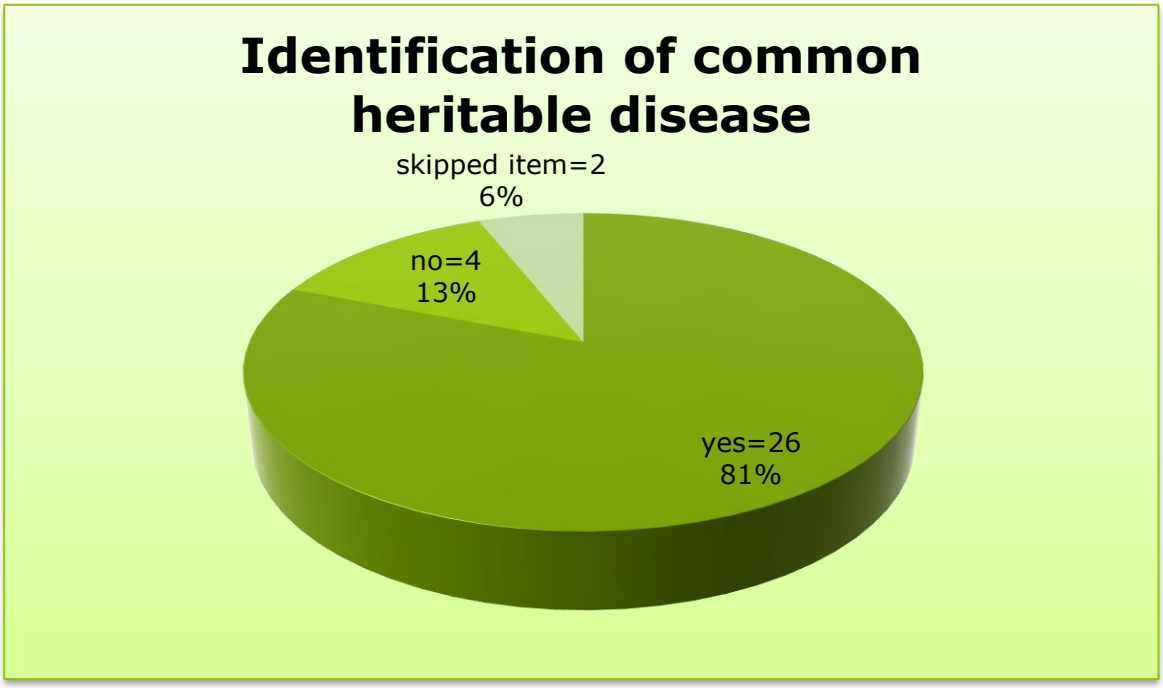

Figure 4.13 Identification of common heritable diseases (n=32)

Eighty one percent (81%) of the sample acknowledge that common heritable disease identification forms part of their teaching although the

Policy Guidelines (2001:29) specified that post-basic nurses receive no genetics education. Only 6% of the respondents are congruent with the Policy Guidelines (2001:29) as these respondents indicated that common heritable diseases are not addressed. According to Pearce, Foliaki, Sporle and Cunningham (2004:1070) "the constant interaction between genes and the environment means that few diseases are purely hereditary". Therefore, nursing education should improve in terms of genetics education so that environmental factors that could interact with genes leading to genetic disorders are identified.

- **Relationship between race and ethnicity**

Fifty percent (50%) of the sample documented the relationship between race and ethnicity to be a concept addressed during teaching and 34% could not identify this concept as part of their teaching. Sixteen percent (16%) skipped the item. Figure 4.14 presents the results.

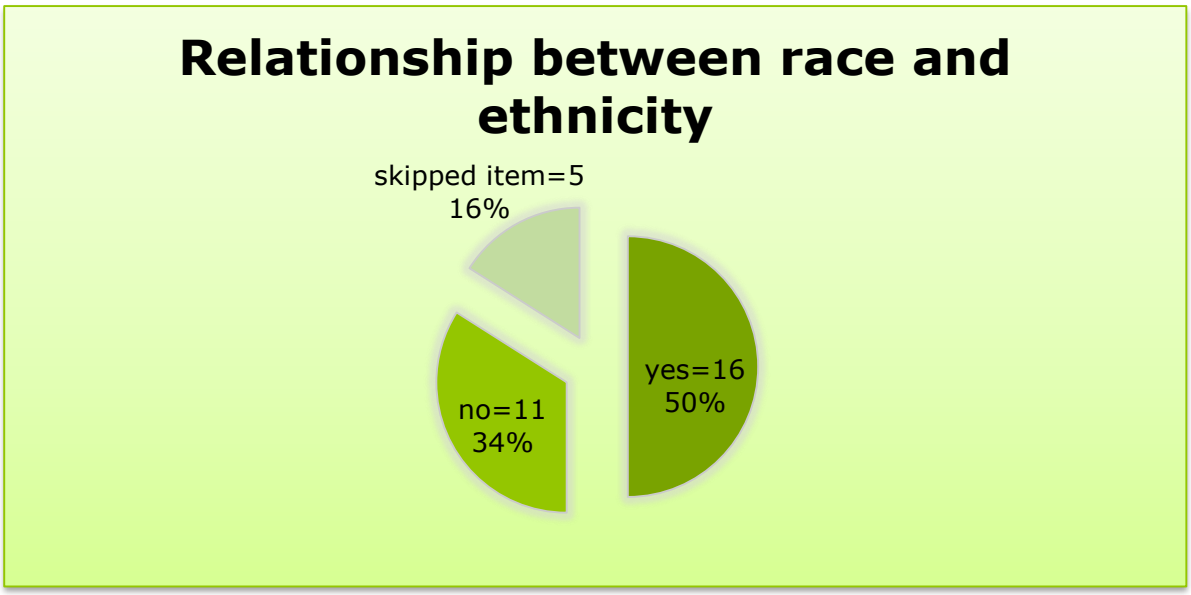

Figure 4.14 Relationship between race and ethnicity (n=32)

Half (50%) of the sample included in their teaching the relationship between race and ethnicity. The manner in which this was taught is not

clear because the level of genetics knowledge among educators is unknown as the literature is lacking. The Policy Guidelines (2001:29) specified that genetics education is lacking in post-basic nursing programmes. Thirty-four percent (34%) of the study sample are congruent with Policy Guidelines information. The race and ethnicity concepts convey inferences that reflect connection to familial and terrestrial derivation of individuals (Collins 2004:S13). It means that certain genetic disorders are inherited between specific groups and are found in those population groups in specific families. For example "Afrikaans speaking persons have a high prevalence of hypercholesterolemia, with life-threatening cardiovascular complications in early adulthood." (Ehlers 2002:153).

- **Recognition of genetic problems**

Fifty percent (50%) of the sample recorded that recognition of genetic problems is the concept addressed during teaching and 34% could not identify the concept as part of their teaching. Sixteen percent (16%) of the sample skipped the item. Thus figure 4.15 present the results.

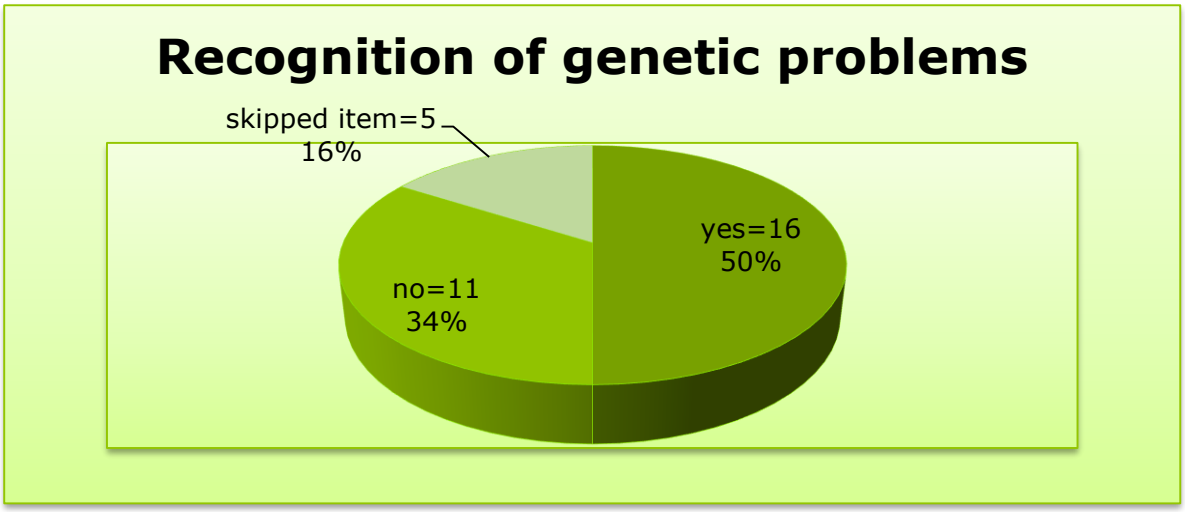

Figure 4.15 Recognition of genetic problems (n=32)

Half (50%) of the sample indicated that inclusion of recognition of genetics problems is part of their teaching. It is not clear regarding how the recognition of genetic problems was addressed because respondents received no genetics education (Policy Guidelines 2001:29). Thirty four percent (34%) of the sample are consistent with the Policy Guidelines (2001:29) by declaring that recognition of genetic problems is not addressed in their teachings. Educators in nursing are expected to teach genetics in the age of genetic healthcare (Simpson 2007:31).

- **Consanguinity**

Fifty percent (50%) of the sample documented consanguinity as the concept addressed during teaching and 34% could not identify the concept as part of their teachings. Sixteen percent (16%) skipped the item. Results are presented in figure 4.16.

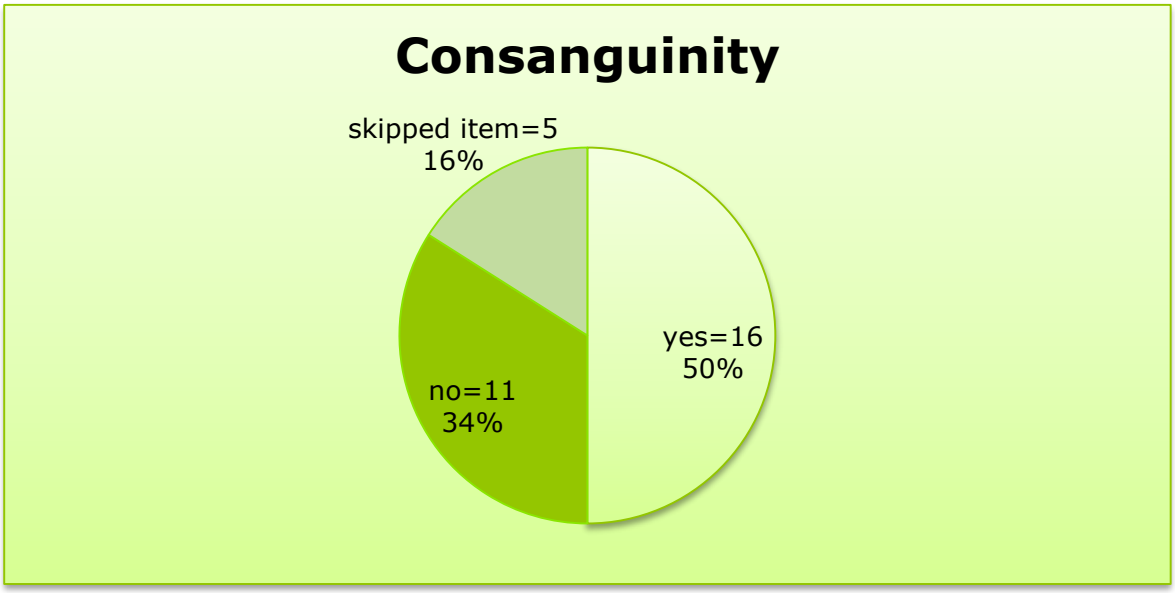

Figure 4.16 Consanguinity (n=32)

Half (50%) of the sample recorded that consanguinity is addressed even though the Policy Guidelines (2001:29) clearly stipulated that post-basic

nurses do not undergo formal education. Thirty four percent (34%) are congruent with the Policy Guidelines specification regarding genetics education for post-basic nursing programmes in South Africa. Consanguinity is mating among people who share ancestors (Department of Human Genetics: Division of Medical Genetics 2003:1). Children born in consanguineous marriages have a chance of acquiring recessive genetic disorders (Department of Human Genetics: Division of Medical Genetics 2003:1). Consanguineous marriages exist in South Africa.

4.6.2.5 Teaching strategies

Two variables (group discussion and case study) representing teaching strategies were provided for respondents to record the one suitable to their teaching and results are as follows:

- **Group discussion**

Seventy-two percent (72%) of the sample applied group discussion and three percent (3%) recorded no use of this strategy. Twenty-five percent (25%) of the sample skipped the item. Figure 4.17 present results for this variable.

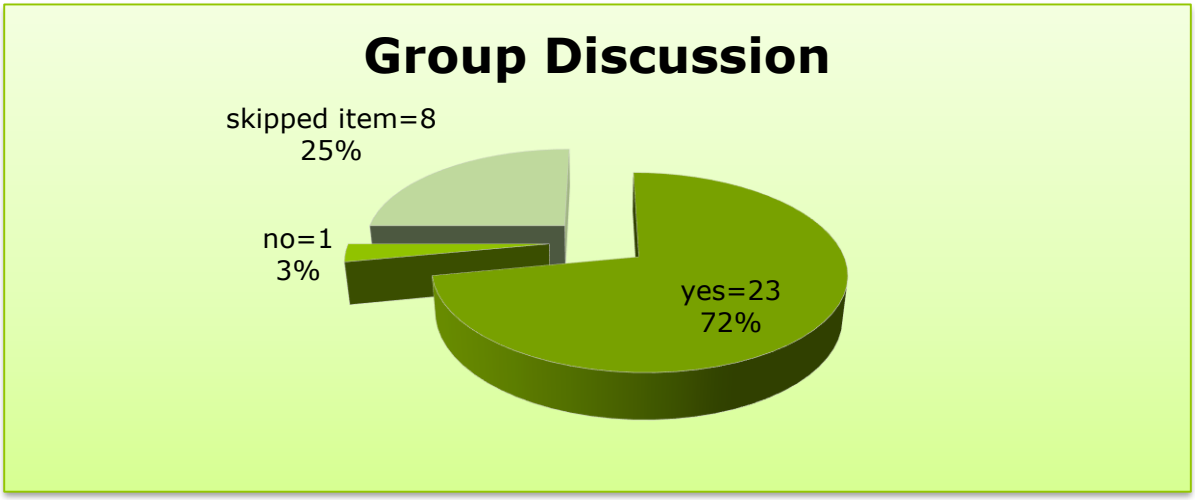

Table 4.17 Group discussion (n=32)

Majority (72%) of the sample implemented group discussion for genetics education with few (3%) not employing this kind of strategy. According to the Policy Guidelines (2001:29) genetics education depends on availability of educators with genetics knowledge. In this regard, group discussion could be used for any other content but not necessarily for genetics education. Limited literature exists that deals with genetics knowledge of educators in advanced a midwifery programmes in South Africa. Twenty five percent (25%) of the study sample skipped the item, probably due to the fact that genetics education is not applicable to their teaching. It is reported in Cragun, et al (2005:92) that limited knowledge results in consistent missing of responses in survey items.

- **Case study**

Thirty eight percent (38%) of the sample recorded the use of case study while 6% were not using that strategy. Fifty six percent (56%) skipped the item. Figure 4.18 present the findings.

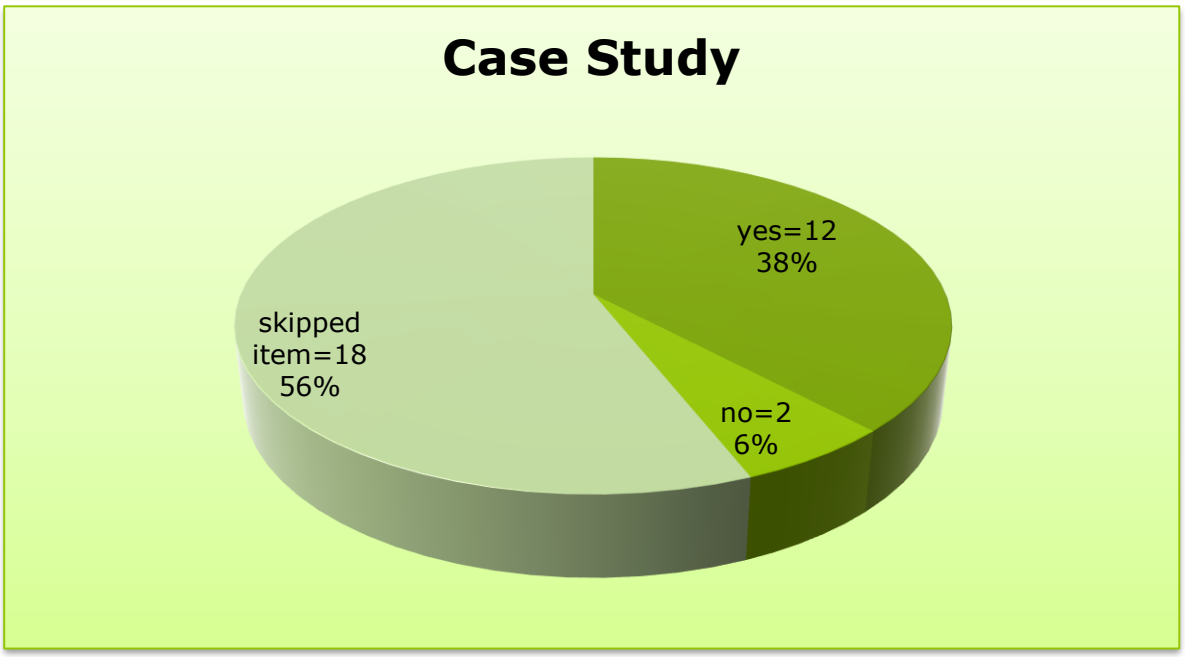

Figure 4.18 Case study (n=32)

It is expected that a limited number (38%) of the sample could use case studies because genetics is not applicable in all nursing schools in South Africa. However, case study strategy was perceived by a majority (70%) of students in Cragun, et al (2005:94) as an excellent teaching strategy for genetics education. Six percent (6%) of the study sample seemed to be unfamiliar with case study strategy for genetics education. The Policy Guidelines (2001:31) stipulated that genetics teaching is varied and depend on availability of educators, thus respondents applying the case study approach could be from NEIs where genetics education is addressed. A majority (56%) of the sample skipped the item, probably because genetics education is not applicable in their teaching. According to Cragun, et al (2005:92) respondents with a lack of knowledge have the tendency to skip items in surveys.

4.6.2.6 Genetics learning outcomes

Fifty four percent (54%) of the sample recorded that genetics outcomes were not clarified. Twenty two percent (22%) of the sample recorded taking of family history during ante-natal care as the outcome in genetics education. Twelve percent (12%) of the sample recorded that genetics counselling is the outcome for genetics education. Only six percent (6%) of the sample recorded identification of women at risk for genetic disorders and another six percent (6%) recorded mode of inheritance as outcomes for genetics education. Findings are depicted in figure 4.19.

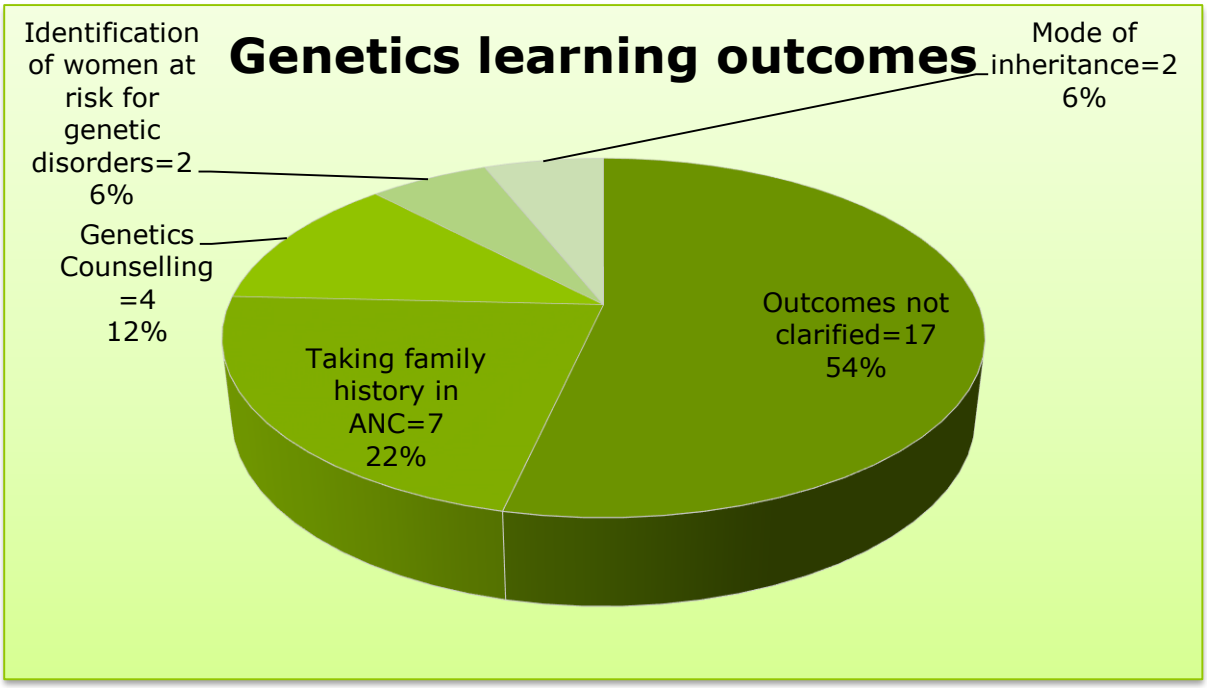

Figure 4.19 Genetics learning outcomes (n=32)

Fifty four percent (54%) of the sample acknowledged that genetics outcomes are not clarified. This is congruent with information stipulated in the Policy Guidelines (2001:29) that genetics teaching is varied. Responses showing some outcomes could mean that respondents came from NEIs where a knowledgeable professional in genetics is available to offer some education. It is shown in figure 4.19 that various respondents identified specific concepts as outcomes following training. This information concurs with the Policy Guidelines (2001:29) in so far that attaining genetics outcomes depends on available educators in South Africa as shown in differing genetics outcomes.

4.6.2.7 Genetics outcomes related to care delivery

Four outcome descriptors were listed for respondents to identify and record those that are applicable and are attained in their advanced midwifery programmes. Results are presented as follows:

- **Basic human genetics technology**

Fifty six percent (56%) of the sample recorded basic human genetic technology for care delivery as the outcome achieved in advanced midwifery programmes. Twenty two percent (22%) of the sample recorded that this outcome is not part of care delivery while another 22% skipped the item. Figure 4.20 present the results.

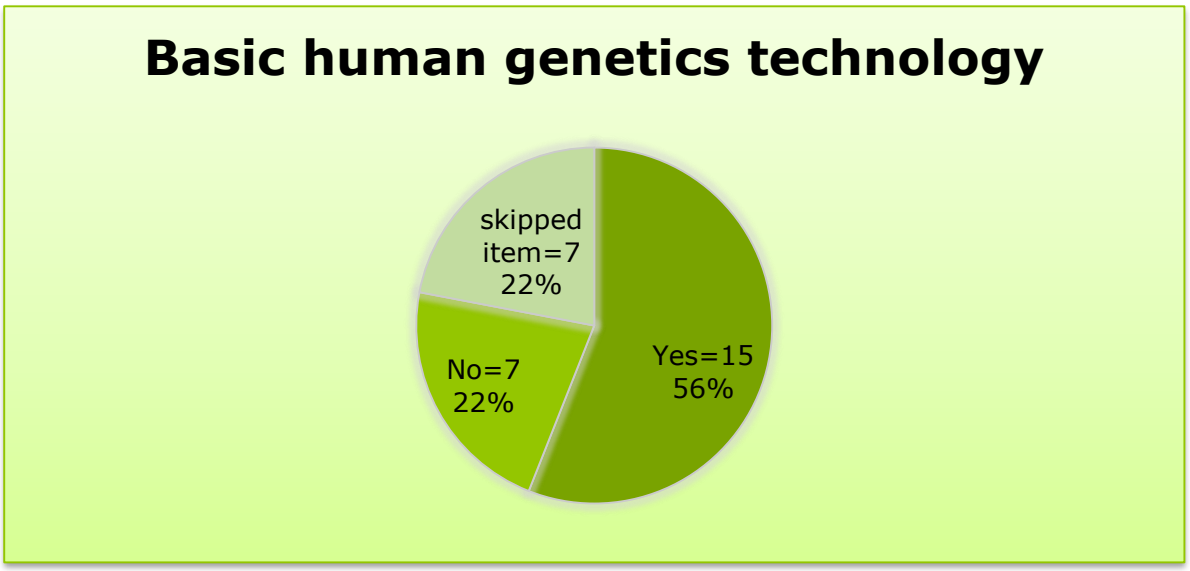

Figure 4.20 Basic human genetics technology (n=32)

Fifty six percent (56%) of the sample includes basic human genetic technology even though the Policy Guidelines (2001:29) stipulated that post-basic nursing programmes in South Africa lack genetics education. Perhaps these respondents came from NEIs that include genetics in their educational programmes. However, literature indicated that genetics is not adequately accommodated and genetics competencies are also lacking in South Africa (Godino and Skirton 2012:174). Ehlers (2002:152) stated that "nurses in most PHC do not have access to genetic technology service nor genetic expertise" in South Africa.

- **Patterns of inheritance**

Fifty six percent (56%) of the sample recorded that basic patterns of inheritance as a care delivery outcome was achieved, 22% recorded that this outcome is not addressed, therefore not achieved. Twenty two percent (22%) of the sample skipped the item. Results are shown in figure 4.21.

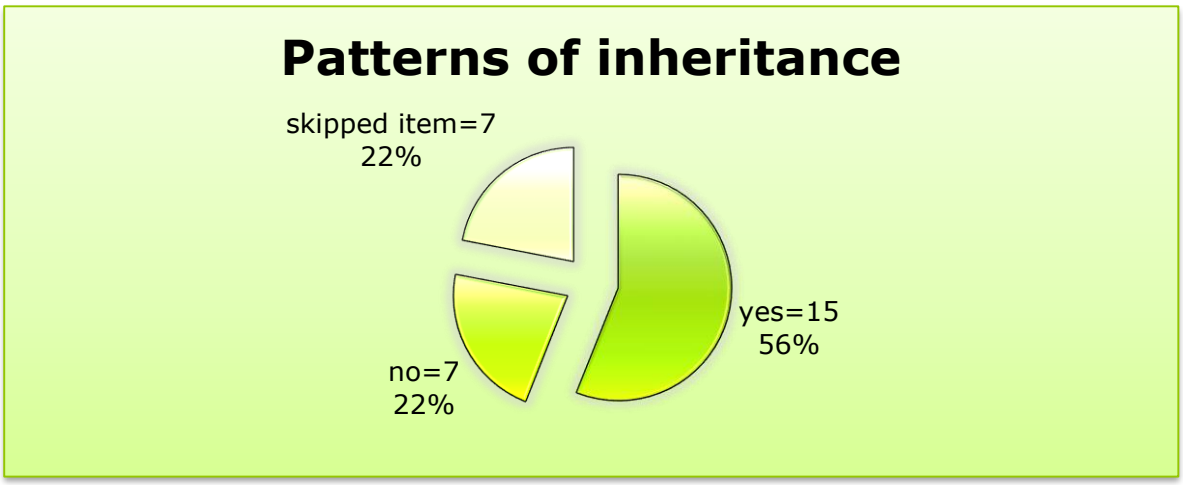

Figure 4.21 Patterns of inheritance (n=32)

Fifty six percent (56%) of the sample addressed patterns of inheritance during teaching even though the Policy Guidelines (2001:29) stipulated that the post-basic nursing programmes offer no genetics education. At least 22% of the study sample agreed with the Policy Guidelines report.

- **The role of family history in assessing predisposition to diseases**

Sixty-nine percent (69%) of the sample recorded that the role of family history in assessing a predisposition to disease is the outcome achieved and 19% could not identify this outcome as being achieved. Figure 4.22 depicts the results.

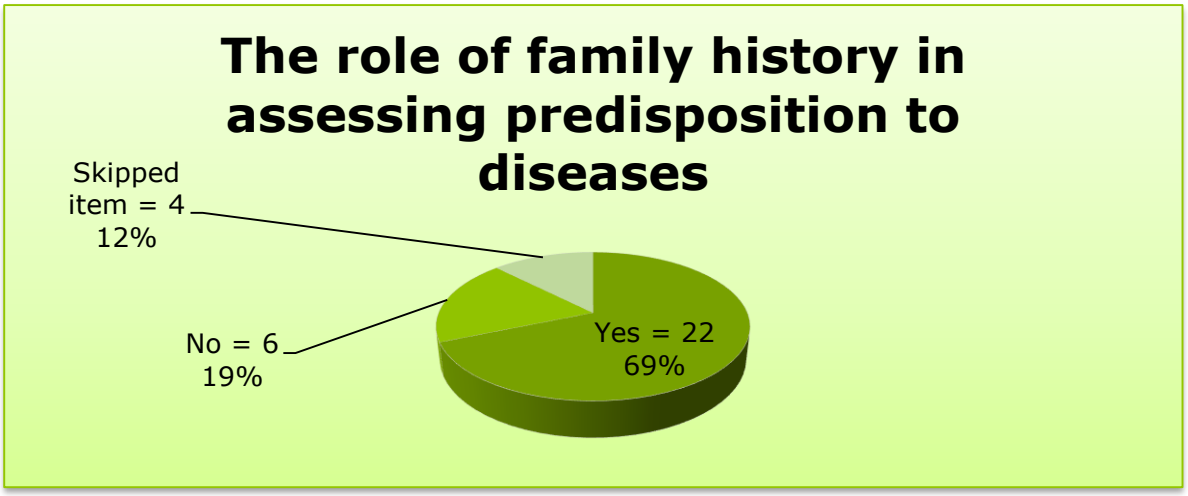

Figure 4.22 The role of family history in assessing predisposition to diseases (n=32)

Sixty nine percent (69%) of the sample included the role of family history in assessing predisposition to disease even though the Policy Guidelines (2001:29) stipulated that genetics is lacking in post-basic nursing curricula in South Africa. Family history is collected for up to three generations to create a tree depicting information about that particular family. A family tree "allow medical and family relationship information to be recorded quickly and clearly, in a form that is readily understood by others." (Gaff 2005:50). Since genetics education is lacking in post-basic nursing programmes, family history assessment could refer to first generation history commonly collected in antenatal clinics. Only 19% of the sample indicated that family history is not part of the education in their programmes, therefore, this outcome is unachieved.

- **The role of genetics in maintaining health and preventing disease**

Sixty nine percent (69%) of the sample recorded that this outcome is achieved while 19% could not identify the outcome. Twelve percent (12%) of the sample skipped the question. Figure 4.23 presents the results.

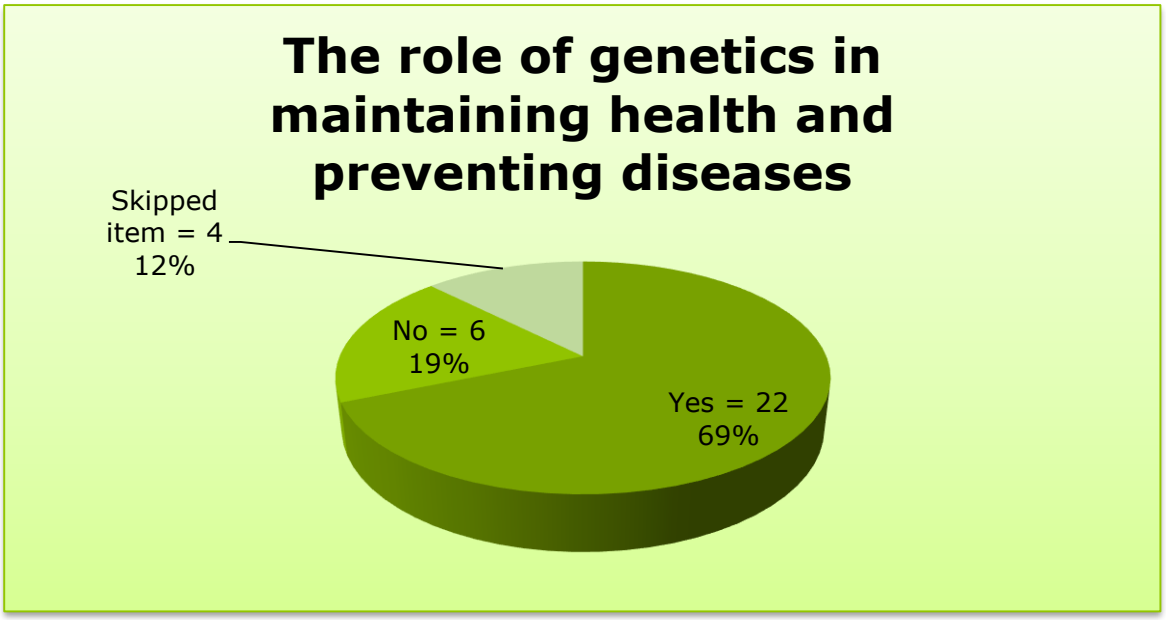

Figure 4.23. The role of genetics in maintaining health and preventing disease (n=32)

Results show a majority (69%) of the sample recognising the role of genetics in maintaining health and prevention of disease. This is in conflict with the Policy Guidelines (2001:29) as it specified that genetics education is lacking in post-basic nursing programmes in South Africa. Genetics knowledge of the health care professionals remains a challenge (World Health Organisation 2006:72).

4.6.2.8 Genetics outcomes related to professional and ethical practice

Four outcome descriptions related to professional and ethical practice were listed for respondents to identify those fitting in their teaching. Results are presented as follows:

- **Recognition of clients' cultural and ethnicity background**

Seventy five percent (75%) of the sample recorded that recognition of clients' cultural and ethnicity background as the outcome achieved and nine percent (9%) could not recognise this outcome. Sixteen percent (16%) skipped the item. Figure 4.24 presents the results.

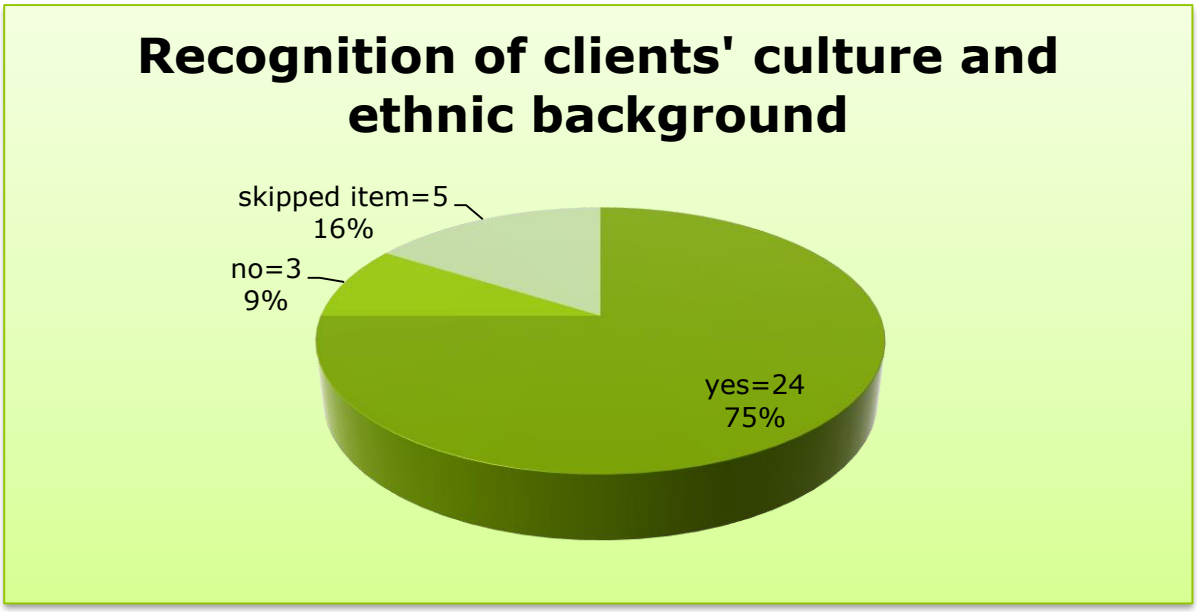

Figure 4.24 Recognition of clients' cultural and ethnicity background (n=32)

- **Social and psychosocial implications of accessing genetics services**

Seventy five percent (75%) of the sample recorded that the above mentioned outcome is achieved and nine percent (9%) could not identify this outcome as achieved. Sixteen percent (16%) skipped the item. Figure 4.25 report results.

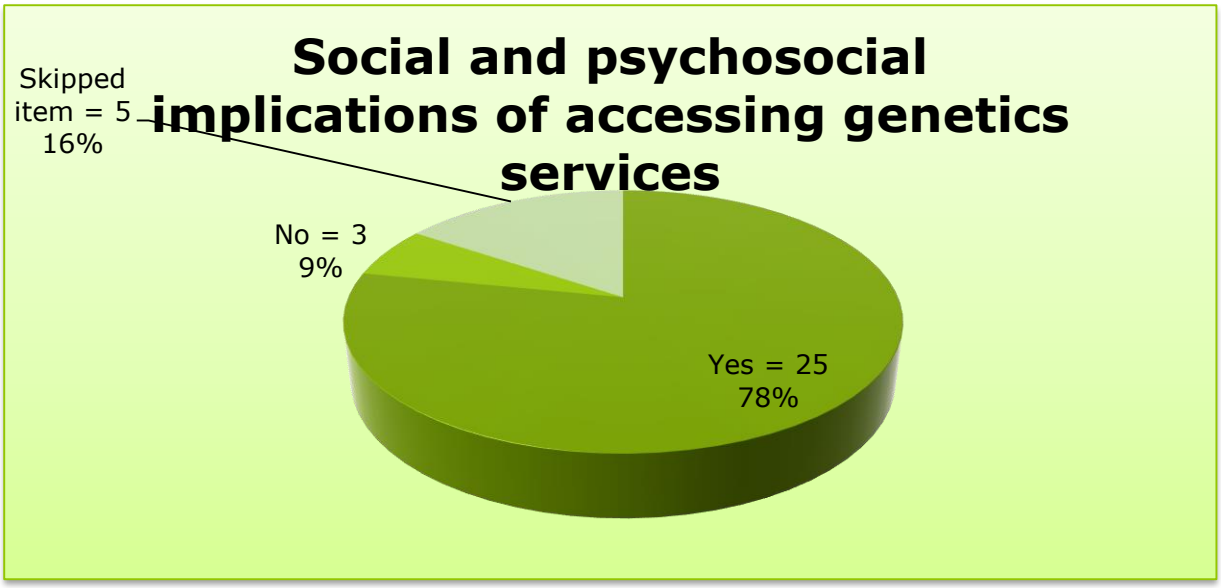

Figure 4.25 Social and psychosocial implications of accessing genetics services (n=32)

- **Recognises genetics needs of the vulnerable**

Sixty six percent (66%) of the sample recorded that this outcome is achieved and 22% could not recognise that this outcome. Twelve percent (12%) skipped the item. Results are presented in figure 4.26.

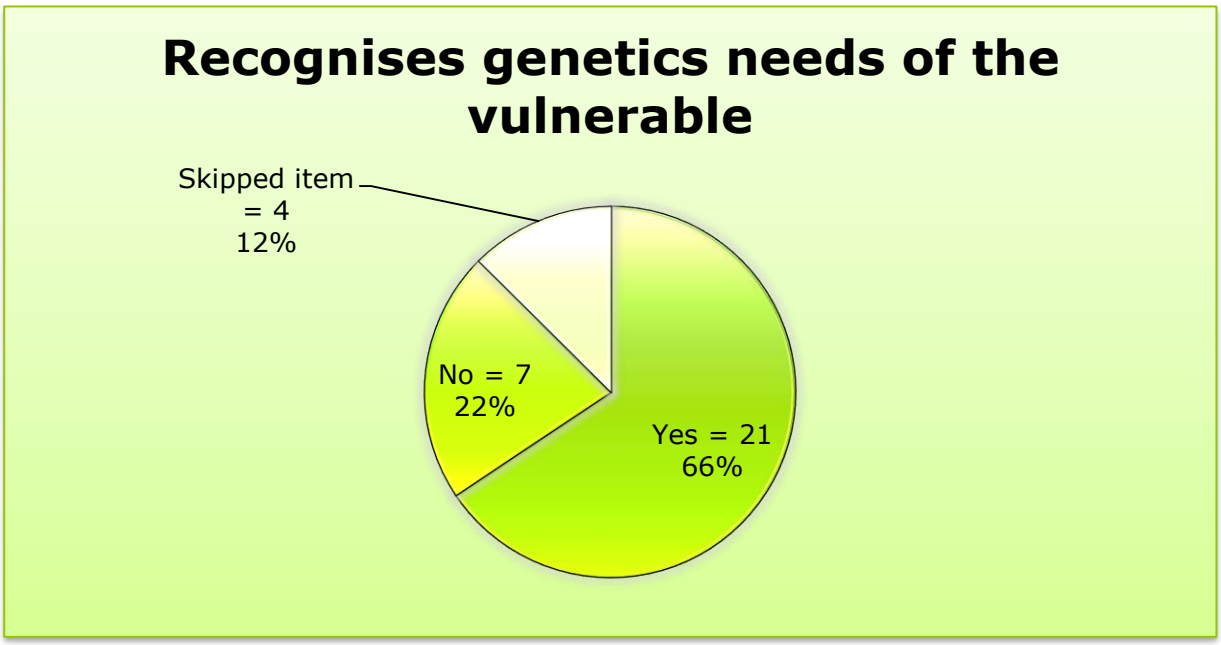

Figure 4.26 Recognises genetics needs of the vulnerable (n=32)

- **Recognition of sensitivity of genetic information**

Eighty one percent (81%) of the sample recorded that the outcome is achieved and ten percent (10%) of the sample recorded that the outcome is unachieved. Nine (9%) skipped the item. Results are reported in figure 4.27.

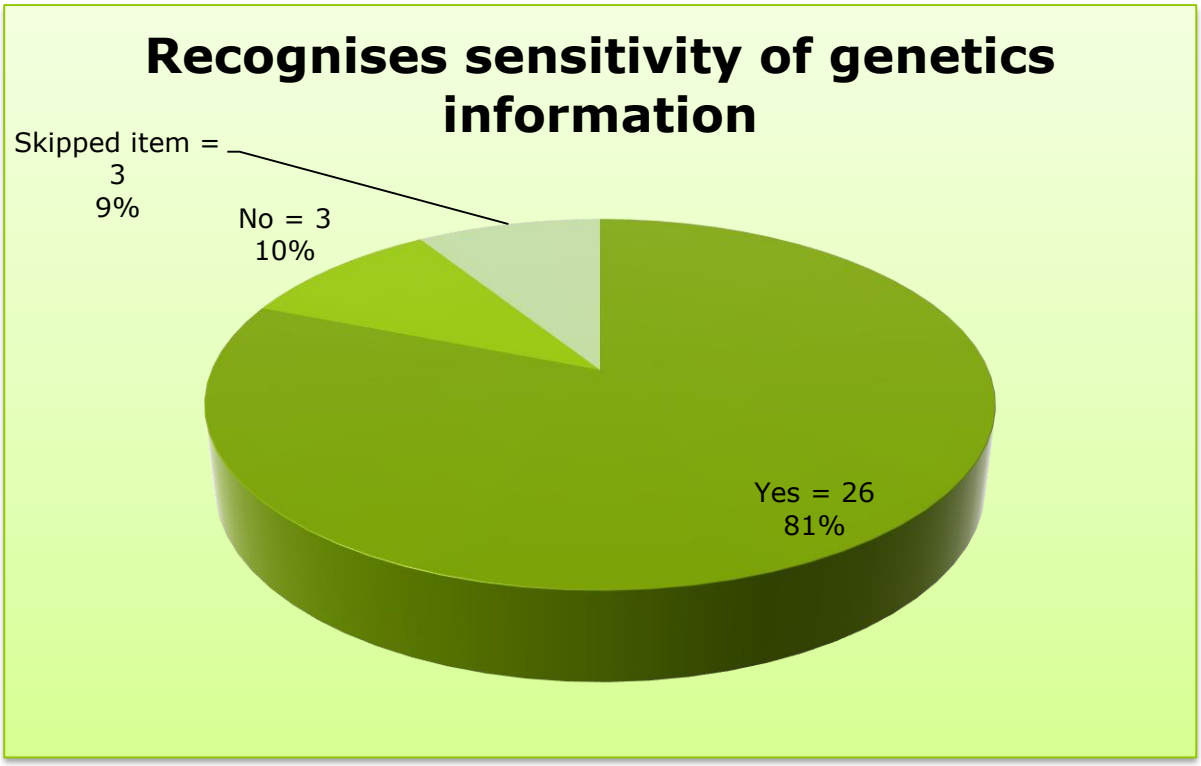

Figure 4.27 Recognises sensitivity of genetic information (n=32)

4.6.2.9 Outcomes related to personal professional development

Two outcomes descriptions related to professional and ethical practice were listed for respondents to record that which is achieved during advanced midwifery training. Results are presented as follows:

- **Recognising the role of scope of practice related to genetics**

Eighty five percent *(*85%) of the sample recorded that the outcome is achieved and six percent (6%) recorded lack of achievement of the outcome. Nine percent (9%) of the sample skipped the item. The rest of the results are reported in figure 4.28.

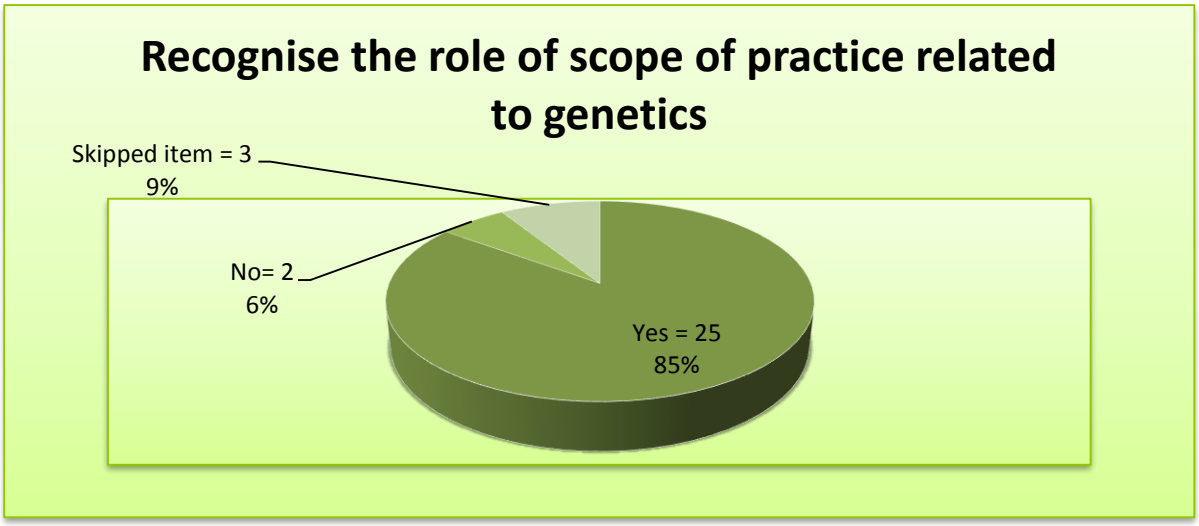

Figure 4.28 Recognise the role of scope of practice in relation to genetics (n=32)

- **Recognise the role of speciality in genetic services**

Ninety one percent (91%) of the sample recorded that the aforementioned outcome is achieved and six percent (6%) recorded that this outcome is unachieved. Three percent (3%) skipped the item. The results are presented in figure 4.29.

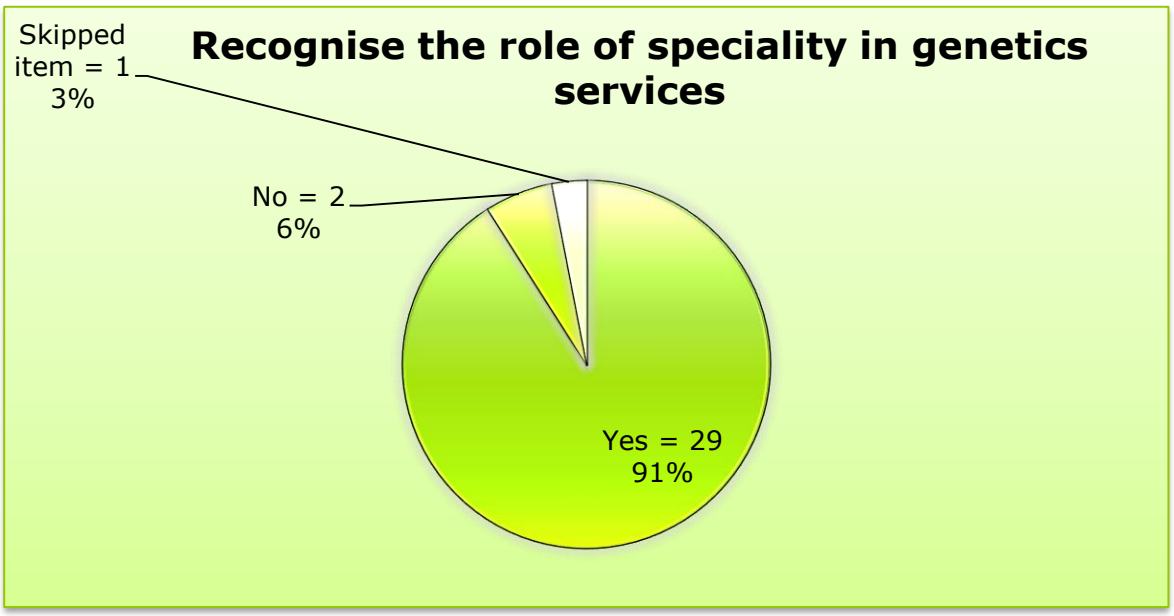

Figure 4.29 Recognise the role of speciality in genetics services (n=32)

4.6.2.10 Assessment tasks

Three assessment tasks were listed for respondents to record those applicable to their teaching programmes. These are: written test or examination, oral presentation and problem solving.

- **Written test or examination**

Ninety one percent (91%) of the sample used a written test or examination whereas nine percent (9%) recorded lack of the use of that assessment task. Table 4.1 present the results.

Table 4.2 Written test or examination (n=32)

Assessment task	Frequency	Proportion	95	CI
Written test or examination	n=29	0.906	0.749	0.980
	n=3	0.094	0.020	0.250

(95=%; CI=Confidence Interval)

Although a maximum proportion (0.906) of the sample used a written test or examination to assess genetics knowledge, this finding need to be viewed with caution because 53% of the sample in item 4.6.2.6 recorded that outcomes are unplanned. The purpose of assessment is to evaluate capabilities demonstrated in learners (Killen 2010:367). Written or oral test or examination could be useful if employed in genetics education to measure the level of knowledge. The lower proportion of 0.094 that are not using this kind of assessment could be from NEIs where genetics education is lacking as the Policy Guideline (2001:29) stipulated that genetics is varied in South Africa.

- **Oral presentation**

Thirty seven percent (37%) of the sample employed oral presentation and 19% recorded lack of use of this kind of assessment task. Forty four

percent (44%) skipped the item. Figure 4.30 report the rest of the results.

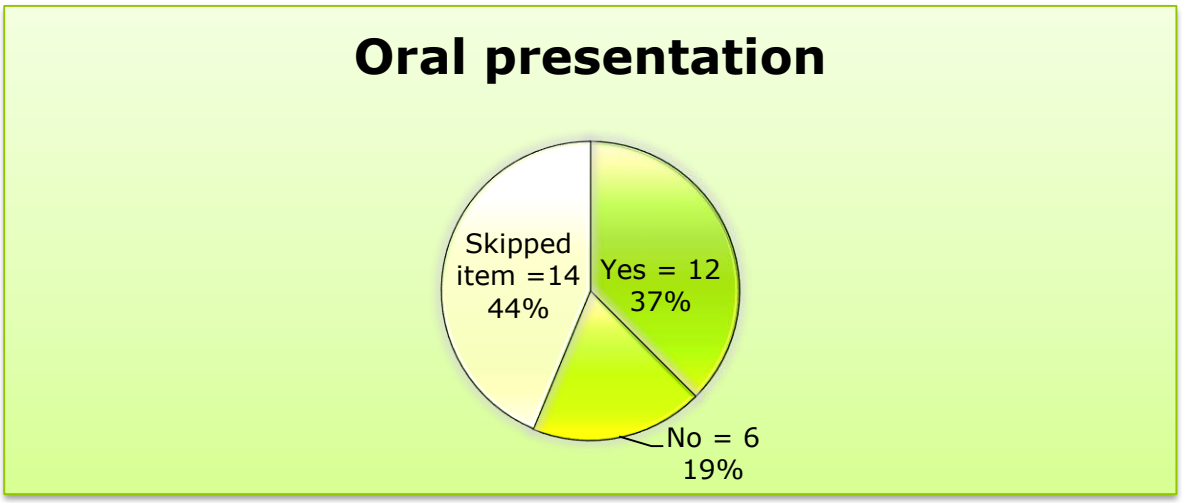

Figure 4.30 Oral presentation (N=32)

It is only 37% of the sample that used oral presentation method to assess genetics knowledge. Perhaps the respondents making up the above figure could be from NEIs that have educators with interest in genetics. However, if 19% (not using oral presentation) is added to 44% (no responded) it could mean that 63% of the sample was not using this kind of method to assess genetics knowledge. It is safe to note that the Policy Guidelines (2001:29) stipulated that post-basic nursing programmes lacks genetics education. The benefit of oral presentation is to identify if learners have mastered the subject (Mellish and Brink 1996:307).

- **Problem solving**

Forty seven percent (47%) of the sample used problem solving to assess genetics knowledge and 16% were not using this kind of assessment method. At least 37% of the sample skipped the item Figure 4.31 depicts the results.

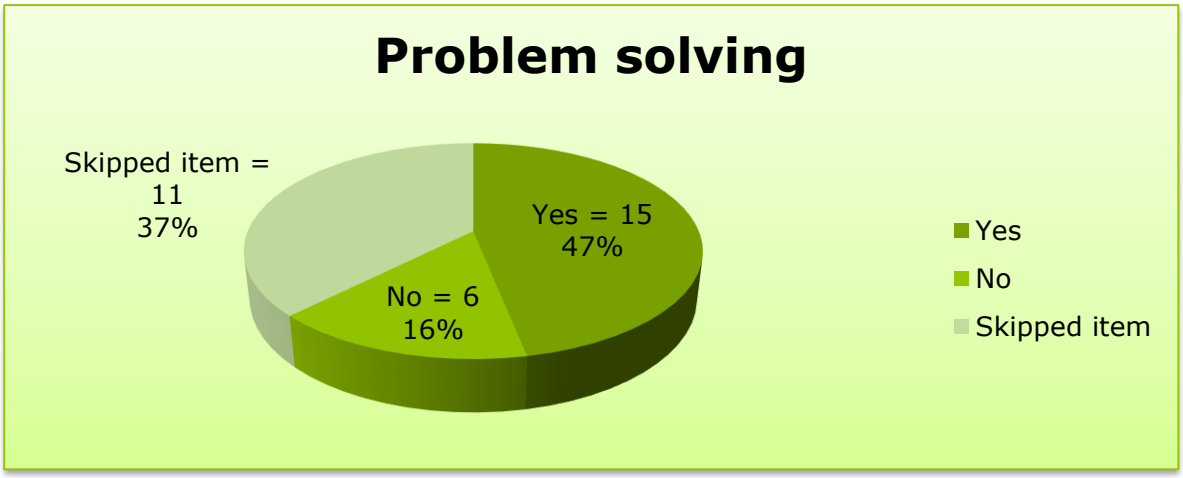

Figure 4.31 Problem solving (N=32)

Although 47% of sample used the problem solving method to assess genetics knowledge however, post-basic nursing curricula include no genetics education (Policy Guidelines 2001:29). Sixteen percent (16%) of the study sample were not using this kind of assessment method.

4.6.2.11. Inclusion of clinical learning for genetics in curricula

Fifty three percent (53%) of the sample recorded that genetics learning experiences are included in their curricula whereas 28% recorded a lack of inclusion and 19% of the sample skipped the item. Figure 4.32 depict the results.

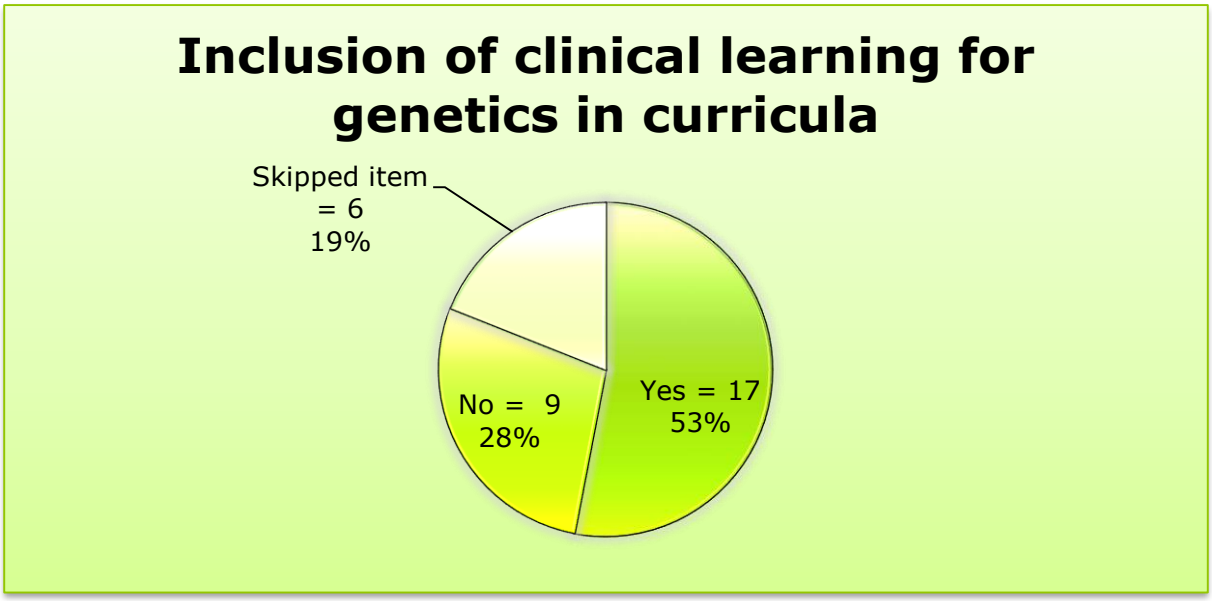

Figure 4.32 Inclusion of clinical learning for genetics in the curricula (n=32)

Contradicting here is that 53% of the sample included clinical learning experiences for genetics in their curricula. There is a significant lack of preceptors or clinicians with adequate genetics knowledge to accompany learners in South Africa. It is also reported in Hetteberg, et al (1999:171) that learning in clinical settings for genetics was not employed. The above view is congruent with 28% of the sample in the current study. In item 4.6.2.15 respondents were required to identify responsible professional for learner accompaniment and great variations, including that clinical learning (for genetics) is not applicable was received from respondents.

4.6.2.12. New-born care as the component for clinical assessment

Fifty three percent (53%) of sample recorded that assessment of new-borns is the component used for clinical assessment. Twenty eight percent (28%) of the sample recorded lack of new-borns assessment as the component for inclusion for genetics. At least 19% of the sample skipped the item. Figure 4.33 depict the results.

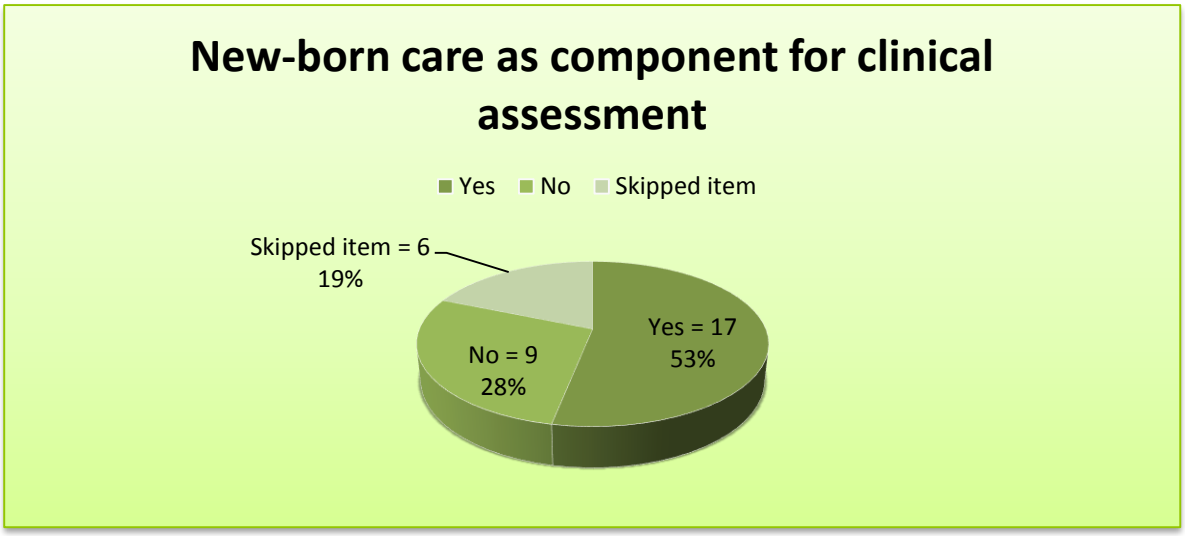

Figure 4.33 New-born care as component for clinical assessment (n=32)

Numerous components that included genetics were indicated in item eight, but indication here show only new-born care that is included for clinical assessment.

4.6.2.13. Settings for experiential learning in genetics

Eighty one percent (81%) of the sample used hospital/clinic facilities for experiential learning for genetics during training. Ten percent (10%) of the sample were not using the clinic or the hospital for clinical assessment while 9% skipped the item. Figure 4.34 illustrates the results.

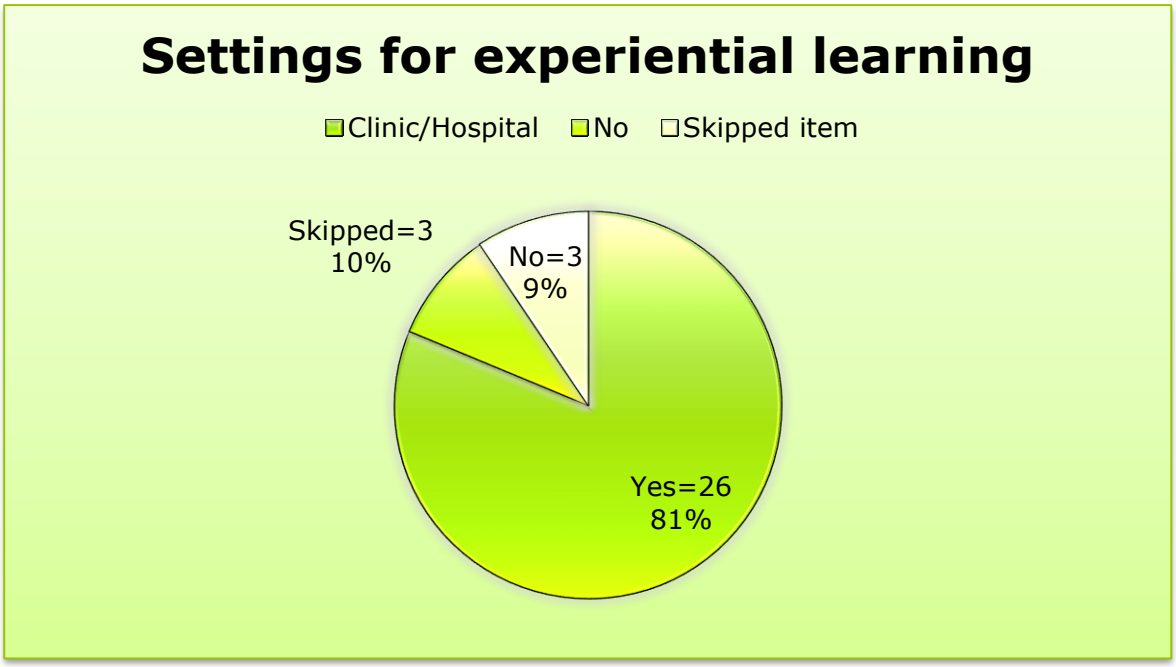

Figure 4.34 Settings for experiential learning in genetics (n=32)

At least 81% of the sample recorded that clinics or hospitals facilities are used for experiential learning. Although the clinic or hospital facilities are available for learner placement regarding clinical learning, these sites are not necessarily used for genetics learning. It is also reported in Hetteberg, et al (1999:171) that clinical sites were not used for genetics education.

4.6.2.14. Number of hours dedicated for clinical learning

Fifty percent (50%) of the sample recorded between one and ten (1–10) hours, 16% indicated between 11 and 20 hours, while three percent (3%) dedicated between 21 - 30 and 31 - 40 hours respectively. In 28% of the sample there is no number of hours allocated for clinical learning in genetics. In table 4.3 findings present the results.

Table 4.3 Number of hours dedicated for clinical learning (n=32)

Item	Frequency	Proportion	95	CI
Hours dedicated for genetics teaching+	1-10 (N=16)	0.50	0.319	0.681
	11-20 (n=5)	0.156	0.053	0.328
	31-40 (n=1)	0.031	0.001	0.162
	41-40 (n=1)	0.031	0.001	0.162
	Missing (n=9)	0.281	0.137	0.467

(95=%; CI=Confidence Interval)

The allocated hours ranged between one and forty (1 – 40) hours reflecting disparities in the number of hours dedicated for clinical learning in genetics. This variance is not unique to this study because in Burke and Kirk (2006) the number of hours used for genetics education greatly differed. In Hetteberg, et al (1999:172) respondents indicated that "no hours were devoted" for clinical learning regarding genetics. According to Uys and Gwele (2005:70) teaching hours are planned during programme design which is not the case with regard to education in genetics.

4.6.2.15. Professional responsible for learner accompaniment

Thirty one percent (31%) of the sample recorded that advanced midwifery educators accompany learners, six percent (6%) recorded that a doctor is responsible, while 16% recorded that a registered nurse in the facility is responsible. At least 25% of the sample recorded that learner accompaniment is not applicable, three percent (3%) recorded that a genetic specialist is responsible and 19% skipped the item. Findings are presented in Figure 4.35.

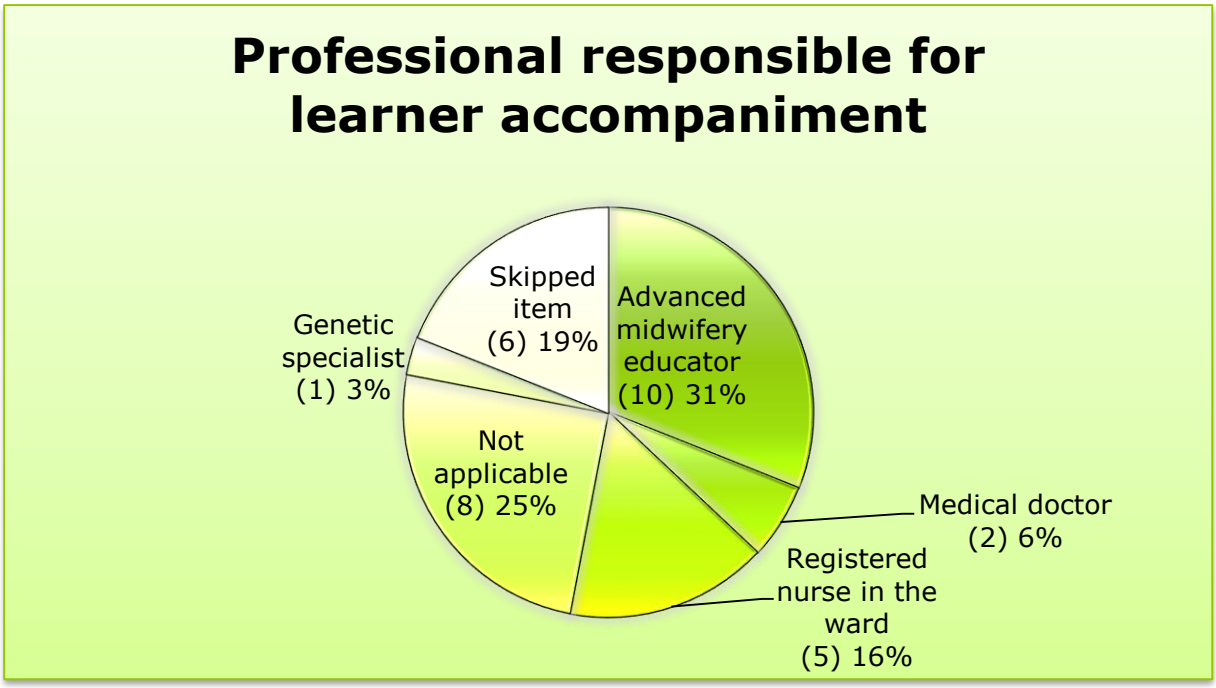

Figure 4.35 Professional responsible for learner accompaniment (n=32)

It is important to note that various professionals are indicated to be providing accompaniment regarding genetics in clinical practice. Respondents received no genetics education according to the Policy Guidelines (2001:29), however 31% recorded that they (as educators) provide accompaniment for genetics. The scientific clinical knowledge is still required among nurses interested in genetics (Ehlers 2002:151), therefore, it is unlikely that registered nurses could provide adequate learner accompaniment.

4.6.2.16. Genetics competencies achieved

Fifty percent (50%) of the sample recorded that competencies are not achieved while 34% recorded that these are achieved. Sixteen percent (16%) skipped the item. Findings are shown in figure 4.36.

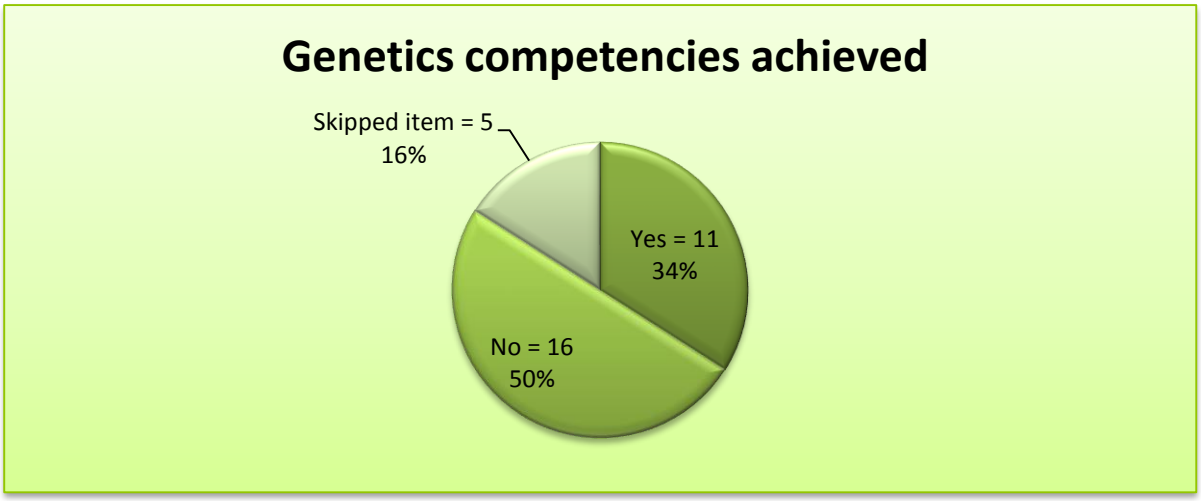

Figure 4.36 Genetics competencies achieved (n=32)

Most concerning here is to note that 50% of the sample recorded that genetics competencies were not accomplished. This information is congruent because aspects of genetics are included in the undergraduate nursing curricula in South Africa. However, genetics content requires evaluation to ascertain for the presence of competencies (Ehlers 2002:151). It is amazing to note that 34% of the sample stated that genetics competencies are achieved in their programmes even though the Policy Guidelines stipulated that genetics education is lacking in the post-basic nursing programmes.

4.6.2.17. Demonstrate screening for genetic problems

Forty four percent (44%) of the sample recorded that demonstration for screening of genetic problems is performed by learners. Thirty seven percent (37%) of the sample recorded that demonstration is not conducted while 19% skipped the item. In figure 4.37 findings are presented.

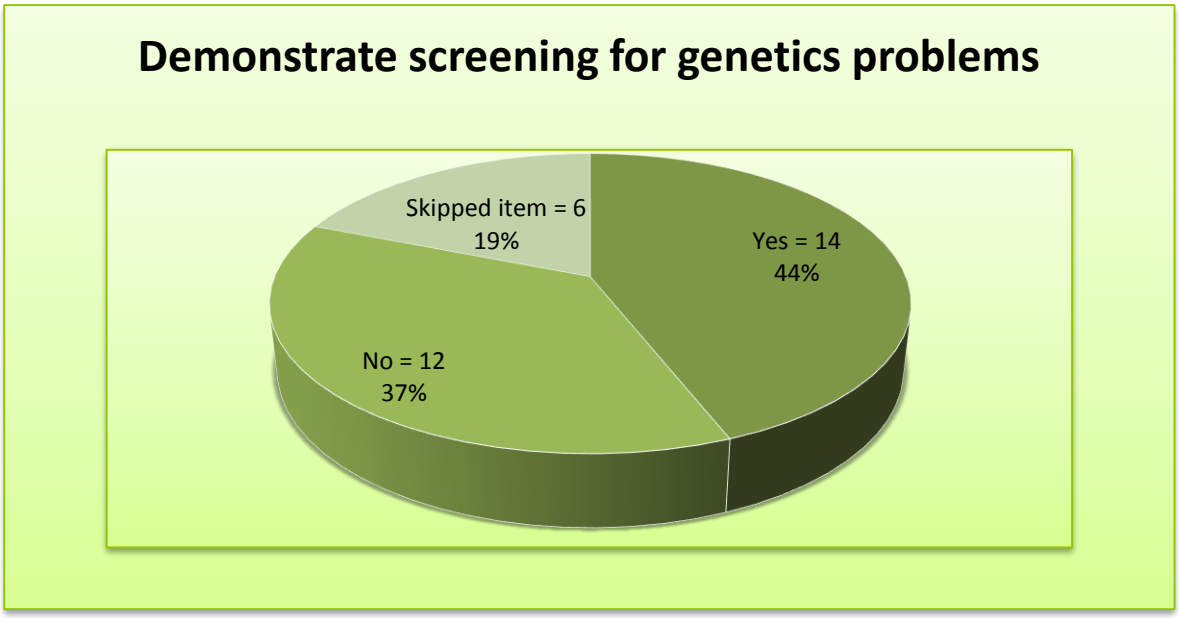

Figure 4.37 Demonstrate screening for genetic problems (N=32)

Forty four (44%) of the sample recorded that demonstration of screening for genetics problems forms part of genetics education. This is contrary to the stipulation in the Policy Guidelines (2001:29) that post-basic nursing programmes receive no genetics education. Clinical demonstration is concerned with teaching of practical clinical skills (Bruce, et al 2010:266). According to Policy Guidelines of 2001 in South Africa, post-basic nursing programmes receive no genetics education. At least 37% of respondents not recognising demonstration for screening of genetic problems are in agreement with the stipulation in the Policy Guidelines of 2001.

4.6.2.18. Learners diagnose genetic problems

Fifty six percent (56%) of the sample recorded that learners are able to diagnose genetic problems and 28% recorded that learners are unable to diagnose genetic problems. Only 16% of the sample skipped the item. Figure 4.38 present the rest of the results.

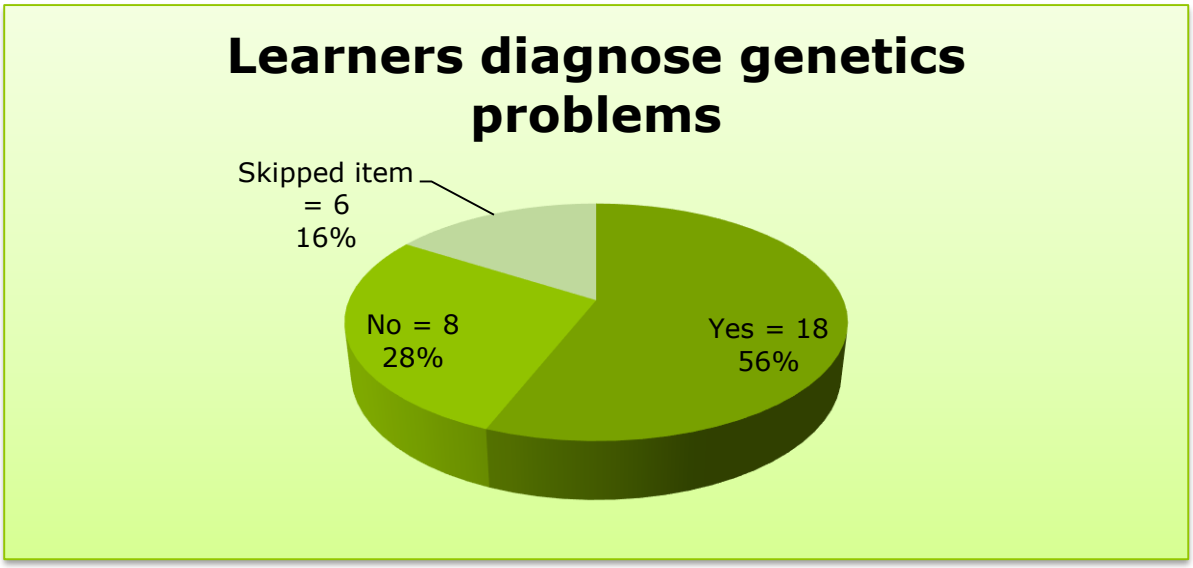

Figure 4.38 Learners diagnose genetic problems (n=32)

Although 56% of the sample recorded that learners in advanced midwifery programmes are able to diagnose genetics problems, it is however indicated in Gaff (2005:51) that "general nurses, midwives or health visitors are not expected to make a genetic diagnosis." Further this finding is conflicting because 50% of the sample in item 4.6.2.16 recorded that genetics competencies are not achieved in advanced midwifery programmes. Because 28% of the sample recorded that learners are unable to diagnose genetics problems, this finding is expected as outcomes are unplanned, therefore the skill to diagnose genetic problems could be lacking.

4.6.2.19. Screening for genetic problems

Four components were listed for respondents to identify those applicable to their teaching programmes. Results are presented as follows:

- **Antenatal care**

Ninety one percent (91%) of the sample recorded that screening for genetics problems form part of genetics education, particularly during teaching of antenatal module. Only three percent (3%) of the sample

recorded that genetics education is not included in antenatal care teaching. At least six percent (6%) skipped the item. Figure 4.39 presents the results.

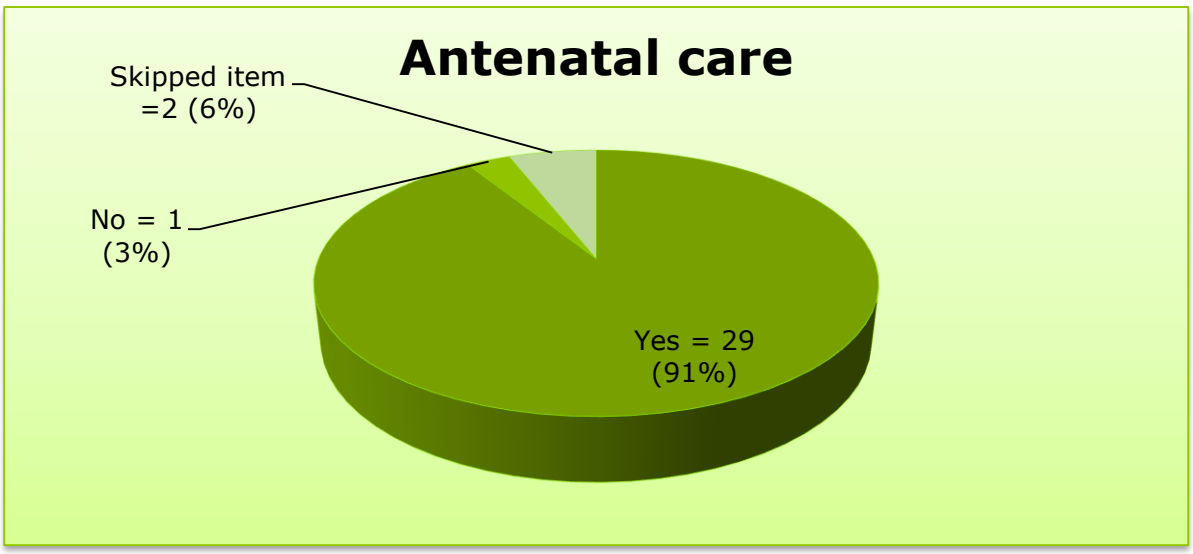

Figure 4.39 Antenatal care (n=32)

It is shown in figure 4.39 that 91% of the sample indicated that screening for genetics problems forms part of antenatal teaching whereas the Policy Guidelines (2001:29) stipulated that post-basic nursing programmes receive no genetics education. However, only three percent (3%) of the sample recorded that genetics is not part of teaching. Lack of coherence of genetics education in NEIs is illustrated through these findings. These contradictions were also observed in Burke and Kirk (2006:231) where pregnant women received varying information regarding screening of women in need of genetics services probably because of inadequate training in genetics among nurses.

- **Intra-partum care**

Ninety one percent (91%) of the sample recorded the inclusion of screening for genetics problems during intra-partum care, in three

percent (3%) it was not included, while six percent (6%) skipped the item. The results are presented in figure 4.40.

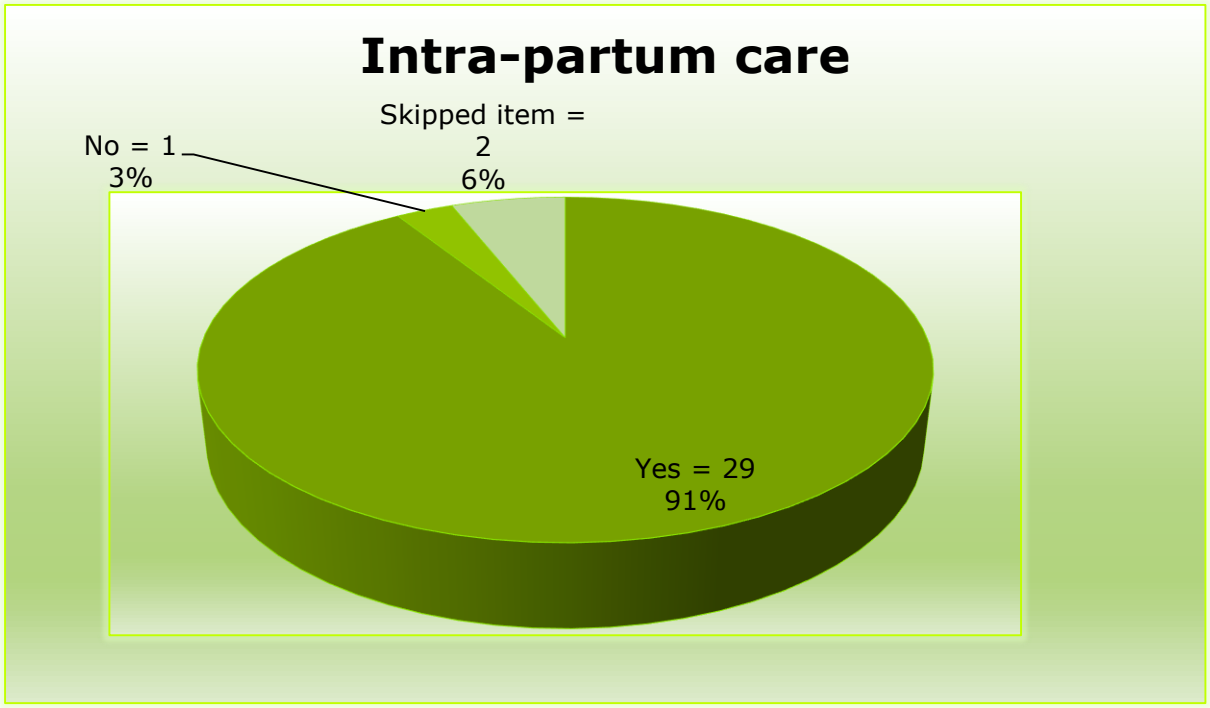

Figure 4.40 Intra-partum care (n=32)

Although 91% of the sample indicated that screening for genetics problems forms part of intra-partum teaching, genetics education is lacking in post-basic nursing programmes in South Africa (Policy Guidelines (2001:29). It is only three percent (3%) of the sample that disagreed with the above statement. This therefore shows that during training, advanced midwives received variable training in genetics as this depended on availability of a knowledgeable educator resulting in insufficient screening skills. This discrepancy is also shown in Burke and Kirk (2006:231) as pregnant women received varying information regarding screening for women in need of genetics services.

- **Post-natal care**

Ninety one percent (91%) of the sample recorded the inclusion of screening for genetics problems during post-natal care teaching with

three percent (3%) of the sample did not include it. Six percent (6%) of the sample skipped the item. Findings are shown in Figure 4.41.

Figure 4.41 Post-natal care (n=32)

It is shown in figure 4.41 that 91% of the sample recorded that screening and diagnosis for genetics problems forms part of intra-partum care teaching. The Policy Guidelines (2001:29) in South Africa stipulated that post-basic nursing programmes receive no genetics education. It is only three percent (3%) of the sample that disagreed with the above statement. This therefore could mean that during training, advanced midwives received inconstant training in genetics as this depended on availability of a knowledgeable educators resulting in insufficient screening skills. This difference is also shown in Burke and Kirk (2006:231) as pregnant women received inconsistent information regarding screening for genetics.

- **Neonatal care**

Seventy eight percent (78%) of the sample recorded the inclusion of screening for genetics problems during neonatal care teaching while 22% of the sample did not include it. In figure 4.42 results are presented.

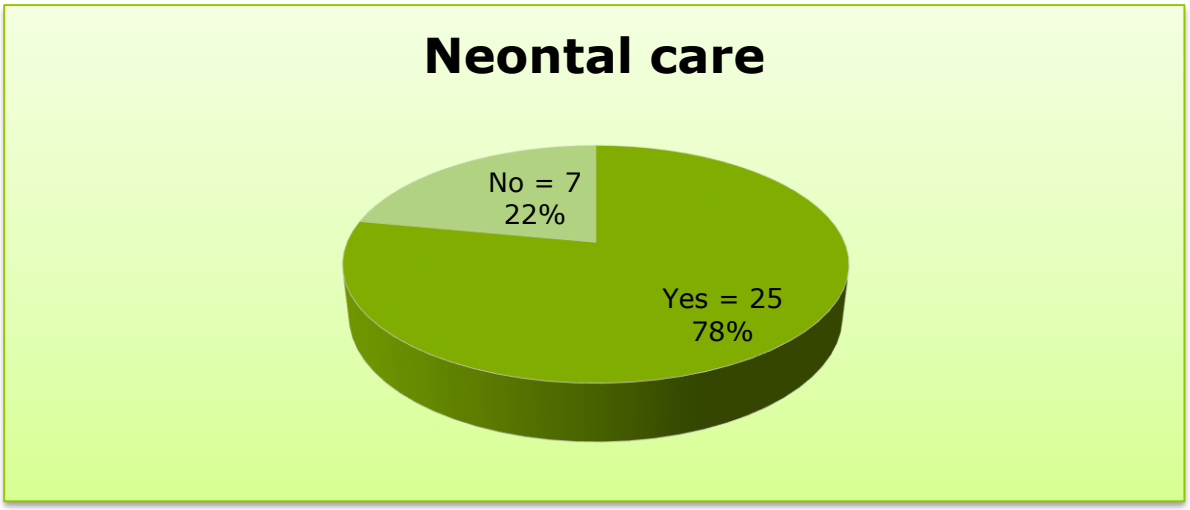

Figure 4.42 Neonatal care (n=32)

It is shown in figure 4.42 that 78% of the sample recorded that screening for genetics problems forms part of neonatal care teaching although the Policy Guidelines (2001:29) stipulated that post-basic nursing programmes receive no genetics education. It is only 22% of the sample that disagreed. According to Burke and Kirk (2006:231), pregnant women received inconsistent information regarding screening for genetics. The inconsistencies in screening regarding genetics could be as a result of varied training that depended on availability of interested educators.

4.6.2.20. Genetics competence domain followed during clinical exposure.

Three domains were listed for respondents to identify and record those fitting their teaching experience. Results are presented as follows:

- **Care delivery practice in genetics**

A majority (70%) of the sample recorded that genetics care delivery is addressed, 12% did not address genetics care delivery domain, while 18% of the sample skipped the item. Figure 4.43 presents the results.

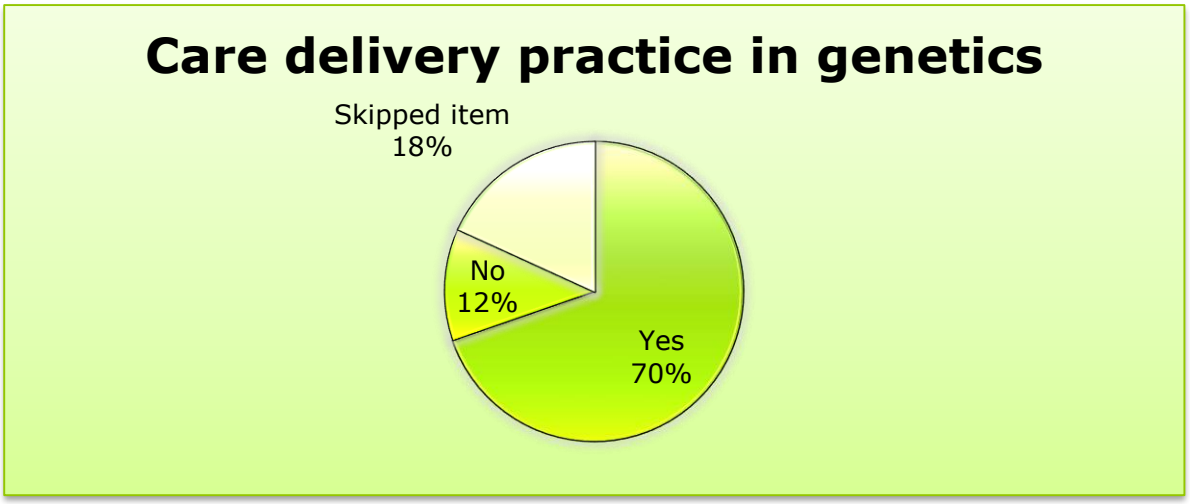

Figure 4.43 Care delivery practice in genetics

It is contrasting that 70% of the sample addresses care delivery related to genetics in clinical practice because genetics outcomes are not planned as indicated in item 4.6.2.6 of this report. Twelve percent (12%) of sample did not address the domain which is congruent with the current state of genetics teaching as reflected in the findings of this study.

- **Professional and ethical practice**

Fifty six (56%) of the sample recorded that the domain is addressed, 13% did not address the domain and 31% of the sample skipped the item. The results appear in Figure 4.44.

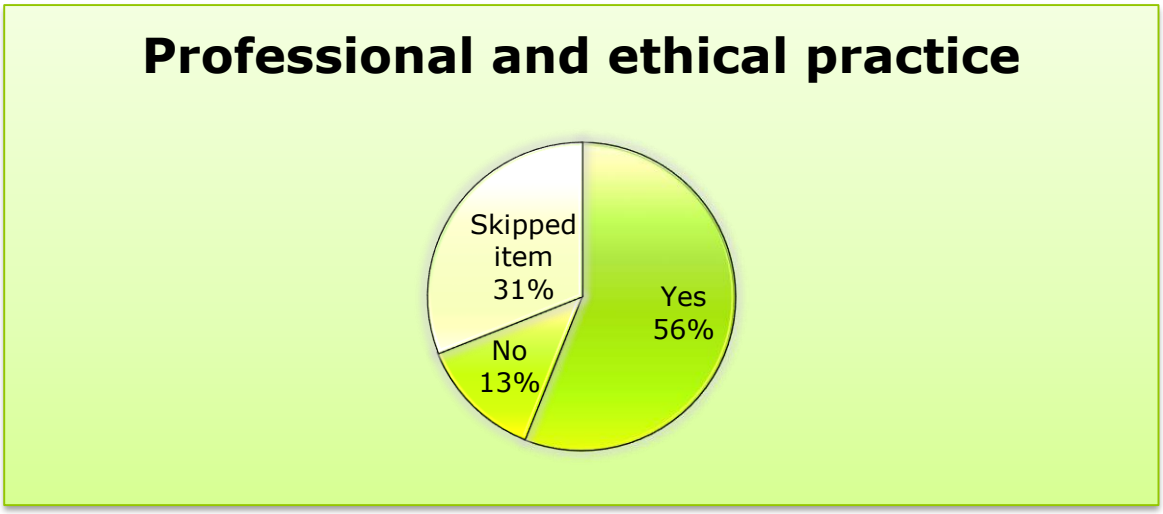

Figure 4.44 Professional and ethical practice (n=32)

Fifty six percent (56%) of the sample agreed that the professional and ethical domains are addressed. This finding is in contrast with current genetics education in advanced midwifery programmes based on item 12 of this report indicating that genetics outcomes are unplanned. The 13% of the sample who recorded that this domain is unaddressed is congruent with current research findings supported by the Policy Guidelines (2001:29) stipulating that post-basic nurses, including advanced midwives, receive no training in genetics.

- **Personal professional development**

Forty one percent (41%) of sample recorded that this domain is addressed, 12% were not addressing it and 47% of the sample skipped the item. Figure 4.45 depict the information about domains followed.

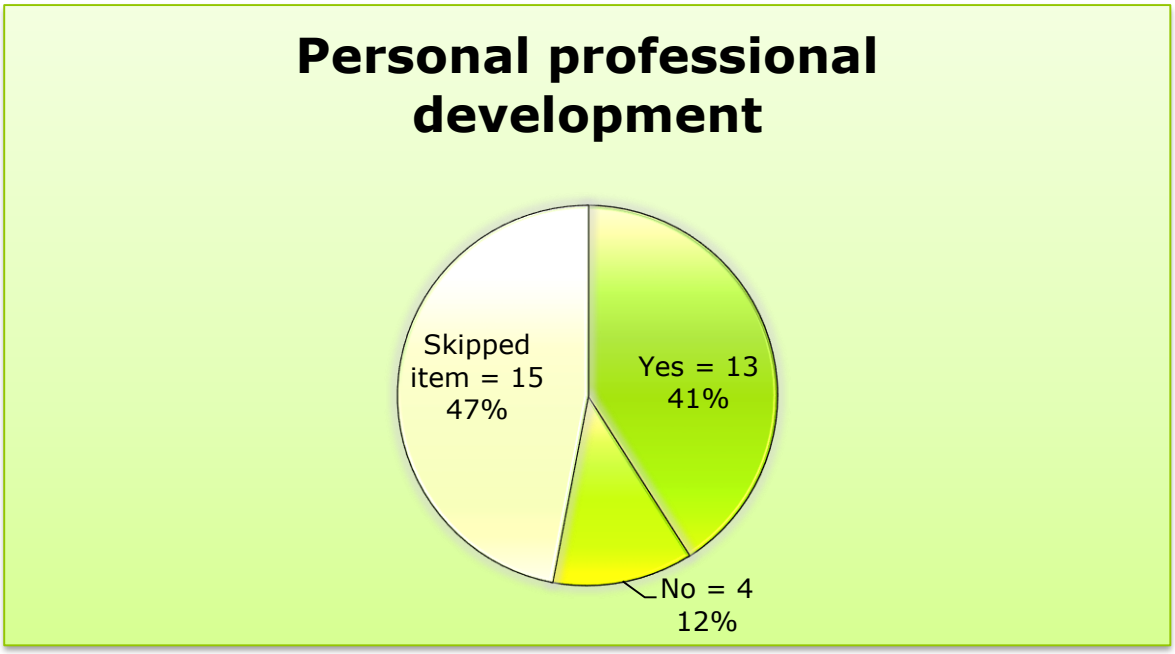

Figure 4.45 Personal professional development (n=32)

The results are in contrast with the current genetics education in advanced midwifery programmes based on item 12 of this report indicating that genetics outcomes are unplanned. The 12% of the sample who recorded that this domain is unaddressed is congruent with current research findings supported by the Policy Guidelines (2001:29) stipulating that post-basic nurses, including advanced midwives, receive no training in genetics.

4.6.2.21. Material used to prepare lessons

Seventy five (75%) of the sample recorded that textbooks and research articles are used to prepare lessons while 25% skipped the item. Figure 4.46 presents the rest of the results.

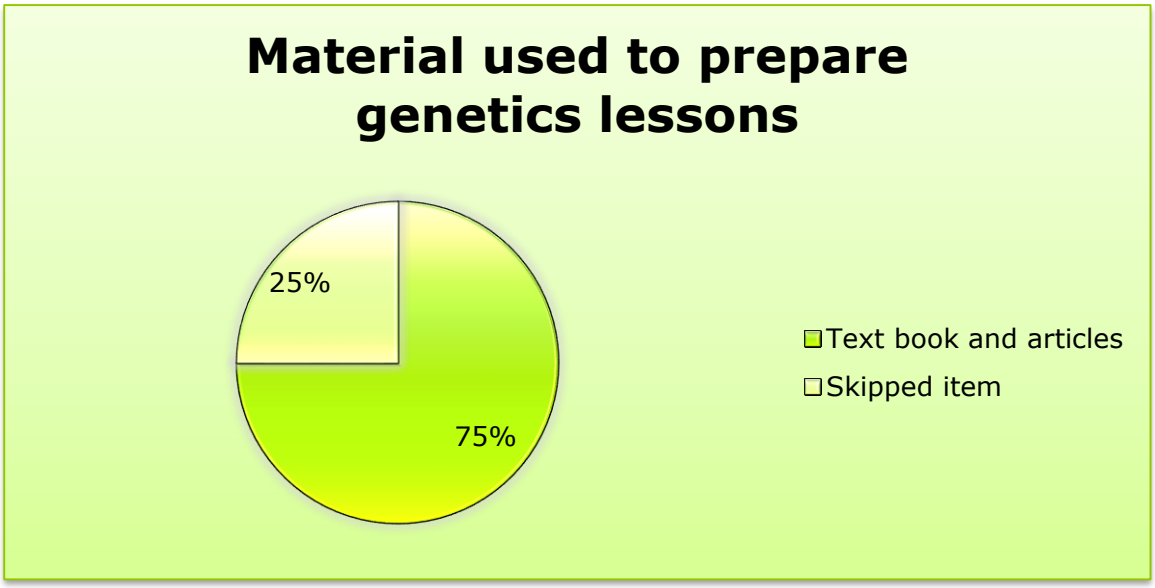

Figure 4.46 Material used to prepare genetics lessons (n=32)

The research articles regarding genetics are available on google website. Most articles are international research with a huge shortage of nursing articles reporting on the South African state of genetics education. Genetics textbooks for nurses in South Africa are limited, however there is one 2014 (latest) textbook written by Clarke that include one chapter on genetics. The book was released after the data collection for this study.

4.6.2.22. Participation in genetics workshops

Seventy three (73%) of the sample recorded a lack of participation in genetics workshop while only nine percent (9%) recorded that they take part in genetics workshops. Eighteen percent (18%) skipped the item. Figure 4.47 present the results.

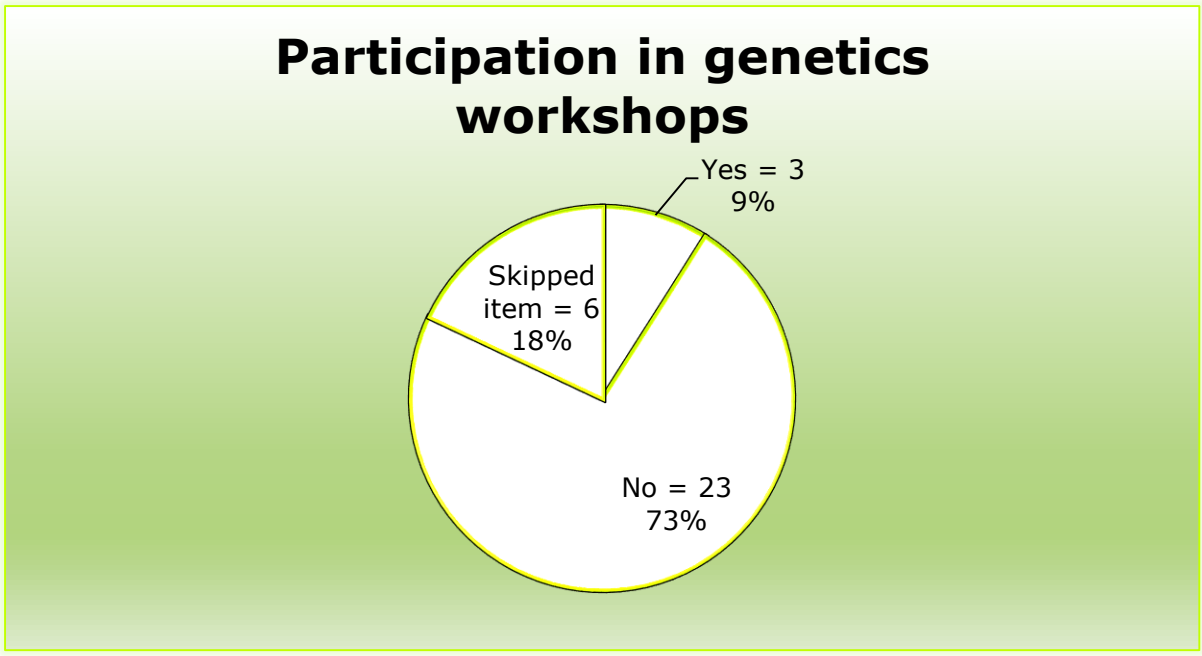

Figure 4.47 Participation in genetics workshops (n=32)

This huge number (73%) of the sample not attending any genetics workshops reflect the level of consideration provided to genetics education in the advanced midwifery programmes. The nine percent (9%) that is attending could be those interested in genetics education and this view is consistent with the Policy Guidelines (2001:29) as it stipulated that genetics education is applied where an educator is available.

4.6.2.23. Barriers for genetics education

Sixty four percent (64%) of the sample recorded that genetics education is unavailable, 25% recorded that genetics education is not important while 11% recorded that the current curriculum is full. Figure 4.48 provide pictorial results.

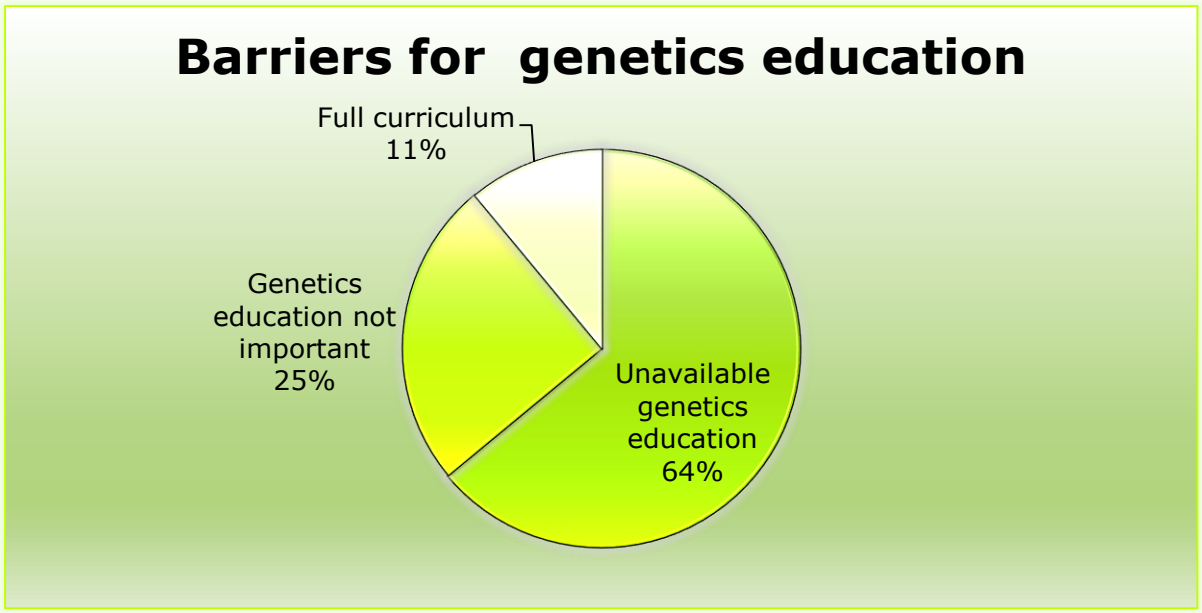

Figure 4.48 Barriers for genetics education (n=32)

Three reasons were identified as barriers for not learning about genetics in this study. The first barrier (unavailable genetics education reported by 64% sample) is expected because post-basic nurses receive no genetics training in South Africa. This finding is consistent with the report in Burke and Kirk (2006:231) indicating that midwives required genetics education because genetics education was scarce.

The second barrier (genetics is not important) is expected because there are health priorities conditions including HIV and AIDS that compromises and devalues genetics education in nursing in South Africa. Devaluing of genetics education is also mentioned in Burke and Kirk (2006:232) who reported that "the importance and impact of genetics was not widely recognised by more senior lecturers, which resulted in limited time for the subject."

The third barrier (full curriculum) is consistent with findings in various studies including that of Williams, et al (2011 3); Cragun, et al (2005:94); Hetteberg, et al (1999:170).

4.6.2.24. Suggestions to increase genetics education

Sixty two percent (62%) of the sample desired capacity in genetics and 38% wished guidelines to assist with inclusion of genetics in the advanced midwifery programmes. Figure 4.49 depicts the rest of the results.

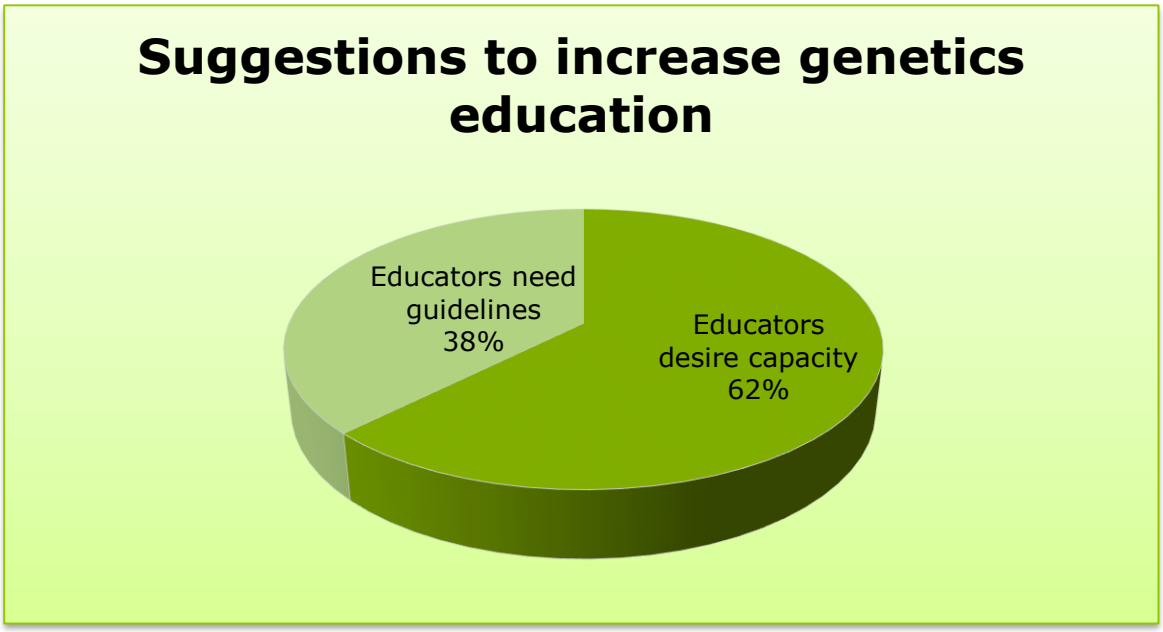

Figure 4.49 Suggestions to increase genetics education (n=32)

Sixty two (62%) of the sample communicated their lack of genetic knowledge and desired abilities in genetics. At least 44.9% of registered nurses stated a desire for more genetics education even though these professionals were unclear if genetics was appropriate to their practice (Godino, et al 2012:1130). Most interesting is noting that 38% of the sample required guidelines for inclusion of genetics in their curriculum. The need for integration of genetics in undergraduate and post-graduate curricula by nursing schools was also reported in Prows, et al (2005:199). This shows a need for a curriculum framework that could guide educators in the integration of genetics in the curricula of nursing schools.

4.7. SUMMARY OF THE RESULTS

The findings revealed that various genetics concepts were addressed in different components of the modules in the advanced midwifery programme. Genetics teaching comprised of varied principles and concepts across NEIs. However, learners lacked skills to screen and diagnose genetic disorders in clinical and PHC settings. The advanced midwifery curriculum was said to be too full to accommodate adequate genetics contents. Genetics learning outcomes and competencies were not planned across all NEIs. Teaching periods also varied and were inconsistent among the same educators from the same NEI and across NEIs in a province. Educators of the advanced midwifery course are not attending continuous education in genetics and they require guidelines on how to include genetics in the advanced midwifery programme.

4.8 CONCLUSION

This chapter presented the methods employed for quantitative data collection and analysis. The findings described the theoretical and practical genetic practices used in NEIs in South Africa. Chapter five present discussions of results and literature control for quantitative results.

CHAPTER 5: DISCUSSION OF QUANTITATIVE RESULTS

5.1 INTRODUCTION

The previous chapter presented quantitative results. The intention of quantitative objective was to determine the current theoretical and practical genetics education in an advanced midwifery programmes. The sample population included educators in advanced midwifery programmes in nursing colleges and universities in South Africa. Data were collected using survey and analysed through quantitative analysis. This chapter presents a discussion of quantitative results. The sample for this chapter is referred to as respondents.

5.2 DISCUSSION OF QUANTITATIVE RESULTS

Part two of the questionnaire comprised items that required genetics information pertaining to theory and practice as these represent the main focus of any education. The discussion is based on current genetics educational activity in the advanced midwifery programmes. Demographic data of 32 educators in the advanced midwifery programmes is presented in Chapter four.

5.2.1 Inclusion of genetics in the curricula

Genetics is a fundamental science of all health care professional education (Feetham, Thomson and Hinshaw 2005:107). Although genetics has been hailed to be an integral component of all health care, nurse educators lack genetics competencies (Maradiegue, et al 2005:477; Jenkins and Calzone

2007:11). Deficiencies of genetics knowledge among nurse educators led to their ability to integrate genetics content in the nursing programmes.

A majority (75%) of the sample indicated that genetics was included in their advanced midwifery programmes. However, it suffices to state that genetics education level is very low as genetics content has not yet reached learners (Collins and Stiles 2011:101). The claim shown in the findings could be a window-dressing type of genetics inclusion because there is lack of a dedicated component that addresses genetics content used in NEIs. The Policy Guidelines (2001:29) stipulated that post-basic nursing programmes receive no genetics education. Therefore, it is unlikely that genetics is adequately included in advanced midwifery programmes. Further, it is stated in Godino and Skirton (2012:174) that genetics could be accommodated after five years (from 2012) in nursing curricula in South Africa. This view supports the 12% of the current study sample who recorded that there is lack of inclusion of genetics in the advanced midwifery curricula and this resulted in absent genetics competencies. Thirteen percent (13%) of the sample skipped the item. According to Cape (2010:7) respondents with limited knowledge on the topic under discussion often refrain from offering their responses in the survey.

5.2.2 Components for inclusion of genetics

Findings revealed that genetics is included in preconception, antenatal and neonatal teaching. It means that genetic education is varied as it depends on a particular NEI regarding the component for inclusion. The variation is congruent with the Policy Guidelines (2001:31). Burke and Kirk 2006:232) found that genetics education in nursing programmes is varied.

Genetics was included in various components and a majority (72%) of sample included genetics in preconception teaching. Preconception services in South Africa are deficient as most pregnant women approach antenatal care only during pregnancy. This is attested to in the study by Kromberg, et al (2011:15) stating that preconception services are not a common practice in South Africa.

Antenatal services are a common service practiced in almost all PHC settings in South Africa. Only 22% of the sample included genetics in antenatal teaching. A missed opportunity is realised because antenatal services are massively available and genetics could be accommodated and practiced. During the antenatal care, pregnant women obtain minimum care necessary (Phaladi-Digamela 2014:2) however the care could lack genetics services as these are lacking in most PHC settings. However, because the current genetics in nursing education is offered based on availability educators, PHC practitioners could lack sufficient genetics knowledge and skills. This view is consistent with Calzone, et al (2010:29) who stated that current nursing education is not standardised, thus it could not adequately prepare nurses to be able to provide efficient genetics services.

An opportunity is missed because it is only six percent (6%) of sample that included genetics content in neonatal teaching. Low-risk births are conducted by midwives operating in PHC settings and midwifery obstetric unit (MOUs) in South Africa. Midwives perform physical assessment in new-born infants and discharge them with their mothers from low-risk settings. It could be an ample opportunity in these instances to offer genetics services because, according to Calzone, Jenkins, Bakos, Cashion, Donaldson, Feero, et al (2013:97) "the use of genomic information and technology is no longer dependent on referral to a genetic specialist, but has transitioned into non-specialty healthcare delivery."

5.2.3 Number of teaching hours (periods)

Great differences regarding the number of teaching hours (1 to 55 hours) dedicated for genetics education is a reality as revealed in this study. Each period equals to 40 minutes of teaching. Results in this study showed variations from similar NEIs in terms of teaching hours based on returned questionnaires received from the same institutions. Similarly differences in teaching hours dedicated for genetics education were identified in Burke and Kirk (2006:232) for whom teaching hours ranged between two and 75 in nursing and midwifery programmes. It is reported in Metcalf and Burton (2003:354) that hours used for genetics teaching in nursing and midwifery ranged from two to six (2-6) in nine institutions among those investigated in that study.

Variations regarding inconsistent teaching hours were identified over a long time as the differences were revealed in Kirk (1999:109) that less than 10 hours was found to be used for genetics teaching. The differences in the allocation of teaching hours (periods) could be attributed to ill-fitting genetics in teaching, thus impacting on genetics practice in PHC settings (Houwink, van Luijk, Henneman, van der Vleuten, Dinant and Cornel 2011:2). Equally, lack of a dedicated number of hours for genetics teaching was found in this study. A curriculum framework to standardise genetics education could assist in addressing the differences in teaching hours currently employed in NEIs in South Africa.

5.2.4 Genetics concepts

Various genetic concepts are addressed in the advanced midwifery programmes. Concepts addressed were: preconception, family history-taking, referral for genetic counselling, interpretation of genetic results, common heritable disease, relationship between race and ethnicity, recognition of genetic problems and consanguinity.

5.2.4.1 Preconception

According to Johnson, et al (2008:s2) preconception refers to several services and care provided "before and between pregnancies" meant for promotion of maternal health to enhance positive pregnancy outcomes. Although majority (72%) of the sample identified preconception as the concept addressed in advanced midwifery programmes, preconception services are lacking in South Africa (Kromberg, et al 2011:15). Teaching of preconception could be on theory that finds little expression in clinical settings. The Policy Guidelines (2001:29) stated that genetics education in post-basic nursing programmes is lacking in South Africa.

A very low number (9%) of the sample did not address genetics during preconception teaching. Nineteen percent (19%) skipped the item. According to Cragun (2005:92) respondents with limited information regarding the phenomenon, result in abstentions to survey item. Avoiding responses regarding preconception could suggest lack of knowledge in the field. A curriculum framework that standardises genetics education could assist NEIs in addressing genetics education.

5.2.4.2 Family's genetic history-taking

In order to identify individuals at risk of genetic diseases it is important to obtain a genetic family history and draw a three generation pedigree and analyse it (a pedigree is a chart documenting the family medical history) (Bowers 2002:124; Bennett 1999:1). A majority (81%) of respondents documented that family history-taking is the concept addressed in teaching. It could relate to only first generation history commonly obtained during the first antenatal visit. De Sevo (2013:128) stipulated that educators in nursing showed lack of genetics knowledge. The kind of lack displayed disempowered educators with inability to sufficiently provide genetics education to learners.

Family history could reveal necessary information such as "adoption, non-paternity, and termination of pregnancies, alcohol abuse, or suicides previously unknown to extended family members." (Bowers 2002:124). This information is required and is essential for decision making as far as genetics is concerned. Obtaining adequate family history of three generations and drawing a pedigree provide opportunity for healthcare professionals to trace heritable genetic diseases and intervene appropriately. Analysis of the pedigree remains essential for healthcare professionals to comprehend gene manifestations (Bowers 2002:124; Bennett 1999:11). Genetics family history and drawing a family pedigree should be obtained from all clients and patients in order to predict genetics problems. Therefore, nursing curricula should accommodate genetics adequately to empower learners.

5.2.4.3 Referral for genetic counselling

Every healthcare professional is expected to be able to comprehend referral for genetic counselling (Cragun, et al 2004:91). Though 81% of the sample indicated that referral for genetic counselling is addressed in their teaching, genetics services are inequitably distributed in South Africa as these are found mostly in cities and towns (Policy Guidelines, 2001:8). Teaching about referral for genetic counselling could be a small theory talked about in class because educators lack genetics knowledge (De Sevo 2013:128).

Thirteen percent (13%) of respondents indicated that referral for genetic counselling forms no part of their teaching. The comprehension among this group proved to be consistent with Ehlers (2002:152) who specified that training in genetics "is not a formal part of any current medical specialization in the Republic of South Africa." The six percent (6%) that lacked association with genetics counselling could be categorised to be having a genetic constraint, thus no commitment.

5.2.4.4 Interpretation of genetic results

According to Bower (2002:124) nurses are not expected to provide a genetic service except to assess and refer if an assessment indicates a genetic problem. A majority (81%) of respondents in this study showed that interpretation of genetics results formed part of teaching in the advanced midwifery programmes. It is only educators trained in genetics who could provide education for interpretation of genetics results.

Genetics education for post-basic nursing programmes in South Africa is informal (Ehlers 2002:151). Even if the interpretation of genetics results is addressed in teaching, caution must be exercised because genetics competencies in South Africa are lacking (Godino and Skirton 2012:174). The 19% respondents that have indicated that the concept under discussion is unaddressed are consistent with stipulations in Policy Guidelines (2001:29) that genetics education in post-basic nursing programmes is lacking. Genetics education has arrived and it has to be embraced in NEIs.

5.2.4.5 Identification of common heritable disease

Common heritable disease could be recognised through screening for insignificant abnormalities during routine assessment. More than three such anomalies in a client or patient, sensitises a nurse to refer (Bower 2002:123). The aforementioned author provides an example of Turner syndrome characterised by "low hairline, short fingers, short stature, and a webbed neck" which nurses could identify in clients during assessment. Genetics competencies in nursing are lacking also in South Africa as genetics is inadequately accommodated in nursing curricula (Godino and Skirton 2012:174).

A majority (81%) of the sample showed that common heritable diseases are addressed in teaching. The group that is identifying with teaching of common heritable disease could be from NEIs with knowledge in genetics. The Policy Guideline (2001:29) indicates that genetics teaching depends on the availability of educators in South Africa. At least a small number (13%) in the sample could not identify recognition of common heritable diseases as part of their teaching. The rationale for this group to indicate lack of teaching for common heritable disease could be their lack of genetics knowledge. Such educators with lack of genetics knowledge are also reported in Maradiegue, et al (2005:477) where educators were unable to attend to genetics issues because of lack of training in the field. The six percent (6%) that lacked association could be categorised as having genetics knowledge limitation, thus no commitment (Cape 2010:7).

5.2.4.6 Relationship between race and ethnicity

According to Freshwater and Maslin-Prothero (2005:502 and 217) "race refers to a tribe, nation, or a people, regarded as of common stock while ethnicity refers to cultural characteristics that connect a particular group or groups of people to each other." Genetic research stresses differences posing vulnerability to certain illnesses and reactions to specific drugs in specific human race groups (Jaja, Gibson and Quarles 2013:203). It means it is important to comprehend race and ethnicity of healthcare consumers in order to foretell their vulnerability towards diseases or reactions to drugs. It is stated in Ehlers (2002:252) that "Afrikaans speaking persons have a high prevalence of hypercholesterolemia." This therefore emphasises the importance of race and ethnicity in relation to genetics education.

Fifty percent (50%) of the sample recorded that relationship between race and ethnicity is included in their genetics teaching. Educators lacked

genetics knowledge, so genetics teaching is compromised and the concepts could not be adequately addressed. At least 34% in the sample are congruent with the Policy Guidelines (2001:29) as it stipulated that post-basic nursing programmes in South Africa do not include genetics. Thus educators lack genetics knowledge to be able to provide satisfactory genetics education. The limited genetic knowledge is recognised in 16% of the items missed by respondents. Respondents with limited knowledge in a particular phenomenon often refrain from responding to items in the questionnaire (Cape 2010:7).

5.2.4.7 Recognition of genetic problems

The expectation is that "nurses with graduate degrees provide genetic/genomic education, counselling and testing, and client support throughout lifespan." (Greco, et al 2012:10). It means such nurses have acquired genetic education and they are empowered to be able to provide education and offer genetic-related services. These nurses are able to recognise genetics problems and offer relevant interventions.

In this study, 50% of respondents indicated that recognition of genetics problems is included in teaching. However, post-basic nursing programmes do not include genetics education in South Africa (Policy Guidelines, 2001:29). Thus recognition of genetics problems remains a distant reality in the advanced midwifery programmes. This view is supported by 34% in the sample who indicated that recognition of genetics problems is not part of their teaching. At least 15% of the sample skipped the item. According to Cragun, et al (2004:92) "questions frequently missed by students illustrate a lack of basic and practical genetics knowledge." This kind of behaviour could be applicable in this study as shown through non-response to survey items represented by 16% of the sample.

5.2.4.8 Consanguinity

Fifty percent (50%) of the sample in this study pointed out that consanguineous is addressed in teaching of the advanced midwifery programme. Based on a lack of genetics education in post-basic nursing programmes, according to the Policy Guidelines of 2001, it is doubtful if this concept is sufficiently covered to empower learners. Educators lack adequate genetics knowledge (De Sevo 2013:15). Consanguinity is mating among people (man and woman) who share ancestors (Department of Human Genetics: Division of Medical Genetics 2003:1). The aforementioned document further stated that babies born in consanguinity have a greater chance of inheriting recessive genetic disorders. Availability of nurses with adequate genetics knowledge could be very helpful for such couples to be counselled and referred for genetics assessment. Because of existence of consanguineous marriages it is highly important for nursing education to address it in its education to empower learners.

5.2.5 Teaching strategies

Educators use various teaching strategies as they decide on potential effective methods because no instructional approach is better than others (Killen 2010:92). Group discussions and case studies are two strategies that respondents confined their responses to.

5.2.5.1 Group discussion

Although group discussion is mostly employed by a majority (72%) of the sample for genetics education, this kind of approach requires a facilitator with adequate information regarding the topic under consideration (Bruce, et al 2011:215). The possibility of sharing information from clinical settings regarding genetic challenges could be discussed in group

discussion sessions. Due to the lack of accredited literature in South Africa found during the author's search regarding genetics education for advanced midwifery programmes, the effectiveness of group discussion could pose a challenge. This could be attributed to the fact that a group facilitator (educator) could be less equipped in genetics because of a lack of knowledge in the field. In areas where genetics research among educators was done, it was found that in numerous programmes, educators felt a need to promote genetics teaching in the curricula (Burke and Kirk 2006:230).

5.2.5.2 Case study

Case study is a teaching strategy that promotes analytic thinking through dynamic learning (Popil 2011:204). Only 38% of the sample employed a case study strategy despite it being perceived to be an excellent teaching method. Genetics pose complex conditions, thus the use of case studies could be useful in genetics education. Though 38% of the sample employed the case study strategy in their teaching, genetics education is lacking in clinical facilities. Respondents lacked recognition of the significance of genetics for their teaching (Kirk, Campalani, Doris, Heron, Mannion, Metcalfe, et al 2011:19). Thus case study was not used by six percent (6%) of the sample. The majority (56%) of the sample skipped the item. As mentioned earlier respondents with little knowledge of a particular topic, displayed a tendency of avoiding survey items if those are considered irrelevant (Cape 2010:7).

5.2.6 Learning outcomes

Learning outcomes are objectives, goals or end results to be achieved at the end of the learning period (Iwasiw, et al 2009:182; Killen 2010:86). An outcome is an identifiable behaviour observed or attained upon programme completion and that could result from learning (Uys and

Gwele (2005:194). It is therefore important to decide on learning outcomes before programme implementation (Killen 2010:90). In an attempt to get rich information regarding genetics outcomes, the questionnaire comprised of various sections that required information about genetics outcomes. The sections that sought outcomes are all discussed in this section.

5.2.6.1 Genetics learning outcomes

Although the Policy Guidelines (2001:1) stated clearly that genetics is a vital part for all levels of care, slightly more than half (54%) of the sample indicated that genetics outcomes are not clarified. It shows the lower degree at which genetics is considered in advanced midwifery programmes. Genetics is not an integral part of the advanced midwifery curricula showed by the lack of planned outcomes. It is also revealed in Thompson and Brooks (2010:1); Maradiegue, et al (2005:473); Vural, et al (2009:225–226) that genetics content is not an integral component of advanced nursing curricula.

It is stipulated in the Policy Guidelines (2001:29) that genetics education differs and depends on availability of knowledgeable educators in genetics. Findings revealed variations and showed that only 22% of the ample recognised family history-taking as a genetics outcome. Further, only 12% of the sample recognised genetics counselling while only 6% identified mode of inheritance as outcome achieved in advanced midwifery programme. Depending on the NEI where respondents are working, specific NEIs exhibited varying genetics outcomes. It is not unknown if the mentioned outcomes are attained because genetics competencies are found only in three countries excluding South Africa (Godino and Skirton 2012:174). It is clear from the findings in this study that genetics education is haphazardly practiced in advanced midwifery programmes. This is congruent with the report in Little and Lewis

(2005:246) stating that genetics content in nursing curricula is insignificant.

5.2.6.2 Genetics outcomes related to care delivery

The following outcomes are used for discussion:

- **Basic human genetic technology**

Technology has made it possible for scientists to look into the genes of living beings (Simpson 2007:31). Basic genetics technology should be available in PHC settings to assist nurses to address genetics in a clinical setup in an endeavour to provide holistic care (Ehlers 2002:152). However, to be able to do it nurses are required to comprehend the role of genetic technology and its intended use (Simpson 2007:92). Fifty six (56%) of the sample in this study included basic human genetics technology in their teaching. Knowledge of genetics technology could be considered to be a competence. In South Africa, genetics competencies are lacking (Godino and Skirton 2010:174). Literature to disagree with the information reported by the aforementioned authors is also lacking meaning that genetics competencies are lacking in the country.

Only twenty two percent (22%) of the sample indicated that basic human genetic technology is not addressed in their teaching. Information brought forth from this group is consistent with that stated in the Policy Guidelines (2001:29) that post-basic nursing programmes provide no genetics education. Technological services are often less available for pregnant women in clinical and PHC settings in South Africa (Ehlers 2002:152). It is observed that 22% of respondents skipped the item. There is persistent skipping of items, and that could mean a lack of information regarding genetics. The lack of knowledge deters response in surveys (Cape 2010:7). Thus, the missing items in this study are attributed to a complete lack of genetics knowledge among specific respondents.

- **Patterns of inheritance**

Patterns of inheritance are the manner in which a particular genetic disorder is passed from parent to the offspring (Freshwater and Maslin-Prothero 2005:302). Examples of patterns of inheritance include autosomal dominant and autosomal recessive, X-linked dominant and X-linked recessive inheritance. A faulty gene may contribute to a genetic disorder or predisposes a person to develop a disorder (Winship 2003:13).

Fifty six percent (56%) of the sample identified that the outcome is addressed in their teaching. This finding is conflicting because post-basic nursing programmes in South Africa provide no genetics education (Policy Guidelines 2001:29). Furthermore, genetics is inadequately accommodated in nursing curricula in South Africa resulting in a lack of competencies (Godino and Skirton 2012:174). Twenty-two percent (22%) of the sample who indicated that the outcome is unaddressed, are consistent with the Policy Guidelines of 2001 and the study that stipulated that educators in nursing lack genetics knowledge. Further, 22% in the sample skipped the item indicating lack of genetics knowledge in the group, hence abstinence from responding (Cape 2010:7).

- **The role of family history in assessing predisposition to diseases**

Drawing of family history and analysis of the family pedigree of three generations is the valuable first phase to recognise individuals at risk for genetic illnesses (Lashley 2007:7; Bennett 1999:1). If this outcome is achieved upon exit from a learning programme, graduates could be able to provide genetics services in clinical settings. The majority (69%) of the sample indicated that family history is the outcome achieved in the advanced midwifery programmes. If educators lack genetics knowledge

(Thompson and Brooks 2010:1; Maradiegue, et al 2005:473; Vural, et al 2009:225-226) it is highly unrealistic for their learners to achieve genetics outcomes. It is now a common knowledge that post-basic nursing programmes do not adequately address genetic education in South Africa, thus drawing family history pedigree for three generations is not achieved.

Because post-basic nursing programmes do not address genetics education in South Africa, 19% of the sample in this study indicated that family history outcome is not achieved. Further 12% of the sample did not respond to the item because of limited genetics knowledge. The lack of knowledge on the subject of interest sets up a barrier for responding to surveys (Cape (2010:7). The role of family history in assessing predisposition to genetics illnesses is a missed opportunity for learners in the advanced midwifery programmes.

- **The role of genetics in maintaining health and preventing disease**

Genetic matters relevant to nursing include and are not limited to understanding of common heritable variants in human populations, identification of genetic contributions to disease and drug response (Lashley 2007:7). Genetics knowledge empowers health care professionals so that they are able to earlier diagnose, manage and prevent genetic problems resulting in improved health outcomes (Mahowald, et al 2001:1). Nurses adequately equipped and having attained genetics competence could be able to address genetics problems in clinical and PHC settings therefore maintaining health and preventing diseases. In South Africa nurses are major healthcare providers particularly in low-risk settings so their genetics knowledge could be highly valuable.

A majority (69%) of the sample indicated that the role of genetics in maintaining health and preventing diseases is the outcome achieved in the advanced midwifery programmes. This finding is in conflict with studies which stated that nursing educators lack adequate genetics knowledge (Thompson and Brooks 2010:1; Maradiegue, et al 2005:473; Vural, et al 2009:225-226) and that genetics is inadequately accommodated in South Africa resulting in lack of genetics competencies (Godino and Skirton 2012:174).

Nineteen percent (19%) of the sample indicated that the outcome under discussion is unachieved. This finding is congruent with Policy Guidelines (2001:29) as it stated that genetics education in post-basic nursing programmes is lacking, therefore, genetics outcomes are absent. Additionally 12% of the sample refrained from providing their answers to the item, thus communicating their lack of genetics knowledge (Cragun 2005:92). It suffices to state that the role of genetics in maintaining health and prevention of diseases is a missed opportunity among learners upon exit from advanced midwifery programmes.

5.2.7. Learner assessment

The purpose of assessment is to recognise areas and levels of competence and to offer feedback regarding learning (Uys and Gwele 2005:207). According to Anema and McCoy (2010:11) assessment should be valid and reliable as different assessment strategies are used to encourage learners to show learning achievement through attained outcomes. Cognitive domain could be assessed through several integrated methods including written assignments and portfolios. Three assessment methods were provided for respondents to identify those applicable in their teaching. Those were: written test or examination, oral presentation and problem solving.

5.2.7.1 Written test or examination

The majority (91%) of the sample used written test or examination to assess genetics knowledge in theory (cognitive). The fact that outcomes were not planned makes it clear that genetics was insufficiently assessed in the advanced midwifery programme. Genetics education in South Africa is reliant on available educators (Policy Guidelines 2001:29). Thus assessment for genetics could have relied on professional judgement of available individual educators (Voorhees 2001:10). This kind of situation lack quality control measures as all could lack information except only one or two educators. The one educator with adequate genetics knowledge could be overburdened with his/her workload as genetics content and assessment could be assigned solely to him or her (Williams, et al 2011:3).

5.2.7.2 Oral presentation

Oral presentation is another assessment method used to evaluate knowledge of learners. It is unclear if oral presentation as an assessment method was valid and reliable because assessment procedures should be "fair and reflect the knowledge and skills that are most important for students." (Uys and Gwele 2005:209). The fact that advanced midwifery educators lacked sufficient genetics information, could pose unsatisfactory assessment of learners regarding genetics competence. Educators showed scarcity of genetics knowledge (De Sevo 2013:128). It could be difficult to assess something that you as an assessor have limited knowledge of.

5.2.7.3 Problem solving

In order to assess problem solving skills in learners, it is important to first recognise required skills, and then recognise the purpose of assessment (Harrold, page 1, http://www.ndsu.nodak.edu). Less than half (47%) of

sample used problem solving to assess genetics skills and knowledge even though skills (outcomes) were unplanned. At least 16% of the sample indicated that problem solving, particularly with regard to genetics, is not applied in their teaching. At least 37% of the sample did not respond to the item probably because of limited genetics knowledge. This confirms that genetics is randomly addressed in the advanced midwifery programmes.

Problem solving skills could be applied as psychomotor in clinical settings. Psychomotor (practical) is often assessed through performance or presentation of activities, either in a real situation or by simulation to resolve problems while being evaluated (Uys and Gwele 2005:208). Respondents reported lack of genetics knowledge therefore it is impossible to assess problem solving skills in learners.

5.2.8 Learning experiences

Clinical learning refers to learning and gaining of specialised roles and skills through direct practice under supervision in clinical and PHC settings (Uys and Gwele 2005:79). This kind of learning offers 50% of learning experience for learners (Warne, Johansson, Papastavrou, Tichelaar, Tomietto and Van den Bossche 2004:809). For this study a majority (53%) of the sample included in their teaching the learning experiences related to genetics.

Clinical learning for genetics for advanced midwifery learners could be enriched if genetics services are practiced in all clinical and PHC settings providing care to pregnant women and child healthcare. Nevertheless evidence suggesting that advanced midwives practicing in clinical and PHC settings have adequate access to genetic services is lacking. Further literature to confirm that learners in advanced midwifery programmes learn genetics during clinical placement could not be established.

5.2.9 Components for clinical assessment

In nursing education, clinical assessment is conducted to evaluate achievement of skills (Uys and Gwele 2005:70). It is in clinical settings where theory and practice are correlated. Various clinical areas and skills laboratories are planned for student assessment. In this study new-born assessment was included in the questionnaire as an example. An empty space was further provided for learners to write other assessment components. However, a 53% of the sample in this study used only new-born babies for clinical assessment regarding genetics.

It is surprising to note that only new-borns are assessed to evaluate genetics skills in learners because, according to the sample, genetics is also included in antenatal care. Clinical assessment for new-borns is reported not be done by 28% of the sample in the current study. Further, 19% of the sample skipped the item. It is reported in Cape (2010:7) that respondents lacking knowledge in a particular subject that requires input often abstain from responding to items in surveys.

5.2.10 Settings for experiential learning

Practical learning in clinical settings is an essential component of nursing education as the profession is practiced-based (Kaphagawani and Useh 2013:181). A majority (81%) of the sample reported the use of hospitals and clinic facilities for experiential learning. For practical learning to be effective, educators and preceptors knowledgeable in genetics are required. Further, registered nurses in clinical settings also require acceptable genetics knowledge as these professionals are responsible for learner supervision throughout placement. It is safe to point out that experiential learning was lacking because both educators and registered nurses had deficient genetics knowledge.

At least 10% of respondents clearly pointed out that experiential learning is not applicable in their teaching meaning that it could be only genetics theory that is been addressed in their learning programmes. According to WHO (2006:20) "genetic services should be rooted in primary health care, and linked with regional, secondary and tertiary levels of care in a rational manner."

5.2.11 Number of hours dedicated for clinical learning

Clinical hours are planned during programme design (Uys and Gwele 2005:70). Great differences (1-40 hours) regarding clinical learning hours are displayed in the results as depicted in table 4.3 in chapter 4 of this study. Every NEI has its own number of hours for clinical learning and there is lack of a standardised guide regarding the number of clinical hours committed for genetics education. Variations of between 2-72 teaching hours for genetics were also reported in Kirk and Burke (2006: 232). Twenty eight percent (28%) of the sample skipped the item and this show that hours for clinical learning are unplanned in other NEIs because items perceived to be irrelevant to respondents due to lack of knowledge, are often neglected (Cape 2010:7).

5.2.12 Responsible professional for learner accompaniment

Clinical accompaniment is a planned supervision provided by educators to learners in order to provide opportunities in learning the practice (Bruce, et al 2010:254). For clinical learning to be beneficial to students, learner accompaniment through the service of educators and preceptors is required. A clinical preceptor could be a qualified educator who accompanies students in clinical learning apart from class learning (Bruce, et al 2011:255).

Numerous professionals were mentioned to be responsible for clinical accompaniment regarding genetics. Thirty-one percent (31%) of respondents indicated that an advanced midwifery educator is responsible for clinical accompaniment. According to Ehlers (2002:151) genetics knowledge in the nursing profession is still lacking in South Africa. This view is congruent with Benjamin, et al (2009:486) that investigation of midwives in their study reported a lack of confidence in performing some genetic procedures. Therefore advanced midwifery educators could not provide effective learning in genetics as they lack adequate genetics knowledge. Results further indicated that registered nurses in the ward (6%) and medical doctors (6%) offer clinical accompaniment in genetics, however genetics skills of these professionals are unknown.

A quarter (25%) of responses indicated that learner accompaniment is not applicable. This view is considered accurate as genetics education in inconsistently employed in South Africa as it depends on available educators (Policy Guidelines 2001:29). Results showed (figure 4.35) that 19% of the sample skipped the item. The item was avoided as this could be inapplicable their genetics teaching. Cape (2010:7) pointed out that items perceived to be irrelevant in measurement instruments are often skipped during surveys. This further designates that genetics education is undervalued in an advanced midwifery programmes.

The results further show that three percent (3%) of the sample indicated that genetics specialists provided learner accompaniment with regard to genetics. This view is highly irrelevant because genetics specialists are very few in South Africa (Policy Guidelines 2001:3) therefore, these professionals are often not found in clinical and PHC settings. The country required 80 genetics specialists for the population of 40 million in 1996 if one specialist was responsible for one million of the population (Policy Guidelines 2001:3). Even if genetics specialists were sufficiently available,

it is not their responsibility to accompany nursing learners except to discuss conditions as and when present in clinical settings particularly during academic ward rounds.

5.2.13 Genetic competencies achieved

A competency is defined as a skill, the knowledge and the ability required for performing a certain job (Freshwater and Maslin-Prothero 2009:141). According to Anema and McCoy (2010:5) "competence describes actions or skills the person should be able to demonstrate." Only 34% of the sample attested that genetics competencies were achieved despite respondents stating that outcomes are not planned. This assertion could be attributed to those educators who teach some aspects of genetic principles as the Policy Guidelines (2001:29) shows that genetics teaching depends on availability of educators.

Perhaps those students perceived to have attained genetics competencies (skills) were taught by educators which the aforementioned policy referred to (individual staff). However, literature could not be found to confirm if advanced midwifery learners attained genetics competencies upon programme completion.

5.2.14. Demonstrate screening for genetic problems

Demonstration is showing learners how certain procedures are performed in clinical settings (Bruce, et al 2011:214). Despite the inclusion of genetics education in maternal, child and women's healthcare programmes in South Africa (Policy Guidelines, 2001:10) findings revealed that only 44% of the sample, demonstrated screening procedure for genetic problems. Educators demonstrating genetics screening might have had prior learning during their own basic training. In situations where demonstration of genetics screening was not employed, educators

might be lacking the genetics skills. A framework might assist in addressing the required skills ensuring that educators are empowered to sufficiently to be able to influence genetics education in the advanced midwifery programme.

5.2.15 Learners diagnose genetic problems

Nurses, midwives and health visitors are responsible for diagnosis of genetics problems (Gaff 2005:51). However, in this study, 56% of the sample indicated that learners are able to diagnose genetics problems. This finding is disallowed because genetics education is lacking in post-basic nursing programmes in South Africa (Policy Guidelines 2001:29). Twenty-eight percent (28%) of the sample indicated that learners are unable to diagnose genetics problems. This finding is permissible based on the Policy Guidelines (2001:29) indicated that some educators oferred genetics education in South Africa. Sixteen percent (16%) of the sample skipped the item confirming their limited genetic knowledge as pointed out by Gragun (2005:92) who stated that a barrier in information leads to an inability to respond in surveys.

5.2.16. Screening for genetic problems

Screening means an assessment of a particular population to uncover curable illnesses (Freshwater and Maslin-Prothero 2005:543). In instances where screening programmes exist, these are planned and implemented regularly with evaluation of their effectiveness by implementers. For example, screening for syphilis is offered to all pregnant women (population) using public healthcare services in South Africa and those found to be syphilis positive, are routinely offered the necessary treatment. Screening for genetics problems were employed during antenatal, intra-partum, post-natal and neonatal care.

5.2.16.1 Antenatal care

Antenatal care refers to "care provided to a pregnant woman from the time conception is confirmed until the beginning of labour." (Fraser, Cooper and Nolte 2010:231). Pregnant women are screened for various illnesses such as diabetes mellitus and infections such as syphilis so that interventions could be provided. Antenatal screening could differ from genetics screening because, for instance, a three generation history could be obtained through drawing of a person's pedigree during genetics screening. Although a majority (91%) of the sample indicated that screening and diagnosis are conducted during antenatal care, it is not the role of nurses and midwives to make a genetic diagnosis (Gaff 2005:51). Respondents lacked genetics capacity to be able to teach screening and diagnosis of genetics problems. It is reported in Burke and Kirk (2006:231) that healthcare professionals providing antenatal care required genetics education.

Antenatal screening programmes are planned, implemented and evaluated for effectiveness while genetic screening is practiced less in South Africa. Most PHC settings in South Africa lack resources for genetic screening and diagnosis and PHC practitioners, including advanced midwives, lack access to genetic technology (Ehlers 2002:152). Opportunities to provide genetics in antenatal teaching are missed. According to the Policy Guidelines (2001:3) genetics should not be viewed as a separate service. It means genetics services should be included in various modules and all healthcare disciplines.

5.2.16.2 Intra-partum care

Intra-partum refers to the period during labour and childbirth (Freshwater and Maslin-Prothero 2005:308). During this period genetics expertise among midwives are required in order to provide holistic care. As a

midwife the researcher often observed that genetics knowledge was lacking among midwives. Often, upon the delivery of babies with genetics or congenital defects the babies were often referred to medical doctor without any intervention by midwives and registered nurses.

A majority (91%) of the sample included screening and diagnosis of genetics problems during teaching of intra-partum care. This view is conflicting because genetics education in post-basic nursing programmes in South Africa is lacking (Policy Guidelines 2001:29). Further, provision of genetics education is incongruent (Kirk, et al 2011:19) causing educators to lack grounding in the field. Missed opportunities for genetics services are realised as graduates lack genetics skills to be employed in clinical and in PHC settings.

5.2.16.3 Post-natal care

Post-natal refers to the period after childbirth (Freshwater and Maslin-Prothero 2005:473). According to the Policy Guidelines (2001:13) genetics services should be provided to parents and new-borns. This includes physical examination of new-born for genetic disorders. A majority (91%) of the sample indicated that screening and diagnosis of genetics problems are included for teaching. So far we already know that genetics education in post-basic nursing programmes in South Africa is lacking as stipulated in the Policy Guidelines (2001:29). It is confirmed in Kirk, et al (2011:13) that educators received dissimilar genetics education resulting in them having little genetics knowledge.

5.2.16.4 Neonatal care

Neonatal care refers to the period following an infant's birth till one month of life (Freshwater and Maslin-Prothero 2005:383). Healthy infants are cared for by their parents while sick infants could be cared for in

hospitals. Genetic screening is mostly done through obtaining a thorough history about pregnancy including possible contact with teratogens such as alcohol during pregnancy. Further a family pedigree should be compiled to confirm any suspected genetic disorder (Levene, Tudhope and Sinha 2008:156).

A majority (78%) of the sample indicated that screening and diagnosis for genetic disorders is part in neonatal teaching. It is known that "education providers may have limited awareness of the relevance of genomic healthcare, and may lack confidences in teaching about it." (Kirk, et al 2011:21). The respondents could fall in the category shown in the above quote because genetics education in the post-basic nursing programme is lacking in South Africa. Only 22% of the sample indicated that screening and diagnosis of new-borns does not form part of teaching. This group (22%) comprehended that genetics education in advanced the midwifery programmes is absent. The curriculum framework to standardise genetics education could assist educators to ensure sufficient genetics teaching.

5.2.17 Genetics competence during clinical exposure

Clinical learning offers opportunities to learners for correlation of theory and practice in real situations. During clinical plcements learners are exposed to teaching and supervision on an on-going basis till mastery of the relevant skills. The aim of clinical teaching is to "produce a competent professional nurse capable of providing nursing care based on sound knowledge and decision making, practiced skill and professional values." (Bruce, et al 2011:254). Three areas were included for respondents to identify those befitting their education in the advanced midwifery programmes.

- **Care delivery practice in genetics**

Care delivery practice in this study, relates to the provision of genetics services in clinical settings. Learner accompaniment could also be a chance to provide genetics education. According to Greco, et al (2012:10) nurses who have obtained a degree are able to recognise "clients with inherited predisposition to diseases as appropriate to the nurse's practice settings." The scope of practice for advanced practice nurses could demonstrate an increased genetics content making their genetics abilities to be more applicable elsewhere. However, it is stipulated in the Policy Guidelines (2001:29) that post-basic nursing programmes offer no genetics education in South Africa. Although a 70% of the sample stated that care delivery related to genetics is offered to learners, it could refers to theory as genetics services are mostly found in big cities in South Africa making them less accessible to all learners.

- **Professional and ethical practice**

For one to maintain professional and ethical standards in clinical practice, nurses must remain competent according to the scope of practice as stipulated for registered nurses. Regarding professional and ethical practice, 56% of the sample stated that the domain is addressed. It could be addressed in any nursing practice but with regard to genetics education, the area remains at a distance as the Policy Guidelines (2001:29) stipulated that the post-basic nursing programme do not address genetics. The 13% of the sample who indicated that professional and ethical practice in genetics is not addressed are consistent with the Policy Guidelines (2001:29) as stated above. An assumption could be made that those 31% respondents who remain neutral regarding response to the item lacked knowledge regarding the area. This view is congruent with Cape (2010:7) who indicated that responses are lacking in

case the sample had limited knowledge regarding the topic under discussion.

- **Personal development**

In order to remain updated with current knowledge and skills in a particular career one has to habitually engage in learning related to that specific subject (Cooper 2009:501). It is shown by 41% of the sample that personal development in genetics is addressed in advanced midwifery programmes. The Policy Guidelines (2001:290) states clearly that post-basic nursing programmes do not receive genetics education, therefore personal development in genetics remains unaddressed. The 12% of the sample who do not address personal development are congruent with the Policy Guidelines (2001:29) stating that genetics education depends on availability of educators meaning only those with interest in genetics could attend personal development in the field.

5.2.18 Material used to prepare lessons

According to Uys and Gwele (2005:72) it is important to select a textbook that largely covers the content of a particular programme. Although a majority (75%) of the sample used a textbook to prepare for genetics lessons, priority genetics conditions for the country as stipulated in the Policy Guidelines of 2001 seemed to be unnoticed. Priority disorders in the teaching of advanced midwifery could help in addressing genetics problems identified as risks in South Africa. However, limited South African nursing and midwifery genetics textbooks that could include genetics issues, including priority conditions, are lacking.

Some of the genetics principles and conditions might be undetected in clinical and in PHC settings as practitioners, including advanced midwives, may be unaware of such. A quarter (16%) of the sample skipped the

item, this shows that genetics education is underrated in the advanced midwifery programmes as educators are not addressing the genetics issue. According to Cragun, et al (2005:92) respondents with limited knowledge in the subject do not provide their responses for something they are not conversant with.

5.2.19 Participation in genetics workshops

A workshop is an activity used "by educators to ensure that they cover certain aspects of the work and to guide learning activities." (Bruce, et al 2011:220). A majority (73%) of the sample in this study do not attend genetics workshops. Failure to attend workshops could contribute to the lack of credit for the importance of genetics in the advanced midwifery programmes. This view is consistent with findings in Kirk, et al (2011:110) that stipulated that educators could not comprehend the importance of genetics.

The Policy Guidelines (2001:12) specifies that opportunities for revival of genetics knowledge and skills are available in South Africa through short courses in genetics on an annual basis, yet respondents seem to be unaware of such continuing education. Further, the International Society for Nurses in Genetics (ISONG 2012:2) "provides a forum for dialogue with others" regarding genetics. However, it was not indicated in any responses regarding awareness of prospects for engagement offered by that society.

Greco and Mahon (2003) state that it is vital for nurses and midwives alike to persistently seek and take part in educational opportunities to keep abreast with the latest developments in the field of genetics. A curriculum framework to standardise genetics education in an advanced midwifery programme could be an opportunity to improve knowledge and

skills in educators and increase participation in genetics-related workshops.

5.2.20 Barriers for genetics education

Findings revealed three barriers for not learning about genetics among respondents in the current study. The first barrier is reflected through 64% of responses indicating that genetics education is unavailable. This status could be attributed to a stipulation in the Policy Guidelines (2001:29) that post-basic clinic nursing practitioners receive no training in genetics. Advanced midwives form part of post-basic nursing professional not trained in genetics. The obstacle might also be ascribed to a further revelation in the aforementioned policy stating that genetics teaching differs according to NEIs and availability of educators. It is also confirmed in De Sevo (2013:128) that educators showed a meagre genetics knowledge.

In circumstances where there are educators with genetics knowledge, genetics could be addressed. As it stands literature to confirm existence of educators with sufficient genetics knowledge in South Africa is lacking. Educators with satisfactory genetics knowledge in advanced midwifery programmes are scarce. This poses a hindrance regarding genetics education in the programme. This view is consistent with Kirk's report (June 1999) which identified a shortage of suitably qualified lecturers as an obstacle for the provision of genetic education.

The current genetics education resulted in limited number of learners with expertise to implement genetics in clinical and PHC settings in South Africa. Similarly in Kirk (1999:113), lack of personnel to train others in genetics existed. Increasing faculty (educator) knowledge about genetics is paramount for the realisation of knowledge transfer (Jenkins, Prows, Dimond, Monsen and Williams 2001:286). The curriculum framework to

standardise genetics education could sensitise educators of advanced midwifery programmes to recognise and sufficiently learn better in that field.

The second barrier is expressed through 25% of responses showing that genetics education is not an essential component of the advanced midwifery programme. By implication, whether genetics is taught or not and whether advanced midwifery learners lack knowledge or skills, this kind of state seem to be acceptable by the sample in this study. In the study by Gharaibeh, Oweis and Hamad (2010:440) nurses and midwives could not perceive themselves as forming part of genetic teaching. Hetteberg and Prows (2004:87) pointed out that it is important to assist educators to realise the importance of genetics content in the curricula.

Educators in the advanced midwifery programmes require adequate empowerment with regard to genetics so that transfer of appropriate and adequate genetics information during training is offered to students. If the status quo remains, lower educational levels among advanced midwives as PHC practitioners could continue and that affects sufficient individual and community teaching (WHO 2006:72). The rate of undesirable preventable genetic problems could persist because of the unskilled healthcare practitioners with regard to genetics needed in clinical and PHC settings.

Lastly, 11% of responses revealed that the advanced midwifery curricula are full. While the curricula is said to be full, genetic problems such as Down syndrome, neural tube defects, etc., are limitedly prevented consequently increasing their prevalence. Similarly the view of limited curricula time is also reported in Williams, et al (2011:3) and Maradiegue, et al (2005:477). Genetics education is not a stand-alone component of education in advanced midwifery. Its practice in clinical and PHC settings should be integrated in current maternal, child and women's health

programmes as these exist. Nurses who are unaccustomed to basic genetics concepts put their clients at risk by not addressing genetics problems earlier (Pal, Radford, Vadaparampil and Prince 2013:151).

Competing contemporary issues such as HIV and AIDS, which are mostly included in the curricula in South Africa, pose an impediment for adequate implementation of genetics education (Ehlers 2002:152). However, Pearce, et al (2004:1071) pointed out that providing too much attention towards genetics could deviate commitment of means away from significant health care conditions. Such conditions include HIV and AIDS which brings further congenital disorders as babies born from such mothers could already have acquired the condition congenital. Both should be addressed in genetics education as transmission of HIV from mother to fetus remains a challenge. The current education does not appropriately prepare nurses for roles in the genetic era (Calzone, et al 2010:29). A curriculum framework could assist in addressing barriers for inclusion of genetics in the curricula.

5.2.21 Suggestions to increase genetics education

Findings revealed two suggestions to improve genetics education in the advanced midwifery programme. The first suggestion is a need for capacity in genetics among educators as indicated by 62% of the sample. This is an acknowledgement of insufficient genetics knowledge among respondents. This realisation is congruent with findings in Kim (2003:1089) in which respondents felt it was important for them to have a genetic course in the curricula as it was lacking. Further, Jenkins et al. (2001:288) stated that the foundational base for genetics education among educators was indicated to be a necessity to fast-track genetic content in the nursing curricular. The preliminary knowledge in genetics could be augmented through the use of curriculum framework that standardises genetics education in the advanced midwifery programme.

The second suggestion was a required guideline to be used for incorporation of genetics in the curricula. A guideline is defined as a direction or principle for presenting current or future rules of a policy (Freshwater and Maslin-Prothero 2005:259). At least 38% of the sample required a guideline to assist in the inclusion of genetics in the advanced midwifery programme. The aforementioned authors further argued that guidelines could be established at any level through convening a panel of experts to direct development.

In this study, a workshop was organised in phase two to identify genetics competencies which are currently unavailable in South Africa. The identified competencies were included during the development of a curriculum framework that standardises genetics education in the advanced midwifery programmes. The developed framework could be used as a guideline for inclusion of genetics in the curricula.

5.3 SUMMARY

The quantitative research question sought current genetics education in the advanced midwifery programme. Findings revealed that genetics is well addressed, indicated through consistent over 50% of positive responses regarding inclusion of genetics in the advanced midwifery programme in most items. However, the consistent variations in components for inclusion of genetics and incongruent teaching hours reflected haphazard genetics education. Genetics content is fragmented (present in some NEIs), disorganised and dissimilar across NEIs that provide the advanced midwifery programme. This is confirmed through a lack of planned learning outcomes and the absence of assessment criteria used for genetics evaluation among learners.

The placement for clinical learning, together with the shortage of preceptors to accompany advanced midwifery learners, posed challenges

regarding clinical learning of genetics. Competencies could not be established and continuous education in genetics for educators is lacking, while quality improvement measures are missing across NEIs that took part in this study.

Despite the Policy Guidelines recommending teaching for post-basic clinic nurse practitioners about genetics, evidence to confirm genetics education in the group is absent. This is aggravated by a lack of educators with adequate genetic knowledge. Advanced midwifery learners exit the programme with limited knowledge and skills to provide genetics services in clinical and PHC settings. Individuals across lifespan are denied opportunity to avert preventable genetics-related disorders, thus healthcare consumers experience an inability to receive genetics healthcare. Missed opportunities exist as genetics is lacking in all teaching components.

A curriculum framework to standardise genetics education is recommended to guide integration of genetics in the advanced midwifery programme. It could improve the current undesirable state of genetics affairs in nursing education. Confidence in the provision of genetics education could be realised in educators of the advanced midwifery programme. Satisfactory empowerment of learners could reduce the prevalent rates of undesirable genetic conditions.

The rate of hospital admissions of those exposed to genetic disorders could also be reduced leading to healthcare cost reductions. Life expectancy could also rise as modification of lifestyle could increase because advanced midwives, forming part of PHC practitioners, might offer sufficient genetic services in healthcare settings.

5.4 CONCLUSION

This chapter provided discussion of quantitative results and literature control was used to support arguments and or confirm the results. Findings are congruent with those found in other international studies. Chapter six presents qualitative data analysis and findings of phase one, step two, of the study.

CHAPTER 6: QUALITATIVE DATA COLLECTION, ANALYSIS AND FINDINGS

6.1 INTRODUCTION

Discussion of quantitative findings was presented in the previous chapter. In this chapter, the qualitative processes are presented. The purpose of qualitative research was to obtain perceptions of participants regarding a competency-based curriculum framework to standardise genetics education in an advanced midwifery programme. In addition this chapter also reports on how trustworthiness was achieved.

Participants were responsible for the implementation of the advanced midwifery programme leading to registration for the "diploma in the post-basic midwifery and neonatal nursing science." (SANC R212 an amended). Participants were identified to be suitable to provide the required information for this study and data was collected through focus group discussions and in-depth individual face-to-face as well as telephone one-on-one interviews.

6.2 INSTITUTIONS THAT TOOK PART IN THIS STUDY

Participants (n=19) were practicing in five nursing colleges from the provinces of Gauteng, Kwa-Zulu Natal and North West Province. Further, participants were also from three universities in the provinces of Gauteng and Kwa-Zulu Natal. Figure 5.1 depicts 84% participants from nursing colleges and 16% from universities.

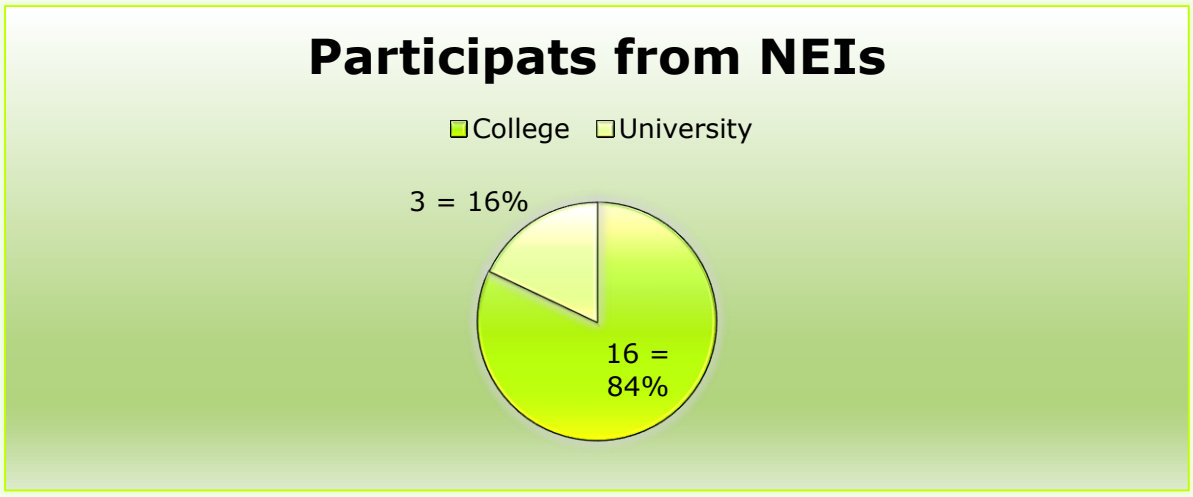

Figure 6.1 Participants from NEIs

6.3 DATA ANALYSIS

Thematic analysis was used to analyse various data sets collected through numerous data collection methods. In addition field notes were obtained during data collection. Several data sets obtained for the qualitative objective are depicted in table 6.1.

Table 6.1 Types of data sets

DATA COLLECTION METHOD	NATURE OF DATA	PARTICIPANTS
Face to face interview	Text	4
In-depth phone call interview	Text	4
Focus group discussions (3 groups)	Text	3 (sets)

Data were obtained from full-time employees as participants at selected NEIs (nursing colleges and universities). All participants were facilitators of advanced midwifery programme at the time of data collection. Nineteen (19) participants took part during interviews and focus group discussions.

6.3.1 Thematic analysis

Thematic analysis is a qualitative data analysis method used to recognise the types of inputs within verbal self-reports (Boyatzis 1998:3). From the verbal reports, the researcher compiled specific statements as thematic analysis was initiated (Boyatzis 1998:3). Thematic analysis permits progressing forward (after initiation) to the second step for grouping the identified patterns from the data sets (Boyatzis 1998:3). The patterns are frequencies of specific messages identified within the data sets that are combined and used for coding to create themes. It is stated that after naming the codes in the second step, the process is moved further to the third step of thematic analysis at which named codes are interpreted (Boyatzis 1998:4).

Thematic analysis is considered to be a process, not a method used for qualitative data analysis and it could be used be used for transforming qualitative data into quantitative data (Boyatzis 1998:4). But Braun and Clarke (2006:79) argued that thematic analysis is a method for analysing qualitative data. This method, according to the aforementioned authors, has the advantage of flexibility as it does not harbour any allegiance to a particular theoretical framework making it applicable in most qualitative data sets similar as in this study. On the other hand Alhojailan (2012:41) stated that thematic analysis is a process followed in "analysing the data without engaging pre-existing themes which means that it can be adapted to any research that relies only on participants' clarification."

In this study thematic analysis described in Braun and Clarke (2006) was employed for data analysis and the description of the processes followed is provided under 6.3.2 later in this chapter. Thematic analysis was used because according Alhojailan (2012:41) this method could be used where less information on a particular phenomenon exists. Information regarding the curriculum framework that standardises genetics education

in an advanced midwifery programme is absent. It was deemed necessary to employ thematic analysis so that findings emerge from data sets as these are data-driven based on self-reports from participants as recommended in Alhojailan (2012:41).

Thematic analysis was therefore approached inductively resulting in data-driven themes because the researcher was actively involved in the data analysis process (Alhojailan 2012:41; Jebreen 2012:170). The researcher's involvement commenced during data collection at which initial coding of data started. Further the researcher transcribed all data sets, upon which the researcher's involvement with data was further expanded.

6.3.2 Thematic analysis process

The open-ended questions were used during in-depth individual interviews and focus group discussions to elicit input that served as self-reports statements. The statements from participants resulted in three types of data sets which: 1) face-to-face interviews; 2) one-on-one telephone interviews; and 3) focus group discussions. Face-to-face interviews and focus group discussions were audio-taped while information obtained during telephone interviews was written down and later transcribed to a Microsoft word file. The audio-taped recorded data was transcribed verbatim by the researcher. These activities resulted in the recognition of themes within data set (Braun and Clarke, 2006:81). Thus thematic analysis in this study is considered to be

> "essentialist or realist method, which reports experiences, meaning and reality of participants or it can be a constructionist method, which examines the ways in which events, realities, meanings, experiences and so on are the effects of a range of discourses operating within society." *(*Braun and Clarke, 2006:81).

Thematic analysis was employed to ultimately report meanings perceived by participants with regard to genetics education.

Data were labelled according to the mode of data collection per participant as a means of identification as reflected in table 6.2. The table shows letter P used for labelling each participant from within individual interviews (face-to-face and one-on-one telephone) and focus groups. Further table 6.2 depicts labelling (code) and the number of meetings held for data collection for phase one step two.

Table 6.2 Labels attached to participants in each data set (n=19)

Focus Groups discussions											Face-to-face Interviews				Telephone Interviews			
Group 1			Group 2			Group 3					Individual				One–on-one			
P1	P2	P3	P1	P2	P3	P1	P2	P3	P4	P5	P1	P2	P3	P4	P1	P2	P3	P4

6.3.3. Stages of thematic analysis

According to Braun and Clarke (2006:87) thematic analysis is characterised by six stages: familiarisation with data; focus of the analysis and generating initial codes; categorise the information; identification of patterns; naming themes; and producing the report. These stages were employed to analyse all data sets.

6.3.3.1 Stage 1: Familiarising yourself with data

All focus group discussions and face-to-face individual interviews were audiotape recorded and was later transcribed verbatim by the researcher. A total of seven transcripts were prepared based on audio tape information. Of those three transcripts contained focus group discussions and four contained face-to-face interviews. During the transcription of

data from audio tapes the researcher familiarised herself with data as the process was unfolding.

The audio tapes were listened to several times as data were transcribed word for word. It was during this process that the meanings and patterns were observed from the data before actual analysis commenced. Furthermore telephone interviews were transcribed soon after interviews to further enhance familiarising the researcher with the data. In fact, the researcher developed prior information about the data during data collection and transcription of all the data increasing established initial analytic opinions of the researcher (Braun and Clarke 2006:87).

Dross (unhelpful information) was removed from the data by taking out material that was not influencing data such as 'like I said', 'like my colleague said' as those were not reducing or assisting data (Burnard 1994:112). In addition, to prevent identification of participants in the data, names which were stated by participants during focus group discussions and interviews were removed from transcripts. This was to boost anonymity of participants.

Soon after data were ready for analysis the researcher read and re-read the data to enhance further self-familiarisation with data because, according to Braun and Clarke (2006:87), reading the data time and again is the foundation of the entire analysis. In order to achieve a complete familiarisation the researcher listened to audio tapes four more times to compare the information on transcripts with the one stored in audio tapes and finally the content tallied. This process is long but Boyatzis (1998:8) and Patton (2002:452) stated that it is important to dip yourself into the data to be able to recognise patterns within the data. Following this process as suggested was helpful because the researcher in this study was able to identify recurring words in the data. Frequencies of

occurrences of certain words were highlighted with different colours for facilitation of coding described in stage two.

6.3.4.2 Stage 2: Generate initial codes

This phase involved the creation of preliminary codes from data (Braun and Clarke 2006:88). According to Boyatzis (1998:63) coding is the "most basic segment or element of the raw data or information that can be assessed in a meaningful way regarding the phenomenon." All eleven transcripts contained the fresh information constituting basic pieces of study data. Similar and frequent pieces of information from the data were coded by using highlighters on patterns of information that seemed to fit together.

Braun and Clarke (2006:88) state that coding is sometimes influenced by whether the themes are more 'data-driven' or 'theory-driven'. For this study coding of themes was data-driven as all themes materialised from the data. Excerpts from the data were coded by showing in colours for comparable code, then a similar set of codes (showed by the same colour) were collated together into a code (Braun and Clarke 2006:88; Patton 2002:463).

In order to code systematically the analysis was focussed per responses to each question as suggested by Taylor-Powell and Renner (2003:2). It means responses to each question from all eleven transcripts were coded simultaneously at a particular time as this further enhanced consistency and variances were eliminated. Further the researcher pasted comparable coloured codes per question from each transcript on the wall in the office. Similar colours were then cut and pasted on another wall to display coloured codes. This process was helpful as like patterns and differences from transcripts were easily located.

6.3.4.3 Stage 3: Searching for themes

During this stage created codes were sorted and collated into main themes to form principal themes (Braun and Clarke 2006:89). As meanings were searched within codes, related codes were harmonised to form major themes and sub-themes. During this process the researcher developed logic of meanings of each created theme.

6.3.4.4 Stage 4: Reviewing themes

This stage involved reviewing the created principal themes against the data set (by re-reading transcripts) to verify if those themes adequately captured meanings on codes to ensure stability (Braun and Clarke 2006:91). This was helpful as it ensured that principal themes emerged from data sets. The principal themes summarised what was asked and reported during data collection ensuring that themes articulated the research data.

6.3.4.5 Stage 5: Defining and naming themes

At this stage the meaning of each theme was determined to be able to present these for "analysis, and analyse the data within them." (Braun and Clarke 2006:92). The aforementioned authors suggested that it is important to detect if themes encompasses sub-themes which are particularly valuable in providing order of meaning in the data during modification. Sub-themes were also identified as the stage progressed. Modification involved revisiting "the collated data extracts for each theme, and organizing them into a coherent and internally consistent account, with accompanying narrative." (Braun and Clarke 2006:92). During this process, as modification continued, each theme with sub-themes resulted in categories as interaction with collated codes was on-going. To conclude this stage, three principal themes were defined and named. Themes, sub-

themes and categories emerged from codes and together formed the outline of the analysed data. The outline is depicted in table 6.3 in this chapter.

6.3.4.6 Stage 6: Producing the report

This is the final stage of thematic analysis at which the report is written for the dissertation in an endeavour to report a complicated story in a manner which convinces readers regarding the quality and validity of the data analysis employed (Braun and Clarke 2006:93). The report is written based on themes, sub-themes and categories emerging from the data.

6.4. DATA OUTLINE

The six stages of thematic analysis were instrumental in enhancing the formation of an outline of results as thematic stages were followed from the beginning of data collection through to the last stage at which the report was written. Codes were identified and collated resulting in comparable patterns which were used for themes, sub-themes and categories. The report resulted in three major themes namely: genetics competence of advanced midwifery learners, unspecified genetic component structure in the advanced midwifery programme and a lack of genetic competence among advanced midwifery educators. Further, sub-themes as well as categories were identified.

6.5. TRUSTWORTHINESS

Trustworthiness is concerned with reliability and validity of research findings in qualitative studies. In order to achieve trustworthiness of results, the following criteria applied:

6.5.1 Triangulation

Different data sets were received face to face and telephone interviews. Additionally data was obtained through focus group discussions. A total number of interviews and focus group discussions are shown in table 6.2. According to Bless, et al (2013:238), if data analysis produces different kinds of results from similar questions at different pointing times with similar participants, there are challenges in the data collection method used and that trustworthiness of those results is weak. Results obtained from various methods of data collection were similar indicating that trustworthiness was achieved in this study.

6.5.2. Methodological verification

Methodological verification, as pointed in Bless, et al (2013:239) was addressed by employing an additional data collection method which was face to face and telephone interviews as the study initially employed focus group discussions to collect data. In consultation with study leaders the spread of NEIs made it difficult to bring participants from one area to the other in order to constitute a focus group meeting.

6.5.3 Data saturation

Data saturation was attained as similar information was received (Bless, et al (2013:239) from focus group number three, face to face interview four and telephone interview number four. Bless, et al (2013:239) attested that data saturation is achieved if evidence of no new information on a particular topic during data collection is received indicating that the topic is adequately exhausted.

6.5.4 Respondent Validation

Respondent validation was achieved by presenting the study results in the form of feedback to participants to verify if findings reflected their perceptions. There was no additional information to the results and participants consulted with findings approved the results. In addition the study results were presented to the workshop planned for phase two of this study, during which some participants participated. The results were further validated and accepted at that particular workshop.

6.5.5 Use of verbatim quotes

According to Bless, et al (2013:239) including direct quotations in the report permit readers to catch exactly what participants alleged and the manner in which the researcher inferred those inputs. Some direct quotations from participants are included in this chapter to enhance trustworthiness of the results.

6.6 SUMMARY OF FIELD-NOTES

Interaction with participants during discussions and interviews assist researchers to comprehend the insight of a particular phenomenon (Burns and Grove 2009:516). During interaction with participants, the researcher used an audio recorder to adequately capture narratives so that making of field notes was possible. Field notes were obtained from three focus group meetings and four face-to-face in-depth interviews. Some of the field notes were used as codes during presentation of qualitative results to enhance triangulation. Additionally four in-depth individual face-to-face interviews and four one-on-one telephone interviews were conducted to generate more inputs and some of those were also used as quotes in the qualitative findings.

6.7 PRESENTATION OF FINDINGS

Upon the completion of data analysis by the researcher clean transcripts were given to an independent analyst. In addition voice recordings of focus group discussions and in-depth interviews were also sent for independent data analysis. After the data analysis by an independent analyst a meeting between the researcher and the independent analyst was held to compare findings. Consensus was reached on themes, sub-themes and categories. Qualitative findings are presented according to themes, sub-themes and categories in table 6.3.

Table.6.3. Outline of themes, sub-themes and categories representing qualitative findings

THEMES	SUB-THEMES	CATEGORIES
1. Genetics competence of advanced midwifery learners	1.1 Knowledge competence	• Genetic conditions addressed in advanced midwifery programmes
		• Risk factors for genetic disorders
	1.2 Skills competence	• Genetic history-taking
		• Identification of genetic disorders
		• Management of genetic disorders
2. Unspecified genetic component structure in advanced midwifery programmes	2.1 Limited standardised genetics content	• Lack of common genetic content
	2.2 Differing teaching hours for genetics	• Lack of common teaching hours (periods) for genetics
	2.3 Unidentified genetics outcomes	• Unplanned genetics outcomes
	2.4 Ineffective teaching strategy	• Use of lecture method for genetics teaching
	2.5 Inadequate learner assessment	• Narrow learners assessment
3. Lack of genetic competence among advanced midwifery educators	3.1 Lack of formal and continuous education in genetics	• Lack of training attendance
		• Need for genetics workshops
		• Need for curricula revision to include genetics

6.7.1. Outline of findings

Perceptions of advanced midwifery educators have been compiled according to three major themes namely: 1) genetics competence of advanced midwifery learners, 2) unspecified genetics component structure in the advanced midwifery programmes and 3) lack of genetic competence among advanced midwifery educators. Of these themes, sub-themes and categories were described as perceptions of participants

regarding a curriculum framework to standardise genetics education for the advanced midwifery programme.

6.7.1.1. Theme 1. Genetics competence of advanced midwifery learners

As data were analysed meanings from the identified theme reflected lack of knowledge and skills competence among learners regarding genetics. Various genetics concepts are addressed during training in advanced midwifery, however, genetics received little attention based on information from participants. The limited attention of genetics resulted in unacquainted and unskilled learners at the end of training. From theme one two sub-theme (knowledge and skills competence) were identified as reflected in table 6.4. Sub-themes and categories for theme one are presented in table 6.4.

Table 6.4 Depict sub-themes and categories for theme one

1.1 Sub-theme	1.2 Sub-theme
Knowledge competence	Skills competence
Categories	**Categories**
• Genetics conditions addressed in advanced midwifery programmes	• Genetic history-taking
• Risk factors for causes of genetic disorders	• Identification of genetic disorders
	• Management of genetic disorders

Sub-theme 1: Knowledge competence

Knowledge competence emerged from theme one (genetics competence of advanced midwifery learners) from which two categories were identified namely: genetics conditions addressed in advanced midwifery programmes and risk factors for the causes of genetic disorders.

- **Genetic conditions addressed in advanced midwifery programmes**

Various genetic conditions were superficially addressed as stated by participants. The lack of a curriculum framework to guide specific genetics content is indicated as the reason for this shortcoming. One participant from the focus group voiced her views as follows:

> *"I teach overview on genetic conditions, environmental factors, chromosomal problems, etc. Those common genetics conditions that we know, we then discuss superficially in class."*

Another participant from another focus group stated her opinion as follows:

> *"I basically do revision of what they have done in basic midwifery. But I felt their genetics knowledge of conditions is very poor. I cannot say they are knowledgeable in genetics the way they should be."*

Another participant from the other focus group stated her opinion as follows:

> "*We often select albinism and address it in class."*

Another participant from a focus group stated her views as follows:

> "*Trisomy's and Edward Syndrome are genetics conditions that we address. We do baseline information about genetics. We do not teach them the genetic route or cause of genetic disorders. They have done Down syndrome in their basic training and also Cystic*

Fibrosis, those types of conditions, haemophilia and sex-linked disorders are genetics conditions that they have done already."

In a telephone interview, one participant expressed her views as follows:

"Genetic conditions must be clarified in the curricula. There must be an integrated genetics content in the form of a framework on specific genetic conditions."

One participant from face-to-face interview expressed her opinion as follows:

"I focus on Down syndrome and cystic fibrosis. The framework is needed to outline what must be addressed."

- **Risk factors for causes of genetic disorders**

Risk factors for causes of genetic disorders emerged from data sets as category two under sub-theme knowledge competence. Participants mentioned that certain risk factors for causes of genetic disorders were addressed in class. Participants further mentioned that currently there is no guide regarding specific methods or criteria for addressing risk factors for causes of genetic disorders. A participant from face-to-face interview expressed her views as follows:

"….in class I explain to learners that they must explain to clients on how to go for genetic tests before conception so that the same genetic problem does not recur. But preconception services are lacking".

Another participant from the telephone interview stated the following:

> *"Pregnant women with advanced maternal age are referred for amniocentesis but because of the increased rate of HIV infections amniocentesis is rarely done."*

A participant from the focus group discussion stated her opinion as follows:

> *"Over-age women falling pregnant, or women practicing blood related marriages and or intimate relationships among relatives, are discouraged."*

Sub-theme 2: Skills competence

As data sets were analysed skills competence appeared as the second sub-theme for theme one. Data sets displayed perceptions of participants indicating that skills competence among learners is lacking. The lack of a curriculum framework to guide genetics teaching affected skills attainment at the end of training in the advanced midwifery programmes, as was alleged by participants. Three categories were derived namely: genetic history-taking, identification of genetic disorders and management of genetic disorders.

- **Genetic history-taking**

During data analysis, it emerged from data sets that learners complete only the first generation during history taking. The lack of a guide as to how many family generations' histories should be taken, was cited by participants as a barrier. A participant from the focus group discussion expressed her views as follows:

> *"We obtain the first degree family history because it is the most important one. Sometimes you go as far as the second degree*

family history taking during antenatal care. There is no guide as to how far could we obtain family history."

Another participant from the focus group discussion expressed her opinion as follows:

"We do not draw any family tree. Most of us were not even aware that both parents must have the same gene to have an albino baby. If we have a framework it will guide us on how family history is taken and how many generations must be taken."

From the telephone interview a participant articulated her views as follows:

"Family history is taken by the advanced midwifery learner so that genetic disorders could be traced. But it is just a general history of the mother that is not specific to genetics."

In one face-to-face interview a participant stated her opinion as follows:

"Paternal and maternal history is taken. We need to know the family history so that we can trace back to where a genetic condition coming from."

- **Identification of genetic disorders**

Identification of genetic disorders emerged from the data sets as category number three. It occurred in the data that identification of genetic disorders is a competence of advanced midwifery learners. Data sets reflected a lack of proper focus on genetics during teaching that resulted in learners not achieving the skill. A participant from telephone interviews articulated her views as follows:

> *"If I have a clear guidance on what to focus on in genetics, learners will benefit. We touch genetics lightly regarding identification of genetic disorders."*

Another participant from face-to-face interview expressed her views as follows:

> *"We do not have a clear direction regarding how to identify genetic disorders."*

A participant from focus group discussion said:

> *"We do not have a clear focused genetics programme currently; that is why our learners have limited skills in the area. A focused genetics education could provide direction on identification of genetic disorders."*

- **Management of genetic disorders.**

Data sets revealed that management of genetic disorders is a skill competence of advanced midwifery learners. It was further shown in the data sets that management of genetic disorders is not well addressed because of lack of clarity regarding genetics resulting in a lack of skills attainment to manage genetic disorders by learners. A participant from one-on-one interview stated the following:

> *"Management skills for genetics are lacking among advanced midwifery learners."*

A participant from a focus group discussion stated her views as follows:

"Because management skills for genetics are lacking, learners always refer women to a genetic nurse."

From another focus group a participant expressed her views as:

"The genetic nurse does all the work and manages all women experiencing a genetic disorder."

Another participant from a telephone interview pronounced her opinions as follows:

"…. *there is no follow-up on mothers referred to a tertiary hospital because of genetic problems. It is not known if mothers are coping as there is no contact after the mother is referred."*

6.7.1.2 Theme 2: Unspecified genetic component structure in advanced midwifery programme

The unspecified genetics component structure in the advanced midwifery programmes was identified as the second theme. Codes derived from data sets reflected that there is lack of genetics component in the advanced midwifery programmes. As it stands, component for genetics teaching is unspecified and there is lack of curriculum framework to guide genetics teaching. The following categories were identified namely: limited standardised genetics content, differing teaching hours (periods) for genetics, unidentified genetics outcomes, ineffective teaching strategies and the inadequate genetics assessment during training.

Sub-theme 1: Limited standardised genetics content

As coding was implemented, limited standardised common genetics content in the advanced midwifery programmes was an identified theme.

Further, as refinement of codes was executed, lack of common genetics content was an identified category.

- **Lack of common genetics content**

During interactions with the data sets, lack of common genetics content for standardised teaching emerged. Often a genetic nurse or doctor provided theory in class and sometimes these professionals offered practical sessions. Participants blamed the lack of framework to guide on what to include for teaching. During the face-to-face interview one participant expressed her opinion as follows:

> *"For us genetic content include preconception and embryology. Genetics nurse give lectures on the two topics. I do not attend the session given by the genetic nurse. Further than that, there is no other content. Genetics is not clear. There is no framework from SANC for us to follow."*

One participant from the telephone interview stated her views as follows:

> *"I am shallow on the genetics subject. There is a need to incorporate adequate genetics content into what we teach. Currently we teach genetics very superficially."*

Another participant from the focus group discussion expressed her views as follows:

> *"There is no common content that we follow in teaching. A framework could assist because genetics is not well represented in our advanced midwifery programmes."*

Sub-theme 2: Differing teaching hours (periods) for genetics

This is the second category identified as data sets were coded and recoded. Information from data sets reflected differing teaching hours for genetics. Lack of guidance regarding the number of hours was identified as the category under this sub-theme.

- **Lack of common teaching hours (periods) for genetics**

During interaction with data sets, differing number of hours dedicated for genetics education emerged. This difference was articulated by most participants. One participant from focus group stated the following:

> *"At least 53 periods (35 hours and 40 minutes) are used to teach genetics because it is done over a period of 5 days and it is translated into 8 credits."*

From the telephone interview, a participant expressed her view as follows*:*

> "*We use two days for genetics teaching which means it is 20 periods (14 hours and 40 minutes) comprising of 4 credits."*

Another participant from the focus group articulated her opinion as follows:

> *"We have allocated 18 periods (12hours) for genetic education. The periods used by the genetic sister are also included."*

A participant from one-on-one interview stated her views as follows:

"I think in 6 hours or 8 hours of class only 10 minutes is allocated for genetics education."

One participant from a focus group discussion stated her opinion as follows:

"All in all it can make 9 periods (6hours) for genetic teaching."

Another participant from the telephone interview expressed her view as follows:

"……genetics education should be done in one week. It is not done."

A participant from the focus group discussion said:

"I think 16 periods (10 hours 40 minutes) are allocated for genetics but I am not sure."

Another participant from one-on-one interview expressed her opinion as follows:

"…… there are no allocated credits related to genetics. Teaching hours are not clear. I can't tell. It is not clear."

Sub-theme 3: Unidentified genetics outcomes

This is the third sub-theme identified during interaction with data sets. Outcomes were not planned as previous clinical exposure is shared in class regarding genetics encounters. The lack of a framework to guide genetics teaching was seen as the motive for the lack of genetics outcomes. Further, as refinement of initial codes was executed, two categories were identified namely: unplanned genetics outcomes and lack of learner assessment.

- **Unplanned genetics outcomes**

During coding and recoding of data it emerged that genetics outcomes were unplanned resulting in learners exiting the programme with an unknown genetics competence. The lack of a curriculum framework that standardise genetics education was accountable for the lack of planning of genetics learning outcomes. One participant from one-on-one interview expressed her view as follows:

> *"Outcomes are not planned. We also lack a curriculum framework to guide genetics education."*

Another participant from the focus group discussion mentioned her opinion as follows:

> *"Currently there are no genetics outcomes in the advanced midwifery programmes."*

From the telephone interview, one participant expressed her views as follows:

> *"We do not have genetics outcomes in our curriculum."*

Sub-theme 4: Ineffective teaching strategy

Ineffective teaching strategy emerged as data were analysed as often teaching was teacher-centred rather than learner-centred. From this sub-theme the following category emerged namely: use of lecture method for genetics teaching.

- **Use of lecture method for genetics teaching**

It emerged from data sets that genetics teaching was mostly by means of the lecture method. Genetic nurses were often invited to provide lectures

to learners in class as reported by some participants. These nurses were at liberty to decide on the teaching content. During one-on-one interview, a participant expressed her views as follows:

> *"The lecture method is used to teach about the frequency of occurrences of genetic conditions."*

In another one-on-one interview a participant articulated her views as follows:

> *"It is up to the genetic nurse to decide on what is covered in her lecture. She decides on what to include and often one lecture is done in class."*

In one focus group discussion it emerged that some learners had the opportunity to attend lectures offered by a genetic nurse. One participant expressed her views as follows:

> *"Where possible, during training in advanced midwifery, we send learners to the genetics class offered by the genetic nurse."*

Sub-theme 5: Inadequate genetics assessment

This is the fifth sub-theme identified from data sets. Assessment for genetics was dismally unplanned. Participants mentioned that fewer than five marks was used to asses genetics knowledge. Participants blamed the lack of a curriculum framework to guide regarding the amount of genetics content to be taught and assessed, and it was indicated to be the reason for the inadequate assessment of genetics. From this sub-theme narrow learner assessment was an identified category.

- **Narrow learner assessment**

During data analysis it emerged from data sets that formative assessment of theory is mostly employed with very few marks being allocated as the lack of guidance regarding how much must be taught and assessed in genetics is lacking. One participant from a focus group discussion expressed her views as follows:

> *"Only formative assessment is done and limited genetics theory is assessed."*

From another focus group a participant articulated her opinion as follows:

> *"Multiple choice questions are asked for about five marks. We used to have a long question of 50 marks in genetics a long time back."*

From the face-to-face interview, a participant expressed her views as follows:

> *"If there is a genetic problem with the mother, formative assessment is done."*

A participant from another focus group discussion said:

> *"Only genetics theory is assessed in the test. We ask about what investigations are done on a pregnant woman, which mostly is through ultrasound."*

6.7.1.3 Theme 3. Lack of genetics competence among advanced midwifery educators

As data analysis was executed the lack of genetics competence among advanced midwifery educators was identified as the third theme.

Participants considered themselves to be lacking genetics competence according to data sets. As coding was performed, one sub-theme emerged namely: lack of formal and continuous education in genetics.

Sub-theme: Lack of formal and continuous education in genetics

Lack of formal and continuous education in the genetics was the sub-theme occurred during data analysis under theme three. Under this sub-theme three categories emerged namely: lack of training attendance, need for genetics workshops and need for curricula revision to include genetics.

- **Lack of training attendance**

During interaction with data sets it appeared that lack of training attendance by educators in advanced midwifery programmes exists. One participant during the telephone interview expressed her views as follows:

> *"…educators in an advanced midwifery programmes need empowerment in genetics."*

From a focus group discussion one participant expressed her views as follows:

> *"We also need genetics information so that, when you stand in front of learners, you can provide the correct information."*

Another participant from focus group discussion expressed her opinion as:

> *"Lecturers teaching advanced midwifery should be trained in genetics because what I have realised is that lecturers do not have*

enough information regarding genetics. The curriculum must be improved in genetics content."

In one-on-one interview a participant articulated her views as follows:

"Since there is a gap I think educators in the advanced midwifery programmes need in-service education in genetics. There is a need for improved attention to genetics than is currently offered."

Another participant from the focus group stated her opinion as follows:

"Genetics need to be prioritised because HIV brought many babies with genetic abnormalities. We need better genetics information."

- **Need for genetics workshops**

The need for genetics workshops emerged during data analysis. A participant from the focus group discussion said the following:

"I do not attend any genetics workshops. We as lecturers used to attend genetics workshops organised for basic midwifery 10 years ago at the university."

Another participant from another focus group expressed her opinion as follows:

"At least, for the first time, there was a one day genetics workshop now in 2013. I did not attend but my colleague attended. We need genetic workshops."

From another focus group a participant stated the following:

"I use to attend genetics workshops when I was full-time in the clinical area. Since I have left the hospital I do not attend genetics workshops anymore."

A participant from one-on-one telephone interview expressed her views as follows:

"I am not involved in any genetics workshop."

Another participant from the face-to-face interview articulated her opinion as follows:

"I do not attend any workshop on genetics. I have attended genetics counselling but I have never followed up with a real mother."

- **Need for curricula revision to include genetics**

There is need for curricula revision in the advanced midwifery programmes to include genetics according to data sets. This was essential so that educators keep abreast with current contemporary issues in genetics in order to provide adequate information to learners. A participant from telephone interview said:

"Genetics is a speciality area and we need to be better trained as educators. There is a need for a framework because genetics is not well-guided."

Another participant from the focus group discussion expressed her views as follows:

> *"We do only basics in genetics. There is a need for a flash out knowledge of genetics among advanced midwifery educators."*

A participant from the face-to-face interview expressed her opinion as follows:

> *"We need training in genetics so that we can keep abreast with genetic information. Education is an on-going process; so we need to keep abreast with genetics knowledge."*

6.8 SUMMARY OF FINDINGS

This chapter presented the method employed for data analysis of qualitative data sets. Findings that emerged during thematic analysis resulted in three major themes. From each theme, sub-themes were derived. Categories were identified under each sub-theme and all constituted findings of step two in phase one of the study. Trustworthiness of findings was also described.

The findings represented perceptions of advanced midwifery educators regarding a competency-based curriculum framework to standardise genetics education. Narratives obtained through qualitative strands clarified numeric data obtained from quantitative strand in this study. The chapter that follows presents discussion of qualitative findings.

CHAPTER 7: QUALITATIVE DATA DISCUSSION AND LITERATURE CONTROL

7.1 INTRODUCTION

The purpose of qualitative research was to obtain perceptions of advanced midwifery educators regarding a competency-based curriculum framework to standardise genetics education. The sample population included educators in the advanced midwifery programme. Data were collected by means of focus group discussions, in-depth face-to-face interviews and one-on-one telephone interviews. A thematic analysis method, according to Braun and Clarke (2006), was employed to analyse data. This chapter discusses qualitative findings.

7.2 DISCUSSION

Three themes emerged from data sets:

1. Genetics competence of advanced midwifery learners,
2. Unspecified genetic component structure in an advanced midwifery programme and
3. Lack of genetic competence among advanced midwifery educators.

7.2.1 Theme 1: Genetics competence of advanced midwifery learners

In theme one two sub-themes, namely knowledge competence and skills competence were identified.

7.2.1.1 Sub-theme 1: Knowledge competence

In genetics care nurses must show knowledge and competence in order to provide efficient and effective care. Cognitive knowledge, referred to as mental skill (Winterton, Delamare-La Deist and Stringfellow 2006:8), is required so that planned tasks are accomplished. On the other hand competence refers to capability in performance of duties (Freshwater and Maslin-Prothero 2005:141). In the nursing profession genetics knowledge and competence are required so that holistic care is practiced in clinical and PHC settings.

Findings showed limited knowledge and competence with regard to genetics among advanced midwifery learners. The basis for this lack, according to participants, is that genetics is superficially addressed during training. Two categories emerged from knowledge competence: Genetics conditions addressed in advanced midwifery programmes and risk factors for causes of genetic disorders.

- **Genetic conditions addressed in advanced midwifery programmes**

Researchers stated that genetics education is addressed invariably in numerous countries and nursing curricula inadequately prepare learners to provide genetics service (Burke and Kirk 2006: 228; Calzone, et al 2011:29). Participants in this study stated that specific genetics conditions were selected and discussed in class. Indications for picking certain genetic conditions were that there is lack of generic framework to guide on which genetic conditions needed to be addressed. Although genetics conditions were superficially addressed, most participants mentioned that advanced midwifery learners had knowledge of genetic conditions.

The participants used their discretion to select genetics conditions for brief discussion with learners. This kind of practice tallies well with the Policy Guidelines (2001:29) which states that genetics education is varied and its implementation depends on availability of educators, particularly in basic nursing programmes. Further the Policy Guidelines document stated that genetics education in the post-basic nursing programme is lacking. Teaching genetics conditions at the discretion of educators contributed to inappropriate learning subsequently producing graduates with shallow knowledge of genetic conditions. This then indicates that genetics education is randomly addressed in advanced midwifery programmes in South Africa as in other countries.

According to the American Nurses Association (ANA) and ISONG (2007: 15) "genetics conditions affect a significant portion of the general population, although any one condition is relatively rare." It is the responsibility of the genetic nurse to engage the genetic condition in its entirety and related aspects emanating from that condition, while other professionals could focus only on a particular system or problem (ANA and ISONG, 2007:15). This makes nurses to be significant in regard to knowledge of genetics conditions. Nurses are in a strategic position to address genetic conditions daily in their encounter with healthcare consumers.

In South Africa, there is identified priority genetic conditions targeted for inclusion in the education namely:

> "Down syndrome, neural tube defects, fetal alcohol syndrome, albinism, cleft-lip and palate, talipes equinovarus (club feet), congenital infections, e.g. rubella and cytomegalovirus, genetic deafness, blindness, physical handicap and mental retardation. Other common disorders include haemophaelia, cystic fibrosis,

thalassemia, fragile X syndrome, Duchene muscular dystrophy and genetic cancers." (Policy Guidelines 2001:6-7).

Some of the conditions indicated above were mentioned by participants as reflected in some verbatim quotes (particularly in Chapter 6), while others were not mentioned at all. For nurses to sufficiently address the South African priority conditions, educational preparation for nurses needs to embrace genetics adequately. Currently the nursing curricula falls short of addressing the genetics conditions entirely as confirmed by participants in this study. Limitations in the nursing curricula were also identified in Calzone, et al (2010:29) as nursing education is yet to include adequate genetics in the curricula. A curriculum framework to standardise genetics education in the advanced midwifery programme could assist in addressing priority genetics conditions in South Africa.

- **Risk factors for genetic disorders**

According to Christianson and Modell (2004:237) "genetic risk factors are common gene variants that cause problems relatively rarely." A parent or parents with genetic disorders, those practicing consanguinity and women falling pregnant while at an advanced maternal age (35 years and above) are among genetic risk factors (Queißer-Luft and Spranger 2006:6). Similarly in this study, participants mentioned that selected risk factors for genetic disorders are addressed in class. One common risk factor mentioned by participants in this study is advanced maternal age. In one focus group a participant stated her views as follows: "Advanced midwifery learners refer pregnant women with advanced maternal age to the doctor for amniocentesis." According to Christianson, Howson and Modell (2006:5) advanced maternal age is mostly addressed among other risk factors for birth defects

It is clearly known that learners understand that advanced maternal age predisposes women to risk factors for genetic and or congenital disorders as mentioned by participants. This kind of knowledge is congruent with opinions stated in Day and Patch (2002:161) that genetics risk factors usually increase with advanced maternal age in pregnancy.

Nevertheless, a full picture of genetic risk factors received narrow attention in the advanced midwifery programmes. There is a spectrum of genetic risk factors that affect other clients and patients, not only the fetus and or new-born infants. The current advanced midwifery programme touches on advanced maternal age disregarding other genetics-related risk factors. Breast cancer could be one of the hereditary cancers present in blood relatives (Lashley 2007:235). Lewis (2012:361) stated that breast cancer that runs in families might be due to inherited gene mutations. This makes breast cancer a risk factor for genetic disorder especially if it "occurred in one's mother, sisters and aunts" signifying high risk for breast cancer in a woman visiting healthcare settings (Lashley 2007:235).

The advanced midwifery programme has a shortfall in addressing a full spectrum of risk factors for genetic disorders. A standardised curriculum framework could assist in addressing the current teaching gap of neglecting genetics teaching resulting in inability to identify risks factors for causes of genetic disorders.

7.2.1.2 Sub-theme 2: Skills competence

Skill is the "level of performance, in the sense of accuracy and speed in performing particular tasks." (Winterton, et al 2006:26). Genetic skills and competence form part of nursing practice as tasks are employed in clinical settings. Findings showed lack of skills competence in genetics that exist among learners as reported by participants themselves. Three

categories emerged under the skills competence sub-theme: genetic history- taking, identification of genetic disorders and management of genetic disorders.

- **Genetic history taking**

Participants stated that advanced midwifery learners have the skill to obtain genetic history during interactions with pregnant women. Genetic history referred to obtaining first generation history only in this study. The basis for obtaining only first generation family history was attributed to lack of guidance regarding how many generations are to be obtained during history-taking. Views of participants in this study are consistent with opinions shown in Qureshi, Wilson, Santaguida, Carroll, Allanson, Ruiz, et al (2007:11) at which a lack of consensus regarding the amount of family history-taking that needed to be taken in the PHC setting was a challenge. Agreement regarding the degree of family history to be taken in that study was lacking. Thus practitioners continued to gather inadequate family history in clinical settings as they interacted with healthcare consumers.

Family history "includes information about health status, causes of death and pregnancy outcomes of the patients and the most genetically related relatives." (Mahowald, et al 2001:17). Health problems of family members like siblings, parents, grand-parents, aunts etc., provide suspicions about diseases (Lashley 2007:17). Family history assessment is an important tool that is underused in clinical practice (Lashley 2007:212). It is required of nurses to obtain general and specific three generation family history and constructing a pedigree from the collected information (Mahowald, et al 2001:21). However, agreed-upon methods of obtaining three generation family-history to lead PHC professionals are lacking (Qureshi, et al 2007:10). A standardised curriculum framework is

required to assist regarding skills of obtaining the three generation history in clinical and PHC settings.

- **Identification of genetic disorders**

It is clear that advanced midwifery learners have skills competence to identify genetic disorders as perceived by participants. Participants further stated that advanced midwifery learners have abilities to identify women at risk for genetic disorders. One participant mentioned her opinion as follows: "Advanced midwifery learners refer pregnant women with a history of genetic disorder to the specialist for chromosomal analysis."

The above quote shows that advanced midwifery learners are able to identify women at risk of genetic disorders and refer them for necessary interventions. Lashley (2007:138) stated that those situations that suggest a genetic problem include, among others, previous history of genetic disorders, women experiencing repeated spontaneous abortions, stillbirths or infant death of unknown origin or genetic causes. The stated conditions fit in the maternal and child healthcare programmes. None of the participants in this study mentioned any of the above stated problems to be related to genetics. Thus, the stated conditions are ignored in clinical and PHC settings as skills competence in addressing such is lacking.

A standardised curriculum framework might assist in the appropriate teaching of skills to identify conditions considered to be of genetic origin and not only in women with in an advanced maternal age.

- **Management of genetic disorders**

Clearly findings revealed that advanced midwifery learners lacked the skill to manage genetic disorders as perceived by participants. Participants considered inclusion of adequate genetics in teaching to be a speciality

area done by specific persons. In areas where genetic nurses were found, such nurses often provided genetics education on behalf of educators as mentioned by participants in this study. The views of participants in the current study are consistent with findings in Kirk, et al (2007:180) stating that nurses do not see genetics as relevant to their practice.

It is further reported in Gharaibeh, et al (2010:440) that nurses and midwives perceived genetics teaching to be relevant in other healthcare professionals rather than them. That is why genetics is erratically offered in nursing and midwifery programmes as it is less embraced. Advanced midwifery learners require skills competence to manage genetic disorders.

Genetics education remains consigned to others or nurses with genetics interest as it is limitedly accepted or recognised in nursing programmes. According to ANA and ISONG (2007:13) nurses in basic nursing programmes provide routine genetics services to healthcare consumers while those in advanced level of practice provide comprehensive practice skills in genetics. Participants are very clear in this study that learners have limited skills to manage genetic disorders. A curriculum framework that standardises genetics education could sensitise educators in nursing to recognise the importance of genetics.

7.2.2 Theme 2: Unspecified genetic component structure in advanced midwifery programmes

Component structure was identified as the second theme that emerged from the data set regarding perceptions of participants regarding curriculum framework to standardise genetics education. Categories for unspecified component structure were: limited standardised genetics content, different teaching hours (periods) for genetics, unidentified genetics outcomes, ineffective teaching strategy and inadequate leaner assessment.

7.2.2.1 Sub-theme 1: Limited standardised genetics content

Upon identification of learning outcomes, content for teaching should be identified (Killen 2010:90). If not, out-dated or irrelevant content could be used. This could result in educators using common practice which could be unhelpful in assisting learners to achieve outcomes. From this sub-theme one category was derived namely: lack of common genetics content for teaching.

- **Lack of common genetic content**

Findings showed lack of common genetics content to focus genetic education in the advanced midwifery programme. Each educator used content that suited her/him without considering the learners' needs. Further, findings indicate that, in the absence of common genetics content, educators often relied on genetic nurses or a doctor with interest in genetics as both were perceived to be better empowered in genetics.

The lack of common genetics content for teaching leads to participants resorting to the use of other professionals regarding genetics teaching in the advanced midwifery programme. Using others perceived to be better informed in genetics seems to follow what Uys and Gwele (2005:144) termed a content-based curriculum in which its developers try to cover the required content by focussing on the learning process. Some content could be covered, but achieving the outcomes remains a challenge. In this study those accorded the responsibility of providing genetics education were not involved in deciding on the teaching content.

The lack of adequate common genetic content in nursing schools hindered the success of genetic education. Standardisation of genetics content in the curriculum in nursing schools could serve as a benefit in case of the transfer of a faculty from one institution to the other as the content could

be found to be similar for both educators and learners (Clavreul 2008:15). Standardised common genetic content in the advanced midwifery programme could assist participants of this study as they have mentioned that they have little genetics information and sometimes are ignorant on what to include for teaching. A framework to standardise genetics education in the advanced midwifery programme is required to assist in adequate common genetics content. The standardised curriculum framework might assist most nursing schools to adequately include genetics content in the curricula because, according to Challen, Harris, Julian-Reynier, ten Kate, Kristoffersson and Nippert, et al (2005:309) certain schools at postgraduate level lack genetics content.

7.2.2.2 Sub-theme 2: Differing teaching hours (periods) for genetics

Teaching hours are planned during programme development (Uys and Gwele 2005:70). By then educators and learners should already have an idea regarding the length of training concerning particular units of study. From this sub-theme a lack of guidance regarding teaching hours was an identified category.

- **Lack of common hours (periods) for genetics**

Regarding teaching hours, findings showed that various numbers of hours were devoted for genetics education in different NEIs offering an advanced midwifery programme. Stipulated numbers of agreed-upon hours devoted to genetics education in an advanced midwifery programmes are absent. Participants attributed differing hours to the absence of guidelines for common numbers for teaching time.

This study found teaching periods that ranged between 10 minutes to 35 hours and 40 minutes for genetics theory teaching. Differences in this study showed huge numbers of hours and very limited numbers of hours

including a very few minutes for genetics teaching. Similar variations regarding big differences in teaching hours of between two to 75 hours for genetics teaching in nursing and midwifery programmes in the United Kingdom are found in the studies of Metcalfe and Burton (2003:354), Challen, et al (2005:309) and Burke and Kirk (2006:232). Teaching hours for genetics education were found to be 6.5 hours in Jenkins, et al (2001:283).

Common teaching hours for genetics could improve competencies, skills and abilities which are lacking in clinical settings (Maradiegue, et al 2005:473; Vural, et al 2009: 225-226). Participants in this study mentioned that they require a standardised framework that would provide suggested common teaching hours for genetics education.

7.2.2.3 Sub-theme 3: Unidentified genetics outcomes

According to Killen (2010:70) outcomes are decided first so that, when teaching takes place, it is directed at achieving the established outcomes. Iwasiw, et al (2009:182) pointed out that "the educational destination that students are supposed to achieve at the end of the nursing program must be specified." In order to achieve programme goals, learning outcomes, learning actions and assessment criteria needed to be planned before actual teaching takes place (Surgenor 2010:10). From this sub-theme one category was identified: unplanned genetics outcomes.

- **Unplanned genetics outcomes**

Participants clearly stated that learning outcomes in genetics were never planned. Genetics teaching mostly involved sharing previous information on genetics encounters in clinical practice with no specific objective to achieve at the end of teaching session. The intention of any teaching session is to accomplish outcomes. According to Enerson, Plank and

Johnson (2004:2) entering a teaching environment without planning of outcomes as a teacher "is like heading cross-country without a map" which is "rarely an efficient way to travel." Enerson, et al 2004:2). Having class sessions without planned learning outcomes and unplanned learner activities pertaining to genetics is a recipe for poor attainment of learning outcomes. Based on inconsistent genetics content in nursing schools it is possible that a lack in learning outcomes resulted as the field is perceived to be less essential in nursing. According to Thompson and Brooks (2010:1); Maradiegue, et al (2005:473); Vural, et al (2009:225–226) genetics content was not an essential component of advanced nursing curricula. This then resulted in lack of competencies and skills as identified outcomes.

According to SANC, Nursing Education and Training Standards stipulate that "NEI's clearly define the educational and clinical outcomes of the programme." Although this statement is obligatory, genetics outcomes were never planned in the advanced midwifery programmes as reported by participants. Graduates who had attained specified outcomes at the end of the teaching programme might provide quality care because "nursing education focuses on the education and training of nursing students to become competent, qualified nurse professionals." (Bruce, et al 2011:10). A curriculum framework could assist NEIs to ensure genetic outcomes are planned and attained at the end of teaching in an advanced midwifery programme.

7.2.2.4 Sub-theme 4: Ineffective teaching strategy

Teaching strategies are means employed in teaching to assist learners to attain leaning outcomes (Killen 2010:92). Teaching strategies are planned beforehand for learners to be alert with regard to the type of strategies at their disposal. According to Uys and Gwele (2005:75) teaching strategies could be in the form of watching a video or learning in the field, which will

could include demonstration of procedures. From this sub-theme, use of a lecture method for teaching was an identified strategy.

- **Use of lecture method for genetics teaching**

Findings revealed that various teaching methods, such as a lecture method, group discussions and video presentations were used in genetics teaching. In instances where class sessions for genetics were held, genetics information was provided through the lecture method. One participant indicated her opinion as follows: "I give lectures on frequencies of occurrences of genetic conditions."

The above quote provides evidence that a lecture method was mostly used to disseminate genetics information to learners in advanced midwifery programme. Lecture methods are mostly used for transmission of information to learners who mainly listen and take notes while the educator mostly does the talking (Quinn and Hughes 2007:222). This kind of teaching is pathetic because it encourages dependency on the lecturer as learners take no active participation in looking for information. Quinn and Hughes (2007:262) pointed out that an adult learner is not happy to sit, listen and receive information as often they like to be actively involved in their own learning.

"Facilitation is to intentionally create a context that is conducive to learning and to guide students to deep-holistic lifelong learning." (Bruce, et al 2011:96). A curriculum framework that includes various other learning and teaching methods is required to enhance learning. The envisaged framework might encourage facilitation of learning rather than lectures only. Inquisitiveness might be stimulated among learners as they could be curious towards self-study regarding genetics if facilitation is used for teaching and learning.

7.2.2.5 Sub-theme 5: Inadequate genetics assessment

Assessment tasks are planned as soon as learning outcomes are identified before implementation of an educational programme so that suitable assessment methods are applied (Bruce, et al 2011:308; Anema and McCoy 2010:129). Formative assessment is performed throughout the process of learning while summative assessment is usually conducted at the end of training (Bruce, et al (2011:305-306). Both theory and practice is assessed in nursing programmes. From this sub-theme a narrow learner assessment was identified.

- **Narrow learner assessment**

Findings revealed a lack of appropriate learner assessment regarding genetics. Both formative and summative assessments were inappropriately conducted, as mentioned by participants in this study. Participants stated clearly that genetics theory is assessed minimally during training with a complete absence of clinical assessment during training in advanced midwifery. Participants attributed this shortcoming to the lack of curriculum framework to guide learner assessment in genetics as the problem. Benjamin, et al (2009:495) pointed out that the majority of midwives employed information obtained during pre-registration for genetics teaching. The aforementioned authors further raised a concern that the pre-registration content and its quality were considered invalid.

Assessment of genetics was less prioritised as perceived by participants in this study. Similar findings were reported in Challen, et al (2005:309) that assessment of genetics was lacking in nursing and midwifery programmes. A curriculum framework to standardise genetics education might address the gap of the lack of genetics assessment in the advanced midwifery programme.

7.2.3 Theme 3: Lack of genetics competence among advanced midwifery educators

Competence among advanced midwifery educators was identified as the third theme under which one sub-theme was identified: lack of formal and continuous education in genetics.

7.2.3.1 Sub-theme 1: Lack of formal and continuous education in genetics

Educator competence was reflected in the form of a lack of training attendance, a need for genetics workshops and the need for curricula revision to include genetics.

- **Lack of training attendance**

Findings revealed that participants lacked adequate training with regard to genetics. Participants themselves mentioned that their genetic knowledge is limited. One participant stated her views as:

> *"I am shallow on genetics subject as I attend no training in genetics."*

The quote shows the lack of suitable education in genetics. The aim of nursing and midwifery education is to produce competent and qualified professionals at the end of learning programme (Bruce, et al 2011:13). However, regarding genetics in South Africa genetics teaching is varied and depended on the availability of educators in nursing schools according to the Policy Guidelines (2001:29). This variation could have contributed to inadequate genetics education among participants as learners during their own training, both in basic and advanced midwifery programmes. Participants are the products of nursing education in which genetics is inadequately provided. The variation contributed towards sloppy teaching that could not have empowered participants.

It could be argued that an element of ignorance might also exist among participants as they failed to empower themselves with adequate knowledge in genetics since this was ignored during their own training. Furthermore, a lack of sensitisation by forebears regarding the genetics field existed as participants are registered nurses and midwives before becoming advanced midwives teaching. Participants received little genetics training in their own training, therefore genetics education is unimportant. This lack of training among participants as educators is also reported in the study by Burke and Kirk (2006:223) where teachers were not well trained in genetics and were unable to provide satisfactory genetics teaching.

Participants further complained of other priority conditions which were prioritised in the curricula. Such conditions included HIV, AIDS, prevention of mother to child transmission (PMTCT) and integrated management of childhood illness (IMCI). This statement is supported by the following quote: "We have compulsory short courses. Learners in the advanced midwifery programme must do HIV, AIDS, PMTCT and IMCI. Now, for us to bring a compulsory genetics content, the curriculum is really overloaded*."*

Participants mentioned numerous barriers as obstacles for the inclusion of adequate genetics in the advanced midwifery programme that consequently overloading the curricula. Some of these obstacles are not unique to the participants in this study. Burke and Kirk (2006:223) revealed barriers of similar nature that were seen to have overcrowded the curriculum in New Zealand consequently some nursing schools avoiding genetics teaching. In instances where genetics was taught, it was allocated less than 20 hours according to Burke and Kirk (2006:223).

In the study titled: "Nurses' competence in genetics: a mixed method systematic review" by Skirton, O'Connor and Humphreys (2012:2388) it

is mentioned that, in regions where there are competing health problems, genetics might be less recognised compared to other health problems. In South Africa HIV and AIDS occupy the centre stage due to its enormous influence on health and society, so genetics has no space in the advanced midwifery programme as participants in this study have stated.

It could further be argued that participants could not grasp the importance of genetics as they could not understand its major relevancy towards teaching and its potential influence in clinical and PHC settings. However, participants required a framework that could help them to learn genetics better to be able to impart sufficient knowledge to their learners.

- **Need for genetics workshops**

Participants mentioned that they are not involved in any genetics workshops to improve their knowledge. A workshop is meeting that is organised to deliberate on a topic of interest by group members (Oxford South African Concise Dictionary 2010:1372). After deliberations, group members could have had opportunity to improve their knowledge and skills for better job performance. The following quote represent participants' lack of attendance of workshops:

> *"I am not involved in any genetics workshop."*

The above quote provides evidence that participants are not involved in any in-service education related to genetics to improve or update their genetics knowledge. ISONG provides a forum for educators regarding genetics but participants are unaware of such forums (ISONG Organisational Overview 2012:2). The Policy Guidelines (2001:10) stated that genetics workshops are held annually in South Africa. However, participants in this study seemed not to be aware of such important meetings. It is clear that a curriculum framework to standardise genetics

education in the advanced midwifery programme is required to improve the current status of genetics education in South Africa. It could assist participants to become involved in genetics workshops that are available in the country.

- **Need for revision of the curriculum to include genetics**

Participants in this study reasoned that the advanced midwifery curricula should be revised to accommodate adequate genetics for teaching. Views of participants are represented in this quote: "The curriculum must be revised to include adequate genetics teaching." Opinions of participants are congruent with those in Kim (2003:1089) where participants required a genetics course in the curriculum to improve their genetics knowledge.

"Revision requires improving, expanding, or updating materials, resources, faculty, and the environment." (Anema and McCoy 2010:176). Genetics education exists in the advanced midwifery programmes as mentioned by participants in this study. However, education with regard to genetics is unplanned. To address the situation, a curriculum framework to standardise genetics education in the advanced midwifery programme could be the solution to address the current genetics knowledge gap to meet the needs of educators and learners. Ultimately, healthcare consumers could benefit from sufficiently trained advanced midwives deployed in clinical and PHC settings.

7.3 SUMMARY

The purpose of the qualitative phase in this study was to explore and describe perceptions of advanced midwifery educators regarding a curriculum framework to standardise genetics education in the advanced midwifery programme. Perceptions of participants revealed random genetics education. Teaching content and hours are greatly varied,

learning outcomes are unplanned, teaching strategies are inappropriately employed and learner assessment is lacking. Graduates in the advanced midwifery programmes exit the programme with insignificant genetics knowledge, skills and competence.

Adequate accommodation of genetics in the advanced midwifery programme could provide learners with sufficient competence, knowledge and skills. This in turn instils confidence among midwives in providing genetic healthcare in clinical and in PHC settings. Genetic challenges might be recognised earlier and interventions could be earlier provided to healthcare consumers in clinical and in PHC settings.

7.4 CONCLUSION

The study findings revealed haphazard genetics education delivered in the advanced midwifery programme in NEIs in South Africa. This resulted in the delivery of less competent, less knowledgeable and less skilled advanced midwives. Chapter eight present phase two of the study.

CHAPTER 8: PHASE ONE RESULTS, PHASE TWO PROCESS AND FRAMEWORK DEVELOPMENT

8.1 INTRODUCTION

The results from phase one (sequential explanatory mixed methods) is provided to conclude the process undertaken in addressing the first and second research questions in this study. The phase two process that addressed research question three (identification of genetic competencies) is also presented in this chapter. To address research question four (developing the framework) the curriculum framework theory according to Lee, et al (2013) was employed and the process followed is described in this chapter.

8.2. EXPLANATORY SEQUENTIAL MIXED METHODS DESIGN

The explanatory sequential mixed methods design process suggests that qualitative findings help to explain quantitative results (Creswell and Plano Clark 2011:83). Explanatory sequential design was first employed where quantitative data collection and analysis was done followed by qualitative data collection and analysis was conducted in two separate steps (Creswell and Plano Clark 2011:83; Maree 2007:264). Although collecting and analysing data in two separate steps takes long to complete (Creswell 2003:215; Maree 2007:269) it was deemed necessary in order to address unexpected results obtained from quantitative strand. Figure

8.1 depicts the procedure followed in implementing explanatory sequential mixed methods design.

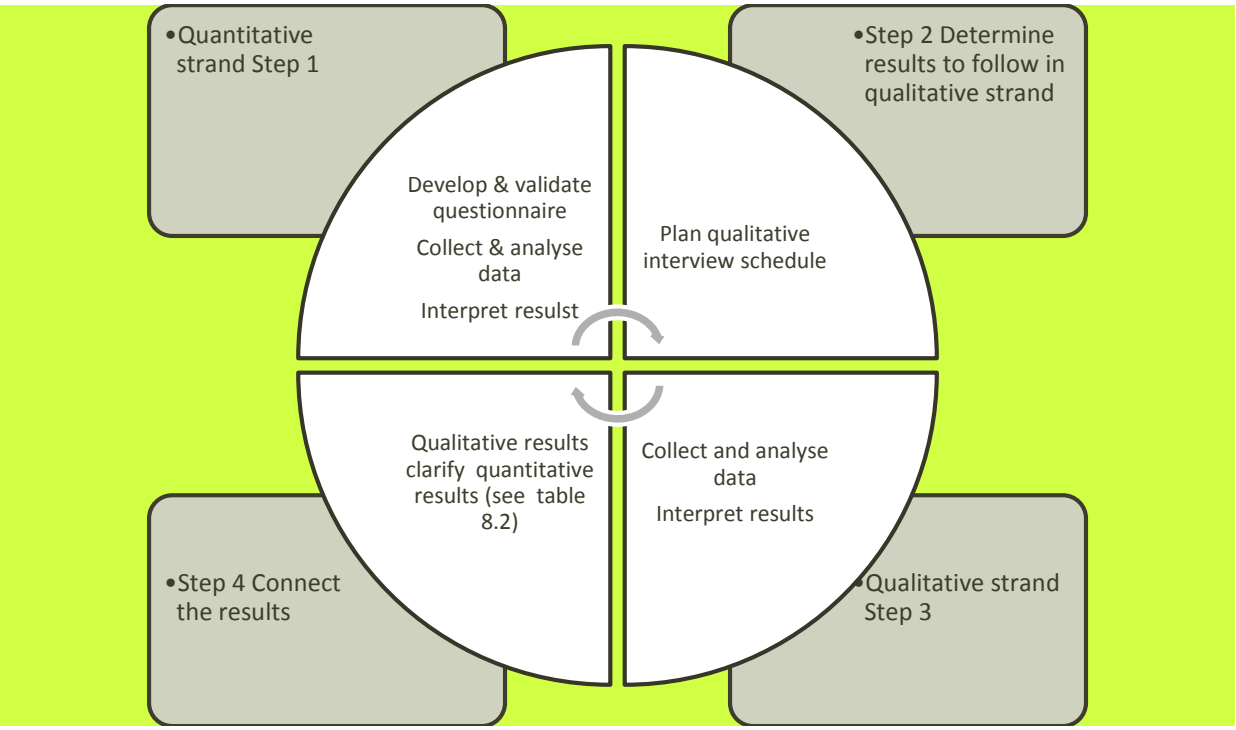

Figure 8.1 Steps followed in explanatory sequential design

Creswell and Plano Clark (2011:81) recommended specific criteria to be used for the explanatory sequential mixed method research. The suggestion required the use of the same individuals as population for both quantitative and qualitative designs. Further a larger and smaller size in these two methods is proposed by Creswell and Plano Clark (2011:83) with the former comprising more and the latter employing a fewer number of participants. This proposal was followed in this study. The information is portrayed in table 8.1. However, continuation of qualitative data collection depended on the saturation which was accomplished resulting in termination of further collection of data. More information regarding other procedures employed for mixed method design, according to Creswell and Plano Clark (2011:255), is provided in table 8.1.

Table 8.1 Criteria used for explanatory sequential mixed methods

QUATITATIVE ASPECT	QUALITATIVE ASPECT
POPULATION **Educators in advanced midwifery programmes**	
Size	
N=32	**N=19**
DATA COLLECTION	
SURVEY Self-administered questionnaires	**INTERVIEWS** • Focus group discussions and in-depth interviews • Telephone interviews
INTERVIEW INSTRUMENT	
Questionnaires	Interview guide
DATA TYPES	
• Numeric • Coded on Excel	• Narratives, field notes and observations • Transcribed verbatim
DATA ANALYSIS	
Descriptive statistics using non-parametric methods	Thematic analysis

8.2.2 Phase one results

As shown in table 8.1 above, quantitative and qualitative designs were employed separately, however, the population in both strands was similar. The results for both strands were combined as narrative responses clarified some statistical survey responses.

8.2.2.1 Integrated results

The sample for phase one was similar which was required to follow up on numeric results. Quantitative results provided numeric and abstract data on current genetic education in the advanced midwifery programmes. In order to obtain a sense brought about numeric results, qualitative data

collection and analysis was employed to obtain clarity on specific quantitative results. Table 8.2 present phase one results.

Table 8.2 Comparison and depicting clarity of quantitative results

Quantitative results	Qualitative results	
Questionnaire Survey	**Theme**	**Focus groups and interviews**
Numerous genetics concepts were included in the curriculum	Genetics competence of advanced midwifery learners	Genetics conditions varied and are superficially addressed
Family history-taking done by 81% learners		Only the first generation family-history is obtained Family pedigree is not drawn
Component for inclusion of genetics is varied.		Genetics teaching is random, varied and offered at educators' discretion
Teaching content different	Unspecified genetic component structure in advanced midwifery programme	Teaching content different
Teaching periods ranged from 1 to 55 periods		Teaching periods ranged between 1 and 53 periods
Learning outcomes • Fifty-three percent (53%) respondents stated that outcomes are not clarified, • genetic counselling is the outcome • family history-taking is the outcome • identification of mothers at risk of genetic disorders is outcome		Learning outcomes not planned
Genetics competencies are achieved as stated by 34% respondents		Learners exit programme with trivial genetics skills
Learner assessment is lacking		Narrow formative assessment
Majority (75%) of educators do no attend genetics workshops	Lack of genetics competence among advanced midwifery educators	Genetics workshops are lacking
Lack of training in genetics		Need for genetics training
Curriculum is too full to accommodate genetics		Curriculum is too full to accommodate genetics
Guidelines for inclusion of genetics are needed		Curriculum review need to happen to address genetics
Genetics education is required		Genetics capacity is required

8.2.3 Results for explanatory sequential mixed methods design

Quantitative and qualitative results were presented together as a principle for mixed methods research and also for easy presentation in the workshop. The results were generated from data collected from educators in the advanced midwifery programmes as the sample of the study. Quantitative results showed that specific genetics concepts varied and were adequately addressed in class. Reaction from similar participants in qualitative design results indicated that genetics concepts varied and were superficially addressed.

Teaching hours (periods) are greatly varied as these ranged from one to fifty-five (1 to 55) periods for both theory teaching and practical exposure. In certain instances inconsistencies regarding teaching times were observed from questionnaires received from the same nursing schools. Overall genetics learning outcomes were not planned and where these existed, coherence was lacking as very few educators planned outcomes. Learner assessment lacked quality assurance measures as little to no assessment was revealed in the findings. Opportunities for learning about genetics in clinical and PHC settings are limited because of the scarcity of educators and preceptors with adequate genetics knowledge.

A majority (75%) of the sample do not attend genetics workshops making their genetics knowledge and skills to be poor making the sample to also lack evidence-based information. The sample in this study further required capacity in genetics knowledge. Furthermore, a suggestion to review the curricula, including the planning of genetics outcomes to assist with integration of genetics into the advanced midwifery programme, was hailed by the sample. Phase one results exposed uncoordinated and random provision of genetics education in the advanced midwifery programmes. The situation is aggravated by the lack of a curriculum framework that standardise genetics education.

8.3 PHASE TWO

Phase two of this study addressed research objective three that sought genetics competencies. The competencies were necessary for inclusion into the competency-based curriculum framework that standardise genetics education. The last research objective was to develop a competency-based curriculum framework that standardise genetics education in an advanced midwifery programme. The application of a theoretical framework according to Rogers' diffusion of innovation was employed during the workshop (phase two).

8.3.1 Population

A total of 17 participants were purposely selected to take part in the workshop. Most participants (n=13) were professional nurses with different backgrounds in the nursing and midwifery profession. Nurses came from universities, hospitals, nursing colleges and the national department of health. One medical doctor teaching genetics at undergraduate level at the university, and one geneticist from the South African NDoH formed part of the workshop team. Additionally two other persons were present, one from the private sector and one representing the community. In the group there were two genetics nurses. The characteristics of participants appear in figure 8.2.

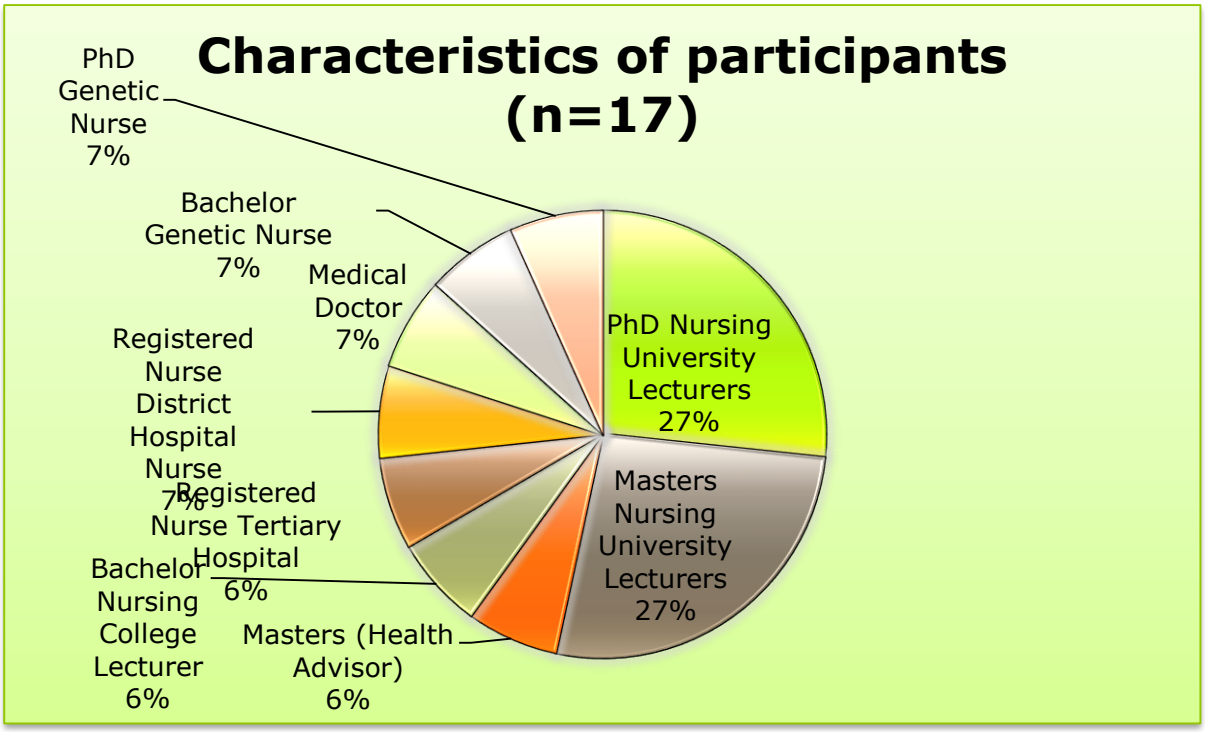

Figure 8.2 Characteristics of participants (n=17)

8.3.2 The Workshop

A workshop is the gathering of people with mutual interests for learning as a group (Mellish, Brink and Paton 1998:172). For this study the workshop was organised for the stakeholder group with common interests regarding genetics in the advanced midwifery programme. The aim of the workshop was to present phase one results and obtain consensus from stakeholders regarding the required genetics competencies.

8.3.2.1 Preparation

The Tshwane learning centre was used to conduct the workshop as it is equipped for educational events. Extra rooms for group discussions are available. Two flip charts were available to prepare for jotting down information during nominal group technique meetings. One was placed in the main room venue, while the other was put in the computer lab room. In addition a glue stick and colour pens were made available. Material

prepared for participants included: A4 folder containing information leaflet with a consent form, a writing pad and pen, cards to be used during nominal group technique meetings and the evaluation form were included. The researcher and a colleague arranged a meeting to discuss and plan for the workshop and nominal group technique meeting process.

During the meeting in the plenary (main venue for workshop) it was agreed on an opening statement to clarify the role of members. The role of members was to discuss phase one results and recognise the value of genetics in an advanced midwifery programme. The goal was to reach consensus regarding genetics competencies, outcomes and teaching content and agree on teaching times at the end of the workshop. An agreement was reached that a four-step process was to be employed to conduct the nominal group technique meetings. The steps were: generating ideas, recording ideas, discussing ideas and voting on ideas. This four-step process is described later under the persuasion stage of Rogers' diffusion of innovation theory. A round table seating arrangement was prepared in the main venue to enable the initial presentation of phase one results.

8.3.2.2 Presentation of results

The researcher introduced herself as the PhD candidate doing research on genetics education in the advanced midwifery programme. The purpose of the workshop was to present phase one findings and to conduct nominal group techniques meetings to obtain consensus regarding the necessary competencies for inclusion in the curriculum framework. The stakeholders were welcomed and everybody was asked to self-introduce and say something briefly about genetics at their workplace. The researcher requested the stakeholder to sign an attendance register. Further the stakeholder were asked to sign the consent form if they were willing to

take part during nominal group technique meetings, which was voluntary as stipulated in the information leaflet.

8.3.3 Application of diffusion of innovation theory

Three stages for diffusion of innovation theory by Rogers were implemented. This theory focus on how new ideas or processes are accepted and adopted by individuals and or organisations to enhance integration of innovations (Anema and McCoy 2010:198; Horner et al. 2004:80). Rogers' theory has elements of sensitising colleagues through sharing of new developments. Ek (2005:4) stated that information is vital if adjustment is to be realised.

The diffusions of innovations theory according to Rogers is characterised by five stages and in this study three stages were implemented. The first stage is called knowledge and this was addressed through the presentation and discussion of phase one results in the workshop.

8.3.3.1 Knowledge stage (stage one)

According to Rogers (2003:21) the knowledge stage represents a chance to learn about the presence of ideas. On realising these ideas one seeks information on performance and why such ideas operate (Rogers 2003:21; Nutley, Davies and Walter 2002:11). In the workshop participants were presented with phase one results which opened an opportunity to know about the current level of genetics education and the perceptions of educators of the advanced midwifery programmes regarding genetics education. Results were presented as a unit. It was during presentation of phase one results that the stakeholders were made aware of existing educational activities with regard to genetics in the advanced midwifery programme. The knowledge stage is composed of

various other types of knowledge of which awareness knowledge and how to knowledge were employed in the study.

- **Awareness knowledge**

Awareness knowledge concerns motivation found in individuals after internalising learnt information where further education lead to embracing innovation (new information). Research results provided an opportunity for participants to learn something of the current state of genetics education, realisation of importance of genetics and the limitation of knowledge.

- **How to knowledge**

How to knowledge is the second type of knowledge stage. It represents evidence on how improvement (innovation) is adequately employed to yield positive results (Robinson 2009:1). How to knowledge is required of individuals to have an ample level of how to knowledge before an innovation is accepted (Robinson 2009:1). Results regarding the benefits of being informed on genetics were presented. The discussion of results enhanced understanding of genetics education among stakeholders during the workshop.

The presentation and discussion took an hour in the main venue after which participants were divided into groups one and two to form nominal group techniques meetings. During the discussions participants acknowledged that genetics is not well addressed in training and in clinical settings where midwives struggle to provide sufficient healthcare when confronted with genetics challenges, particularly during intra-partum care. Glass (2004) (a genetic nurse) stated that:

> "a majority of midwives at the various maternity sections at three of the academic hospitals in Gauteng are unaware of the procedures that should be followed when faced with a woman at risk for having a baby with a genetic condition, or how to manage the fetus or infant with multiple congenital abnormalities."

The stakeholders in the workshop attested that there is a limitation of knowledge, skills and competence among midwives and advanced midwives to deal with genetics challenges in clinical and in PHC settings.

8.3.3.2 Persuasion stage (stage two)

The persuasion stage was employed during nominal group techniques meetings. This stage is when individuals deny or accept the innovation (Rogers 2003:176). Refusal of or the embracing of the innovation often does not result in dismissal or approval of that particular innovation (Rogers 2003:176). The presentation of results sensitised the stakeholders about the presence of information regarding genetics education in the advanced midwifery programme.

Genetic nurses and other renowned midwives were equally distributed between the two groups because of their potential knowledge about genetics information in nursing and midwifery education and practice in South Africa. The presence of genetics nurses and advanced midwifery educators proved effective as these are highly informed professionals with regard to an advanced midwifery programme.

These professionals were instrumental in dispelling or addressing uncertainty about genetics in the nursing system. The strengthening of information through persons that are adequately empowered positively

influences the views of others who end up favouring the innovation (Rogers 2003:175; Robinson 2009:1).

Nominal group technique meetings

Nominal group technique is a structured process of a few individuals used to draw the knowledge through consensus (Delp, Thesen, Motiwalla and Seshardi 1977:14; Department of Health and Human Services, 2006:1). All participants were released to join their respective groups as determined by the researcher. Group one comprised of eight while group two had nine participants. The researcher and a colleague (lecturer) acted as moderators in each groups. Each moderator had a set of three similar questions which were used to facilitate discussion during nominal group technique meetings.

Nominal group technique meetings were employed through the use of three pre-planned questions (appendix D). The nominal group technique steps were employed according to Delp, et al 1977 and the Department of Health and Human Services 2006.

Step 1 Generating ideas: During this step the moderator wrote a question on the flip chart and read it for participants to individually write their responses on the cards. Discussion was forbidden among group members.

Step 2 Recording ideas: All members voiced their ideas while the moderator wrote them on the flip chart. Discussions were still restricted.

Step 3 Discussing ideas: During this step items were discussed and clarity provided with the moderator further seeking more comments from group members on each item. Ideas were then listed on the flip chart.

Step 4 Voting on ideas: Separate individual voting was conducted first. Items that received high numbers were put first in sequence by the moderator. Items receiving lower votes were eliminated and the first five items that received a high score were accepted as group consensus. These items were then presented in the main venue in the presence of all other stakeholders. Figure 8.3 presents the process employed during nominal group techniques meetings.

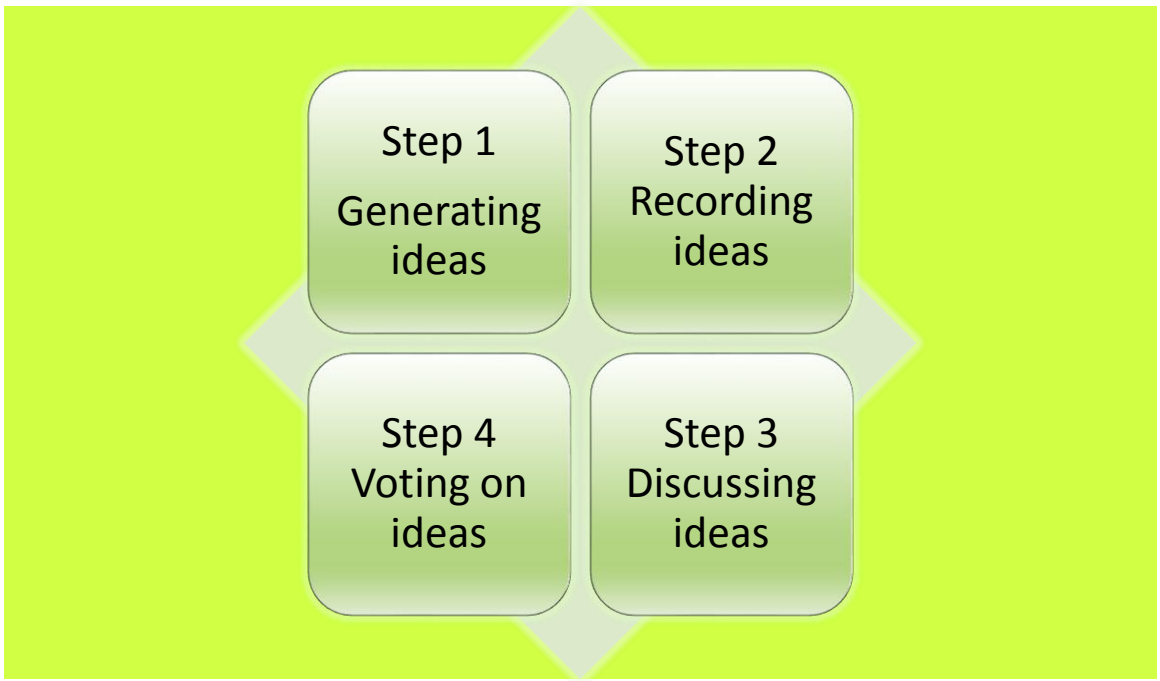

Figure 8.3 Process followed in nominal group technique meetings

8.3.3.3 Decision Stage (Stage three)

The decision stage represents group decision making in accepting or rejecting an innovation (Rogers 2003:166). This stage was performed in the main venue for the workshop. Flip charts were displayed in the venue with final items from nominal group meetings. Each group then presented its report. A final discussion was held based on the presentations from the two nominal group technique meetings. A consensus was reached in the

main venue regarding what constituted the information agreed on. Further deliberations on items were done to clarify presented information.

A decision was made to accept all items presented by both groups. It was agreed that presented items represent competencies for an advanced midwifery programme. Consensus was further reached that the content should be spread in the advanced midwifery programme as it could not be a stand-alone module. In addition the workshop agreed that the content be assigned 40 teaching hours which will represent four credits. The workshop agreed further that implementation of the framework should include theory and practical, and formative and summative assessment.

The presence of genetic nurses, advanced midwifery cadres, a geneticist, health advisor, registered nurses and a community member in the workshop, and subsequently in the nominal group technique meetings, was instrumental for the sake of persuasion stage. Decision stage was accomplished in the workshop after each group presented the agreed upon items that represented genetics competencies. Figure 8.4 depicts the process followed during the workshop.

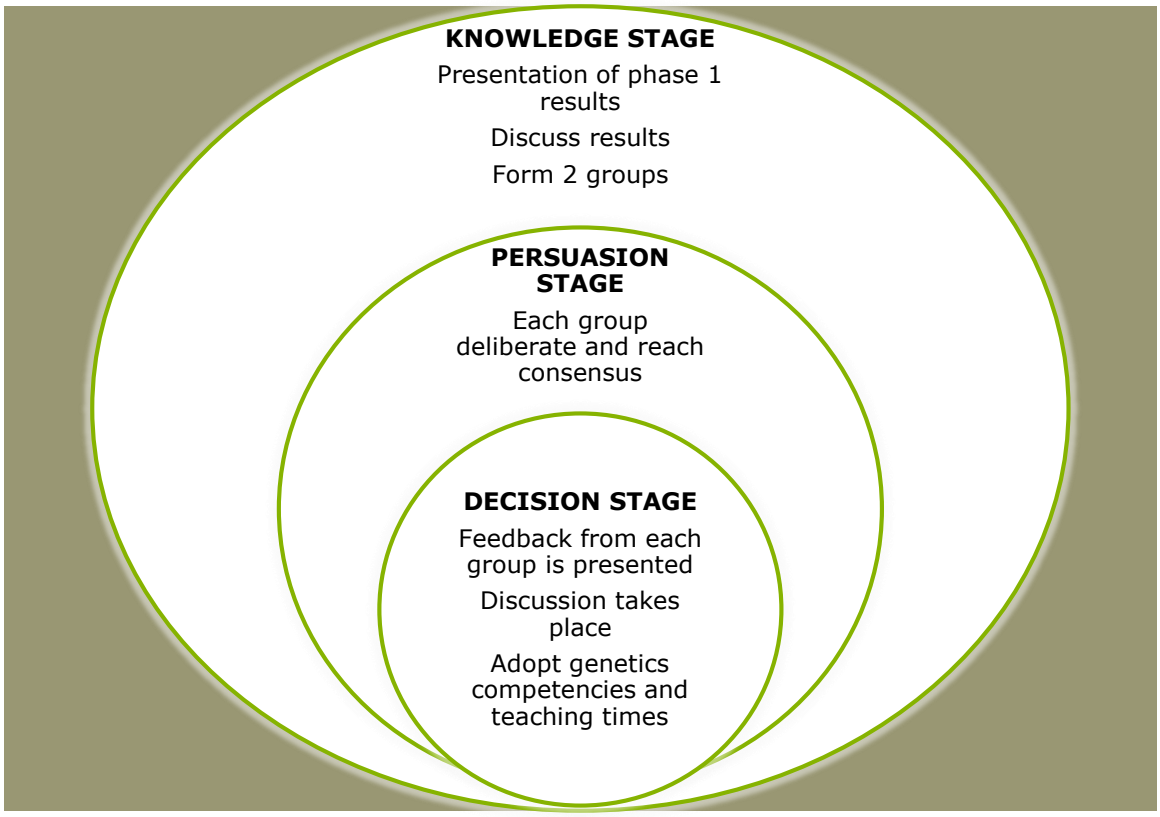

Figure 8.4 Application of diffusion of innovations' theory

8.4 OUTCOME OF THE WORKSHOP

The purpose of the workshop was to present phase one results and obtains opinions from stakeholders regarding the genetics competencies necessary for inclusion in the envisaged competency-based curriculum framework. The competencies could serve as teaching outcomes used for genetics education in an advanced midwifery programme. The workshop further agreed on teaching times that could be allocated in the programme. The competencies, outcomes and teaching times are depicted in Appendix O.

8.5 CURRICULUM FRAMEWORK DEVELOPMENT

Competencies to include in the curriculum framework were identified during nominal group techniques meetings and were endorsed in the

workshop. Based on the identified competencies, it was necessary to develop a competency-based curriculum framework that could standardise genetics education. The process employed for framework development was underpinned in the dimensions for curriculum framework according to Lee, et al 2013.

8.5.1 Description of a curriculum

A curriculum is a planned learning experience to be provided to learners in institutions of learning (Bruce, et al 2010:166; Uys and Gwele, 2005:1). Curriculum planners consider factors such as learner needs, societal and community circumstances, goals of the nursing profession and the mission of institutions implementing it (Iwasiw, et al 2009:5). Specialists in nursing programmes form part of curriculum committee for its planning and design at macro level.

8.5.2 Description of the curriculum framework

A curriculum framework, according to Stabback (2007:3), "is a document (or set of documents) that sets standards for a curriculum and provides the context (available resources, capabilities of teachers and system support) in which subject specialists develop syllabuses." Bruce, et al (2010:166) stated that a curriculum framework is a comprehensive summary for courses developed by a registering body and it stipulates only specific principles. A curriculum framework is also referred to as outline curricula in Mellish (third author of the book by Bruce, et al. 2010 – referred to earlier above) and Brink (1996:231). This last description (outline curricula) is considered for discussion in this report because of its reference to specific factors that are important in the curriculum framework at macro level. Such factors include:

The Council for Higher Education (CHE) which is responsible for the quality of Higher Education and Training (HET) at universities in South Africa. The criteria for education is set by CHE and SANC for nursing schools and nursing departments at universities (HET), and nursing colleges meet the criteria set by SANC (Bruce, et al 2010:11). However, all NEIs (nursing colleges and universities) in South Africa derive educational directives from curricula outlines referred to as curriculum framework in this study. A curriculum framework pertaining to genetics education in South Africa could not be identified, hence it was vital to develop one in this study.

8.5.3 Purpose of a standardised competency-based curriculum framework development

In order to develop a curriculum framework, it was necessary for the stakeholders to agree on the competencies. Such competencies (appendix O) were approved during the workshop and are included in the curriculum framework. The basis for the curriculum framework development is reinforced by the findings in phase that reflected random genetics education in the advanced midwifery programme. The standardised competency-based curriculum framework could assist NEIs in the integration of genetics in the advanced midwifery curricula.

A focussed genetics education is required, particularly with regard to genetics theory and practical in the advanced midwifery programme. Even though the envisaged competency-based curriculum framework is planned for the advanced midwifery programme, it could be employed in any other nursing programme since genetics is applicable to all health-related programmes.

8.6 THEORETICAL BASIS FOR CURRICULUM FRAMEWORK DEVELOPMENT

The four dimensional curriculum framework according to Lee, et al (2013) serves as a guide for professionals in the health care arena particularly educators "to link educational practice to health policy, workforce and professional practices in a coherent and reflexive way." Using the four-dimensional curriculum framework is relevant in this study as it could support and address the challenges of varied implementation of genetics education raised in the Policy Guidelines of 2001 in South Africa. Phase one results indicate differences in application of genetics education in NEIs.

Secondly, the four dimensional framework could be used to enhance integration of genetics in the advanced midwifery programme. Graduates could be empowered with sufficient genetics knowledge, skills and competence required in clinical and in PHC settings. Thirdly, the four dimensional framework could assist in ensuring that health care providers, deliver holistic care as genetic services are appropriately employed particularly in settings only served by nurses and midwives practicing without any medical doctors.

Lastly the envisaged curriculum framework approached according to Lee, et al (2013:69) entails a communication structure that drives important information regarding specific content within the curriculum framework. Such content forms part of the developed competency-based framework in this study. Outcomes, content, time allocation for genetics education, resources and assessment were targeted during framework development in order to ensure consistent genetics education. Dimensions for curriculum development are described as follows:

8.6.1 Dimension one

Dimension one is macro-oriented (mother-body) for curriculum development as meso and micro planners derive a mandate from the national curriculum developed by experts from various fields of specialities. According to Lee, et al (2013:69) dimension one relates to a higher level process which involves the "Big picture decisions - the why." It could be referred to what Uys and Gwele (2005:24) denoted as a national process of curriculum development. According to Uys and Gwele (2005:24) regulating authorities for Nursing in South Africa (SANC) develops a national curriculum for nursing programmes for specific purposes such as (and not limited to):

- National minimum standards for population safety,
- Quality education for attainment of qualifications,
- National standards that enhance consistency among members of a particular discipline in the country,
- Consideration of national health priorities in the country, and
- A guarantee of standardised competencies in the nursing and midwifery profession in South Africa.

Based on specific purposes of the national curriculum, according to Uys and Gwele (2005:24) it suffices to note the lack of a coherent genetics education policy that addresses some purpose in South Africa. The consequence of incoherent genetics education, particularly in an advanced midwifery programme, is the delivery of graduates with limited genetics skills and competence. This defies the intention of the mother-body (a national curriculum) as genetics principles in education remain unaddressed.

In South Africa the SANC, in terms of the provisions of the Nursing Act of 2005, makes available prescriptions regarding the national curriculum

framework for nursing programmes in the country. Specific goals are stipulated in the SANC curriculum framework document as a guide regarding expectations from NEIs as institutional curricula are developed. Goal number 1.4 stipulates that "…articulation of what students should know and be able to do and supports lecturers in knowing how to achieve these goals." (SANC, Circular No 8/2013 SANC). The articulation stated in the aforementioned circular has implications on NEIs with regard to learner training.

The Policy Guidelines of 2001 is a national document in South Africa and it was developed in an endeavour to address genetics in the country through education of health workers. Looking at the current state of genetics education in the advanced midwifery programmes, implementation of recommendations stipulated in the Policy Guidelines continue to find little or no expression in NEIs. However, a national framework for genetics is lacking, which this study intend to develop in an attempt to close the gap. Genetics education as an integral component of nursing as stipulated in the national Policy Guidelines of 2001, lacks appreciation though this field should be the first to find expression in dimension one as macro-oriented (mother-body) level.

8.6.2 Dimension two

Dimension two is concerned with abilities, particularly those derived from clinical settings as learners practice to enhance the development of knowledge, skills and competencies (Lee, et al 2013:70. This dimension, according to Lee, et al (2013:70) further deals with capabilities of graduates as they show that knowledge has been internalised and skills are displayed. Clinical learning is concerned with the integration of theory and practice. In clinical settings individual learners practice in real

situations as actual practice is critiqued during an on-going learning (Lee, et al 2013:70).

According to Uys and Gwele (2005:25) the placement schedule that outlines clinical facilities for deployment of learners throughout their training for theory integration is done during curriculum preparation. In the advanced midwifery programme information regarding genetics placement schedule for learners is lacking. Dimension two, which is meso/micro oriented, is used to address learner placement for integration of genetics theory into practice.

Phase one results revealed lack of coherence regarding genetics education and experiential learning. In phase two the stakeholders proposed that at least practical placement should be included in the 40 hours allocated for genetics education in the prospective curriculum framework developed in this study. Accreditation of learning facilities is approved by the SANC but implementation of the programme is done at institutional level. This view indicates the relationship between macro and meso levels regarding curriculum matters.

8.6.3 Dimension three

According to Lee, et al (2013:70) dimension three "involves core educational activities of teaching, learning and assessment." This dimension is meso-oriented as it is institutional-specific because fundamentals of education are planned and implemented at NEIs and it is where micro-curricula are designed. Because this dimension deals with the "how" part of education and there are opportunities for collaboration with other disciplines (Lee, et al 2013:70). Uys and Gwele (2005:102) stated that teaching involves communicating facts, arousing inquisitive thinking, enabling critiquing deliberation and assisting with effective learning tactics. Teaching could realise among members in a common

profession as in health care characterised by shared modules. Genetics teaching could be facilitated by specific educators for learners on the same levels from various disciplines making it a shared module in an institution.

8.6.4 Dimension four

This last dimension involves institutional management and governance of education. It is institutional in nature because "cultural norms, protocols, and procedures responsive to specific universities and locations" are addressed in an institution (Lee, et al 2013:70). Each institution has its own goals guiding its operations and through its activities it develops its own culture. Genetics education is the responsibility of every healthcare discipline and it could be integrated as a shared module among other disciplines such as Nursing, Physiotherapy, etc. Other health-related disciplines could also be involved to enhance the educational viewpoint as learners are empowered with genetics skills and competence.

8.7 PROCESS FOLLOWED FOR CURRICULUM FRAMEWORK DEVELOPMENT

The four dimensions for the curriculum framework operate in unison and they are interconnected. Dimension one, which is macro-oriented (national level e.g. SANC) provides directives for the implementation of nursing education. Numerous factors are considered for a macro curriculum framework. Such factors include educational requirements and maintenance of standards for patient safety (Mellish and Brink 1996:232).

The national curriculum framework for nursing programmes is designed to provide direction in health care education in nursing. Concerning genetics education national principles to guide it in nursing in South Africa could not be identified. Genetics norms for maintenance of standards that could

lead to patient safety are lacking. A curriculum framework for genetics education is required to curtail the random implementation of genetics teaching uncovered by current study findings and the literature.

Although the four dimensions are sequentially addressed from one to four in Lee, et al (2013:70) it appeared rather early for dimension two to rise because capabilities are realised after application of dimension four (meso) which is institutional delivery of the curriculum. Further competencies could be identified following curriculum implementation (micro) which is dimension three, according to Lee, et al (2013).

In South Africa the sequence of curriculum framework development is the responsibility of the examining body. This is compatible with dimension one in Lee, et al (2013). The second level of curriculum planning is at meso-level, meaning consideration of institutional policy regarding education that is in line with the Department of Health in South Africa. Chabeli (inaugural speech, p5) pointed out that the Department of Health is responsible for the training of nurses. The meso-level curricula at institutional level consider educational policy requirements. The detailed curricula (meso) ensures that learner placement in health care facilities of the Department of Health is addressed. In this study dimension two, according to Lee, et al (2013), is incorporated with dimension three and four to make one dimension (three). Dimension three is the end result of curriculum implementation where capabilities are realised. Therefore, in this study, only three dimensions suffice. Figure 8.5 presents the three dimensions for curriculum development in this study.

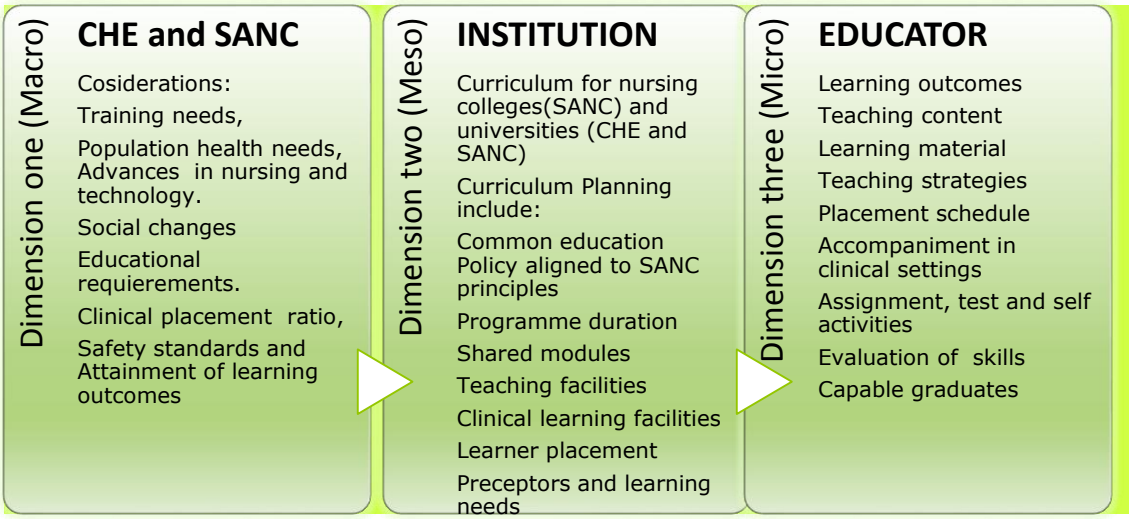

Figure 8.5 Three dimensions for curriculum development

Three dimensions were followed for a curriculum framework development in this study. Dimension two, end-product of curriculum implementation, was combined with dimension four to form dimension three.

8.7.1 Content for the framework

The content according to Uys and Gwele (2005:53) refers to and is not limited to competencies, ideas, concepts, principles and ethical considerations included for learning and the content is selected based on a topic. The content is organised according to that particular topic. The macro-curricula outline considers learning needs of students and population needs (Mellish and Brink 1996:232). In phase two of the current study, in addition to genetics competencies, the stakeholders approved 40 hours for genetics teaching.

8.7.2 Elements in the curriculum framework

A curriculum framework establishes what is worth learning as it offers a plan of comprehensive outcomes for programmes developed at national level by registering authorities (Bruce, et al 2011:166-167; Stabback 2007:6). Stabback (2007:6) indicates that, in a subject, "specific

objectives, outcomes, content, and appropriate assessment and teaching methodologies" are outlined through a curriculum framework. Stabback (2007:6) further states that a curriculum framework pronounces the learning background where a syllabus could be established as it permits flexibility and sets standards.

The curriculum framework in this study was developed and is composed of the following features: Competencies, outcomes, resources, teaching times and assessment.

8.7.2.1 Element one: competencies

Competencies are experiences shown in learners following an educational process (Uys and Gwele 2005:194) and programme competencies forms part of curriculum at macro-level (Uys and Gwele 2005:46). Programme competencies are planned during curriculum design as these are first planned (Uys and Gwele 2005:53). Learners are required to achieve critical competencies in any learning programme as expected by the South African Qualification Authority (SAQA) in South Africa. (Refer to appendix O for competencies).

8.7.2.2 Element two: outcomes

According to Uys and Gwele (2005:47-48) outcomes refer to performance supported by "knowledge, understanding, skill and attitude" on the part of a learner. The consequence of the above stated competence is effective practice. Learners in an advanced midwifery programme are expected to demonstrate genetics knowledge and apply such in clinical settings. The acquired knowledge assists in the maintenance of standards resulting in patient safety forming part of the curriculum framework in South Africa (Mellish and Brink 1996:232). Findings in this study revealed that graduates in the advanced midwifery programme exit with partial genetics

competencies. It is against this background that a competency-based (performance-based) curriculum framework that could standardise genetics education in an advanced midwifery programme was planned.

Dimension one, according to Lee, et al (2013:70) referred mostly to national matters, therefore genetics competencies in this study could be used nationally at any of the NEIs in South Africa. Findings for the current study revealed in phase one that genetics competencies are absent. The envisaged competency-based curriculum framework could assist NEIs in planning for genetics competencies.

8.7.2.3 Element three: Resources

Teaching and learning resources that need planning include videos, learning games, field trips etc. (Uys and Gwele 2005:72). The Policy Guidelines for genetics in South Africa, use of relevant text books and articles, accompaniment for experiential learning, knowledgeable educators and preceptors are some of the resources required for genetics education.

8.7.2 4 Element four: Teaching times and assessment

- **Teaching times**

During curriculum planning, teaching times and credits are allocated for each programme (Uys and Gwele 2005:70). The findings in this study revealed great variances regarding teaching times allocated for genetics education. The stakeholder workshop in phase two proposed that genetics education should be assigned 40 hours (four credits) (see Appendix O). The envisaged competency-based curriculum framework could provide guidance regarding time allocated for genetics teaching.

- **Assessment**

Bruce, et al (2011:304) stated that assessment infers that the teacher supports the learner throughout the learning experience. The purpose of assessment is to assist educators regarding learning that took place among learners. Various types of assessment tasks are available. In nursing and midwifery practice learners are assessed for knowledge, skills and competence in theory and practice. Assessment is conducted to measure the level of competence, knowledge and skills in the subject. Assessment is undertaken to check if learners have mastered the material or require remedial action in the subject. The envisaged competency-based curriculum framework is important to clearly define assessment criteria necessary for genetics education. The competency-based curriculum framework for genetics education in an advanced midwifery programme is presented in figure 8.6.

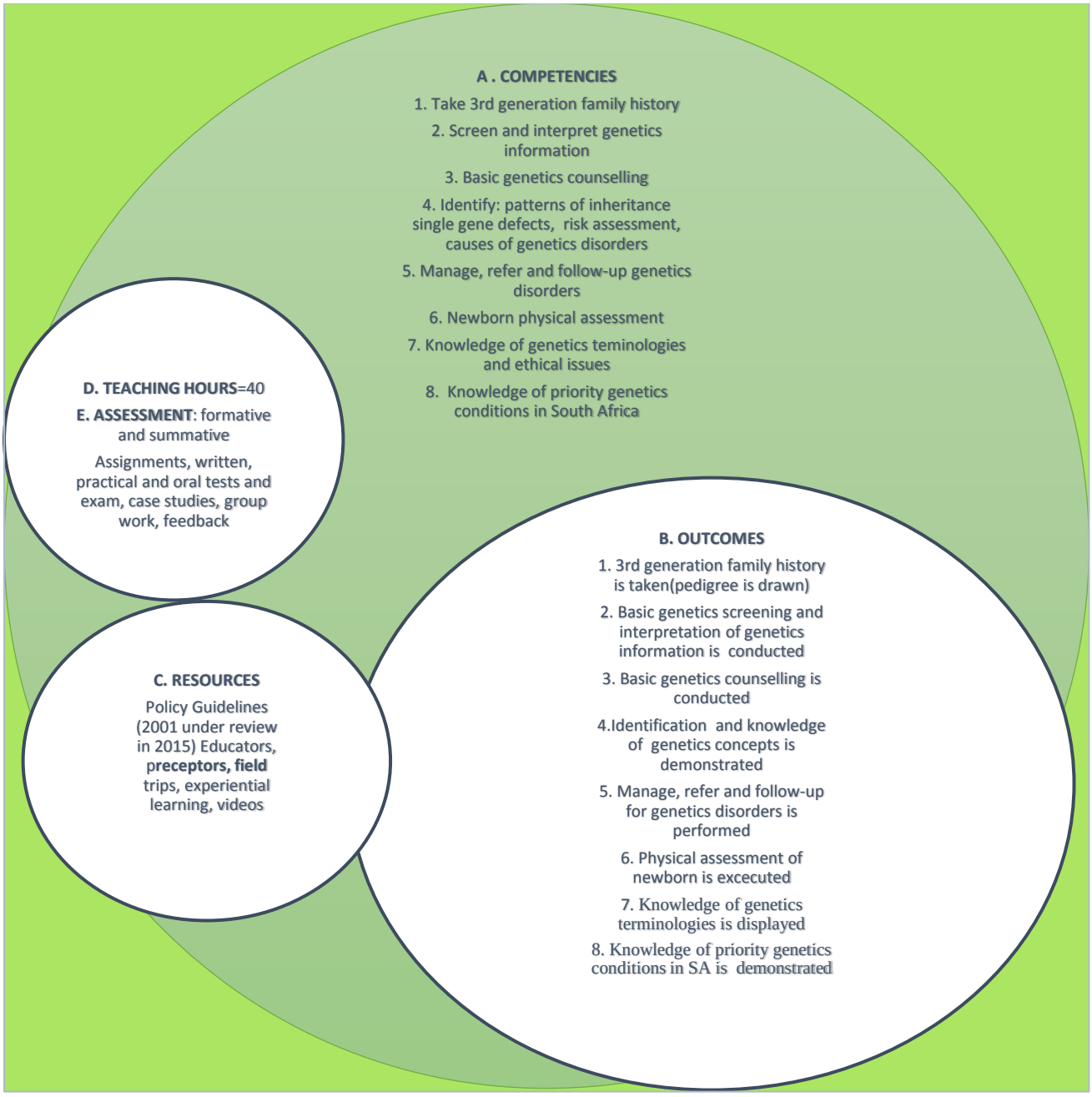

Figure 8.6 Competency-based curriculum framework

8.8 CONCLUSION

In Chapter eight, integrated results of phase one were presented. The process followed in phase two of addressing objective three and four was described. Genetics competencies for inclusion into the competency-based

curriculum framework were identified, meaning the objective was accomplished. Additionally, teaching hours were planned to be an integral component for genetics education. The theory underpinning the framework development was employed. Chapter nine presents conclusions, recommendations and limitations of the study.

CHAPTER 9: STRENGTHS, LIMITATIONS, RECOMMENDATIONS AND CONCLUSIONS

9.1 INTRODUCTION

The purpose of this study was to develop a competency-based curriculum framework to standardise genetics education in an advanced midwifery programme. The study was first planned in two phases to address three research objectives. Secondly, in order to address objective four of developing a curriculum framework, the process for framework development process according to Lee, et al (2013) were executed. Three stages (knowledge, persuasion and decision) according to Rogers' diffusion of innovations' theory were employed to guide the study.

The sample population of phase one included educators in advanced midwifery programmes from universities and nursing colleges in South Africa. Quantitative data was collected using survey and analysis was by means of quantitative analysis. Qualitative data were collected through focus group discussions, in-depth individual face-to-face and one-on-one telephone interviews. Thematic analysis, according to Braun and Clarke (2006) was employed to analyse data.

In this chapter, the strengths and limitations related to the research process are presented. Next, recommendations are also provided. Lastly, this chapter ends with conclusions regarding the journey that was undertaken to address research objectives of the study.

9.2 STRENGTHS OF THE STUDY

Conducting research promotes advancement in knowledge of a particular phenomenon. This research study focused on developing a competency-based curriculum framework to standardise genetics education in an advanced midwifery programme. A quantitative data collection instrument was developed which also add to the strength of this study. Numeric data collected through surveys were confirmed through narratives obtained in the qualitative data collection step (Creswell and Plano Clark 2011:15).

Validation of findings obtained in mixed methods designs was performed through presentation of phase one results in the stakeholder workshop (phase two). Various professionals, including those with adequate genetics knowledge and the study population formed part of the stakeholder workshop. Triangulation in this study was achieved through various data collection methods. Familiarisation with genetics information was enhanced through thematic analysis employed during qualitative data collection and analysis.

The main strength for this study was developing a competency-based curriculum framework that standardises genetics education in an advanced midwifery programme. Studies in the context of South Africa that examined genetics education in the advanced midwifery programme could not be found. This study also contributed to the body of literature regarding the number of hours (one to 55 hours) dedicated to genetics education (theory and practice) in NEIs in South Africa and elsewhere. Additionally few studies that indicated lack of competencies or investigation of competencies in nursing in South Africa could not assess the level of genetics knowledge among advanced midwifery educators except the current study.

Ehlers (2002:154) stated that core competencies in nursing programmes should be evaluated. The current study seems to be the first that evaluated genetics knowledge and evaluated the presence of genetics outcomes in the advanced midwifery programmes. It is in this study that educators as study population, acknowledges their genetics inadequacies. Like many other international research studies, it is confirmed also in this study that basic or undergraduate nursing curricula is too full to accommodate genetics education. The curriculum framework developed in this study could be applied in other nursing programmes in an endeavour to accommodate adequate genetics education as this framework could be the sole guide currently, particularly in South Africa.

9.3 LIMITATIONS OF THE STUDY

Providing information about study limitations could assists future research designs. Several limitations impacted on this study.

Firstly, vastness of the NEIs made it difficult to have more members in focus group discussion meetings as participants could not travel from one NEI to another. However, three focus group discussions with three members in two groups and five members in a group were held. This challenge was addressed through in-depth individual face-to-face and one-on-one telephone interviews. Secondly, the limited number of advanced midwifery educators in each NEI is a worrying factor as very few was found, particularly in universities.

The use of purposive sampling to select the sample with specific knowledge in the advanced midwifery programmes could have resulted in a biased population (Rees, 2011:208). This therefore calls for the findings to be related only to that particular population (Latham 2007:9).

The other limitation for this study was methodological in nature since a new questionnaire was used for data collection. Although the questionnaire was assessed by the biostatistician, experts in genetics in nursing could have been approached to evaluate content validity of the questionnaire (Creswell and Plano Clarke 2011:210). This step was not undertaken in the current study. In future studies, the questionnaire should be subjected to experts review in order to address content validity.

The other limitation was using the FUNDISA booklet to identify the sample from NEIs. The sample not listed in the FUNDISA booklet could have been omitted resulting in selection bias. To address this problem a list from the SANC was used to identify the population from the rest of the NEIs that taught the advanced midwifery programme to curb the problem of a too small sample. Forty (40) respondents agreed to take part in this study however eight (8) of those did not return the questionnaire and perhaps they could have provided a differing interpretation regarding current genetics education in advanced midwifery programmes. Those participants, who declined participation in the qualitative part, could have provided contrary opinions as their perceptions regarding a curriculum framework to standardise genetics education.

Accessibility to participants was a challenge due to long protocols that were followed to request permission. In other NEIs, particularly universities, gate keepers denied access to participants citing that the two were very busy.

9.4 SUMMARY OF THE RESULTS

9.4.1. Phase one results

The focus of phase one was to conduct a situational analysis in order to obtain current genetics education in an advanced midwifery programme.

Findings showed that genetics concepts varied and were superficially addressed during theory presentation in the advanced midwifery programmes. Teaching hours are greatly varied as these ranged between one to fifty-five (1 to 55) hours for both theory and practice. These variances regarding teaching periods existed in the same nursing schools indicating that genetics education is not well guided. Genetics learning outcomes are unplanned.

Assessment of genetics learning lacked quality assurance measures as little to no evaluation was identified. Learner placement for genetics is lacking as the field is randomly addressed in the advanced midwifery programmes. The sample attends no genetics workshops, making their genetics knowledge and skills to be poor. Evidence-based genetics care remains deprived. Genetics competencies are lacking (Godino and Skirton 2012:174) and graduates remain underprivileged with regard to genetics knowledge. Like in many other studies, the curricula in the advanced midwifery programmes are said to be too full to adequately accommodate genetics. Participants pleaded for a genetics capacity. Further, participants suggested a curriculum review in order to adequately accommodate genetics in the advanced midwifery programme.

Phase one findings support existing literature about low genetics education in nursing programmes (Little and Lewis 2005:246). Previous research has shown that genetics competencies are lacking (Godino and Skirton 2012:174).

9.4.2 Phase two results

The focus of phase two was to identify genetics competencies for inclusion in the competency-based curriculum framework that standardises genetics education. Based on identification genetics of competencies, develop a curriculum framework that could standardise genetics education

in an advanced midwifery programme. Underpinned by dimensions stipulated in Lee, et al (2013) the competency-based curriculum framework was developed and it is presented in chapter eight, figure 8.6.

Phase two findings also support existing literature about the fact that current nursing educations include no standardised competency-based curriculum for genetics to prepare nurses in advanced practice (Calzone, et al 2010:29). Literature shows that genetics education receives more attention internationally though, in developing countries, genetics information in the nursing discipline remains very low. This is based on limited literature related to developing countries where a systemic review found only one study in Africa and no study in South America regarding genetics competence among nurses (Skirton, et al 2012:2395).

9.5 RECOMMENDATIONS

Genetics is integrated into the MCWH cluster in South Africa (Policy Guidelines 2001:12). In essence genetics competencies should be found only in MCWH disregarding other nursing programmes. Examined literature shows one study that examined genetics knowledge was among diploma nursing students from few nursing colleges in one province of South Africa (Prows, et al 2005:98). This requires examination of genetics in all basic and other post-basic nursing programmes in the country because studies that have included nursing learners are lacking. Therefore genetics competencies in nursing programmes in South Africa are lacking, as indicated in Godino and Skirton (2012).

Currently, genetics knowledge among educators in basic and post-basic nursing programmes is unknown. Future research endeavours should consider data collection from educators in basic and other post-basic nursing programmes. Further, data collection in healthcare facilities such as hospitals and clinics among practicing nurses regarding the application

of genetics is required to advance a body of genetics knowledge in South Africa.

Additionally curriculum inclusion of genetics in other healthcare disciplines should be investigated because genetics forms part of all healthcare disciplines (Lashley 2007:73; Horner, Abel, Taylor and Sands 2004: 80). It is essential to conduct research in these other healthcare disciplines because genetics competencies in those disciplines are unknown. It may also prove valuable to examine genetics knowledge in healthcare departments such as comparing nursing versus medical students in order to enhance the development of the relevant body of knowledge in the genetics field.

Implementation of the competency-based curriculum framework to standardise genetics education in an advanced midwifery programme could be a starting point for NEIs in South Africa to recognise the importance of genetics in nursing. Facilitation of education that includes genetics could produce graduates with genetics competencies measured as outcomes at the end of the advanced midwifery programme. Healthcare services could improve as genetics-related matters are addressed in clinical and PHC settings. Healthcare consumers might be recognised earlier and referred to genetics services available in South Africa.

The 2001 Policy Guidelines require urgent revision as it is the only point of reference on genetics education in South Africa. Genetics information is advancing fast and healthcare professionals, including those in nursing, need to stay informed about advances in genetics knowledge.

9.6 CONCLUSION

The study was set out to develop a competency-based curriculum framework to standardise genetics education in the advanced midwifery programme. The basis for requiring a curriculum framework resulted from inadequate genetics education in advanced midwifery programmes consequently graduates exited the programme with unknown genetics knowledge at the end of training. Poor genetics knowledge among healthcare professionals let to inability to adequately provide genetics services in clinical and in PHC settings. Therefore, genetics conditions remain unaddressed even though most diseases have a genetic origin.

This study was conducted in two phases. Phase one followed a sequential explanatory mixed methods design that addressed the first and the second research questions. The first question was quantitative in nature seeking current genetics education by means of a situational analysis in the advanced midwifery programmes. The findings and results discussions are chapter specific. Chapter four presented the quantitative results while chapter five presented quantitative discussions. Genetics education is randomly addressed characterised by the unplanned genetics outcomes, differing teaching content, absent assessment criteria and varying teaching times aggravated by absent curriculum framework that standardises genetics education in the advanced midwifery programmes.

The second research question which was qualitative, sought the perceptions of similar sample regarding a competency-based curriculum framework that standardises genetics education. Quantitative strand was conducted first to generate numeric data which was confirmed by narratives obtained from qualitative strand. Findings are also chapter specific of which chapter six presented qualitative results while chapter seven presented the discussion of those results. Genetics education is

haphazardly offered in the advanced midwifery programmes as reported by the sample who further indicated that the current curricula are too full to accommodate genetics. Further, the sample attended no genetics education except accommodating the priority conditions such as HIV and AIDS which are seen to be paramount in almost all NEIs, disregarding that these also bring about genetic disorders in new-born babies. Lack of curriculum framework that standardises genetics education was blamed by participants as the contributory factor towards failure to accommodate genetics education in the advanced midwifery programmes. Mixed methods results were consolidated as phase one results.

Phase two addressed the third research question that pursued genetics competencies necessary for inclusion into the curriculum framework. A stakeholder workshop was organised at which phase one results were presented. During this process, the knowledge stage according to Rogers' diffusions of innovation theory was used as the stakeholders were introduced to the new information on genetics education in the advanced midwifery programmes. Further, two nominal group technique meetings were conducted for participants to reach consensus regarding genetics competencies. In these meetings, the persuasion stage of the theory mentioned earlier was accomplished through the use of experts in the nominal group technique meetings. In order to address the decision stage of the theory, each group presented their results and consensus on relevant competencies and teaching times was approved in the workshop. The implications of Rogers' diffusion of innovation theory assisted in identification of genetics competencies as some of the stakeholders also recognised their own limitations in regard to genetics knowledge.

Based on the identified genetics competencies, the process for developing the curriculum framework in order to address the last research question which was to develop a curriculum framework was commenced. This

process was underpinned through application of the four dimensions for framework development according to Lee, et al (2013) described in chapter eight of this report. The rest of the process followed to develop the curriculum framework is presented in chapter eight under item 8.7.

The study of developing a competency-based curriculum framework to standardise genetics education is the first that offered important insights into genetics in the advanced midwifery programme in South Africa. Urgent attention is demanded from NEIs for sufficient inclusion of genetics in their advanced midwifery programmes. Continuously placing genetics education on the side track is an injustice to healthcare consumers as genetics problems are unnoticed in clinical and in PHC settings resulting from uninformed healthcare providers.

Genetics education could empower learners in the advanced midwifery programmes to enable them to address genetics services with adequate knowledge, skills and competence required in clinical and in PHC settings. Genetics education is the cornerstone for the prevention of preventable genetic diseases among healthcare consumers. Thus, NEIs should ensure that the nursing curricula adequately address genetics education for learners to acquire competencies required in clinical and in PHC settings upon programme completion. The study achieved its aim of developing a competency-based curriculum framework to standardise genetics education in an advanced midwifery programme.

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Appendix A

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
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Information leaflet and informed Consent

Tittle: A competency-Based Curriculum Framework to Standardise Genetics Education for an Advanced Midwifery Programme

Dear Participant

1. Introduction

You are invited to participate in a research study and this information leaflet will help you decide regarding your participation. Before you agree to participate you should fully understand what the research entails. If you have any question that this leaflet does not explain, please do not hesitate to ask the interviewer, Mrs MR Phaladi-Digamela, or the supervisors, Prof FM Mulaudzi on 012 354 2125 or Prof T Maja on 072 5108 242.

2. The nature and purpose of the study

The aim of this study is to develop a competency-based curriculum framework to standardise genetic and genomic education for advanced midwifery. You are a very important source of information in this study.

3. Explanation of procedures to be followed

Phase one of this study comprises two steps that involve quantitative and qualitative data collection and analysis. A questionnaire is attached for quantitative data collection regarding current theoretical and practical genetic and genomic content and competencies (skills) attained at the end of training in the advanced midwifery programme.

4. Risk and Discomfort Involved

There is no risk in participating in this study and there is no experiment involved. The questionnaire may take 30 minutes to complete.

5. Possible Benefits

Although you will not benefit directly from the study, the results of the study may help with identification of common genetic and genomic concepts to be included in the micro/meso curriculum. In addition, specific competencies may be identified and learners may have common outcomes at the end of the advanced midwifery programme.

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 completion of the questionnaire. Your withdrawal from the study will not affect you in any way. It is your right to withdraw as and when it suits you.

7. Has the study received ethical approval?

This study has received written approval from the ethics committee of the faculty of Health Sciences at the University of Pretoria. A copy of the approval letter is available if you wish to have one. The contact person at the ethics committee of the University of Pretoria is Ms D Behari and she

can be contacted on 012 354 1677 or fax number 086 6516 047 or e-mail her at deepeka.behari@up.ac.za.

8. Information and contact persons

The contact person for this study is Mrs M.R. Phaladi-Digamela. If you have any questions about the study please contact her at 082 562 4357 or 012 354 1450 or rebecca.digamela@up.ac.za respectively. Your participation is voluntary and no compensation will be given for your participation.

9. Confidentiality

All information that you provide will be kept strictly confidential. Research reports and articles in scientific journals will not include any information that may identify you.

Participant's Name_____ (Print)

Participant's Signature: _____Date:_____

Researcher's Name: M.R. Phaladi-Digamela (Print)

Researcher's Signature_____Date:_____

Informed consent to participate in this study

I confirm that the person asking my consent to take part in this study has provided me with information indicating the nature, processes, risks, discomfort and benefits of the study. I have also received, read and understood the above written participation information leaflet 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 participation in 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: _____
Researcher's Name: M.R. Phaladi-Digamela____ (Please Print)
Researcher's Signature _____ Date: _____

APPENDIX B

BIOSTATISTICS UNIT
Private Bag X385, Pretoria, South Africa,
No. 1 Soutpansberg Road, Pretoria
Tel: 012 339 8519, Fax: 012 339 8582
URL://www.mrc.ac.za/

LETTER OF STATISTICAL SUPPORT

Date: 1/11/2012

This letter is to confirm that the student, **M.R. Phaladi-Digamela**, PhD degree student studying at University of Pretoria discussed the Project with the title "**A Competency-Based Curriculum Framework to Standardise Genetics Education for an Advanced Midwifery Programme"** 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.

DATA ANALYSIS

The aim of this study is to assess the level of knowledge of genetic and genomic content, teaching strategies, learning activities and competencies in advanced midwifery in South African Nursing Colleges and Universities. Furthermore, to evaluate the perceptions of advanced midwifery course educators regarding inclusion of competency based framework in the standardization of genetics and genomics curriculum. The first phase is a cross-sectional prospective study targeted at Nursing Colleges and Universities in Gauteng. In addition, other Nursing colleges and Universities in other provinces will be identified through systemic sampling for participation in the study. Data will be collected using semi-structured questionnaire and captured using Excel. Descriptive analysis of data presenting summary statistics, use of chi-square tests (contingency table analysis) to assess level of association between factors and use of non-parametric methods (Mann-Whitney and Kruskal-Wallis methods) as may be determined by the biostatistician. STATA 12.1 will be the package of choice.

SAMPLE SIZE

The researcher will generate the data using all willing respondents in colleges and university departments offering advanced midwifery in Gauteng province and other colleges and universities from other four provinces in South Africa.

Name Dr SAS Olorunju

Biostatistics Unit

MRC Pretoria

Signature

Tel: 0123398553

Date 1/11/2012.

APPENDIX C

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi

QUESTIONNAIRE: COMPLETED BY NURSE EDUCATORS OF ADVANCED MIDWIFERY

A Competency-Based Curriculum Framework to Standardise Genetics Education for an Advanced Midwifery Programme

General Information:

1. Please encircle or mark the applicable answer
2. Where indicated give brief description
3. The word nurse educator refers to educator of advanced midwifery

Thank you for your willingness to complete this questionnaire.

Questionnaire No----------

Date: (Official use)		Respondent Number:	
A Biographical Information			Official use
Q1	Age	……..years	Q1
Q2	Gender	Female 1	Q2
		Male 2	
		Other 2	
Q3	Highest qualification	Diploma & specialisation 1	Q3

		B degree 2		
		B degree & specialisation 3		
		Master's degree 4		
		Doctoral degree 5		
Q4	Years of experience as an advanced midwife.	----------Years		Q4
Q5	Number of years involved in facilitating advanced midwifery programme.	…… Years		Q5
Q6	Type of institution you are employed.	College	1	Q6
		University	2	
B Questions about genetics education				Official use
Q7	Is genetics part of advanced midwifery curriculum in your institution?		Yes No	Q7
Q8	At what component is genetics included?	Antenatal		Q8
		Intra-partum		
		Post-natal		
		Neonatal		
Q9	How many hours are dedicated to theory of genetics teaching per week?	……Hours/week		Q9
Q10	What genetics concepts are included in your		Yes	No Q10
		10.1 Preconception		

	study guide?			care	
			10.2	Generation of family history	
			10.3	Referral for genetics evaluation or counselling	
			10.4	Interpretation of genetic results	
			10.5	Identification of common heritable disease(s)	
			10.6	Relationship between race, ethnicity	
			10.7	Recognition of genetics problems	
			10.8	Consanguineous marriages or relationships	
			10.9	Other Specify	

Q11	Which strategy/ies are mostly used for teaching genetics in your institution?		Yes	No
		Case study		
		Group discussion		
		Other Specify		

Q12	List expected outcomes related to genetics in the meso curriculum of advanced midwifery of	**1**	**Q12**
		2	
		3	

	your institution**.**				
Q13.	What are the specific genetics outcomes related to care delivery achieved at the end of advanced midwifery programme?	**Care delivery knowledge Outcomes**. E.G.	Yes	No	Q13
		13.1 Basic human genetics technology			
		13.2 Basic patterns of inheritance			
		13.3 Recognition of the role of family history in assessing predisposition to disease			
		13.4 The role of genetics factor in maintaining health and preventing diseases			
Q14	What are the specific genetics outcomes related to professional and ethical practice achieved at the end of advanced midwifery programme?	**Professional and ethical practice Outcome E.G.**	Yes	No	Q14
		14.1 Recognition of clients' cultural and ethnicity perspective may influence ability to use genetics services			
		14.2 Description of social and psychosocial implications of accessing information and genetics services			
		14.3 Recognises the particular needs of those unable to give informed consent in relation to accessing and using genetic information			
		14.4 Recognition of the sensitivity of genetic information in particular the associated ethical, legal and social issues			
Q15	What are the specific genetics outcomes in relation to personal and professional development outcome achieved at the end of advanced midwifery programme?	**Personal and professional development Outcome**	Yes	No	Q15
		15.1 Recognition of the scope of practice as an advanced midwife and acknowledge the limitations in own abilities in relation to genetics			

		15.2	Recognition of the role of speciality in genetics services in providing appropriate patient/ client care			

Q16	**How are genetics outcomes assessed in your institution?**	**16.1**	**Written Test/Examination**	**Yes**	**No**	**Q16**
		16.2	Oral presentation			
		16.3	Problem solving			
		16.4	Other Specify			
Q17	Are genetics learning experiences included in your micro curriculum of advanced midwifery programme?	17.1		Yes	No	Q17
		17.2	If yes Specify……			
Q18	What genetics component is entailed in your institution?	18.1	E.G. Assessment of new-born for genetics problems	Yes	No	Q18
		18.2	Other, Specify			
Q19.	Which setting is used for provision of experiential learning in genetics?	19.1	Hospital	Yes	No	Q19
		19.2	Clinic			
		19.3	Other Specify …… …….			
Q20	Specify hours per week dedicated for genetic clinical practice during advanced midwifery training.	Hours/week				Q20

Q21	**Who mostly provide accompaniment for genetics in clinical settings?**					**Q21**
Q22	At the end of training in advanced midwifery are genetics competencies achieved?			Yes	No	Q22
Q23	Do you demonstrate to leaners about screening for genetics problems?			Yes	No	Q23
Q24	Are learners able to diagnose genetics problem?			Yes	No	Q24
Q25	Which clinical component entails screening and diagnosis for genetics problems?	25.1	Antenatal care	Yes	No	Q25
		25.2	Intra-partum care			
		25.3	Post-natal care			
		25.4	Neonatal care			
		25.5	6 weeks post-natal			
Q26	Which genetic competence domains are followed during clinical exposure?	26.1	Care delivery	Yes	No	Q26
		26.2	Professional and ethical practice			
		26.3	Personal and professional development			
		26.4	Other Specify			
Q27	Which material do you use to prepare genetics lessons?					Q27

Q28	Do you take part in genetics workshops?	Yes No	Q28
		Specify	
Q29	Itemise reasons for not learning about genetics	1.	Q29
		2.	

Q30	Give suggestions to assist in enhancing genetic education in the advanced midwifery programme	3.	
		1.	Q30
		2.	
		4.	

APPENDIX D

A Competency-Based Curriculum Framework to Standardise Genetics Education for an Advanced Midwifery Programme

INTERVIEW GUIDE

Describe common genetics concepts or topics included in your facilitation of an advanced midwifery programme.

Describe the number of hours dedicated for teaching of genetics in the advanced midwifery programme.

Indicate genetics learning outcomes/skills/competencies attained at the end of an advanced midwifery programme.

Explain if workshops or campaigns for genetics are attended

Explain the strategies employed for genetics teaching

Explain the formative or summative assessment methods applicable for genetics evaluation

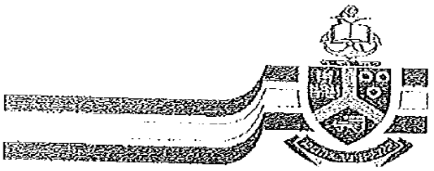
Explain the reasons for not learning about genetics

Describe the suggestions you have for genetics education in an advanced midwifery programme

APPENDIX E

2012-03-12

Faculty Ethics Committee
Faculty of Health Sciences
University of Pretoria



University of Pretoria

PO Box 677 Pretoria 0001
Republic of South Africa
http://www.up.ac.za
Tel: (012) 354 1980
Fax: (012) 354 1682

Office of the Chairperson
School of Health Care Sciences
Faculty of Health Sciences

To whom it may concern,

Evaluation of protocol for the following student:
Student MR Phaladi-Digamela (PhD Nursing)

Title:" A competency-based curriculum framework to standardise genetic and genomic education for advanced midwifery."

This letter serves to confirm that the abovementioned protocol served on the School of Health Care Sciences: Postgraduate and Research Committee of 07 November 2012 where it was approved and referred to the School Academic Advisory Committee for final discussion.

Sincerely yours,

Professor AJ van Rooijen
Chairperson: School Research and Postgraduate Committee

APPENDIX F

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
YUNIBESITHI YA PRETORIA

Faculty of Health Sciences Research Ethics Committe

7/03/201

Approval Notice
New Application

Ethics Reference No.: 38/2013

Title: A Competency-based Curriculum Framework to Standardise Genetic and Genomic Education for Advanced Midwifery

Dear Mauwane Rebecca Phaladi-Digamela

The New Application for your research received on the 20/02/2013, was approved by the Faculty of Health Sciences Research Ethics Committee on the 27/02/2013

Please note the following about your ethics approval:
- Ethics Approval is valid for 1 year, till the end of February 2014.
- Please remember to use your protocol number (38/2013) on any documents or correspondence with the Research Ethics Committee regarding your research.
- Please note that the Research Ethics Committee may ask further questions, seek additional information, require further modification, or monitor the conduct of your research.

Ethics approval is subject to the following:
Standard Conditions:
- The ethics approval is conditional on the receipt of 6 monthly written Progress Reports, and
- The ethics approval is conditional on the research being conducted as stipulated by the details of all documents submitted to the Committee. In the event that a further 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.

The Faculty of Health Sciences Research Ethics Committee complies with the SA National Act 61 of 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 and 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

We wish you the best with your research.

Yours sincerely

Dr B Sommers; MBChB; MMed (Int); MPharMed.
Deputy Chairperson of the Faculty of Health Sciences Research Ethics Committee, University of Pretoria

♦ Tel:012-3541330 ♦ Fax:012-3541367 Fax2Email: 0866515924 ♦ E-Mail: mando@med.up.ac.za
♦ Web: //www.healthethics-up.co.za ♦ H W Snyman Bld (South) Level 2-34 ♦ Private Bag x 323, Arcadia, Pta, S.A., 0007

APPENDIX G

CONDITIONS OF APPROVAL OF A RESEARCH STUDY PROPOSAL

GAUTENG PROVINCE
REPUBLIC OF SOUTH AFRICA

POLICY, PLANNING AND RESEARCH (PPR)
Enquiries: Dr B Ikalafeng
Tel: +2711 355 3500
Fax: +2711 355 3675 Email:bridget.ikalafeng@gauteng.gov.za

CONTACT DETAILS OF THE RESEARCHER	
Date	18 March 2013
Contact number	Tel: 082 562 4357
Email	rebecca.digamela@up.ac.za
Researcher /Principal investigator (PI)	M. R. Phaladi-Digamela
Supervisor	
Institution	University of Pretoria
Research title	A competency-based curriculum framework to standardize Genetic and Genomic education for advanced midwifery

This approval is granted only for a research proposal submitted to GDH by M R Phaladi Digamela"A competency-based curriculum framework to standardize Genetic and Genomic education for advanced midwifery"

Approval is hereby granted by the Gauteng Department of Health for the above mentioned research study proposal for a study to be conducted within GDH domain. Approval is limited to compliance with the following terms and conditions:

1. All principles and South African regulations pertaining to ethics of research are observed and adhered to by all involved in the research project. Ethics approval is only acceptable if it has been provided by a South African research ethics committee which is accredited by the National Health Research Ethics Council (NHREC) of South Africa; this is regardless of whether ethics approval has been granted elsewhere.

   Of key importance for all researchers is that they abide by of all research ethics principles and practice relating to human subjects as contained in the Declaration of Helsinki (1964, amended in 1983) and the constitution of the Republic of South Africa in its entirety. Declaration of Helsinki upholds the following principles when conducting research, respect for:

   - Human dignity;
   - Autonomy;
   - Informed consent;
   - Vulnerable persons;
   - Confidentiality;
   - Lack of harm;
   - Maximum benefit;
   - and justice

2. The GDH is indemnified from any form of liability arising from or as a consequence of the process or outcomes of any research approved by HOD and conducted within the GDH domain;
3. Researchers commit to providing the GDH with periodic progress and a final report; short term projects are expected to submit progress reports on a more frequent basis and all reports must be submitted to the Director: Policy, Planning and Research of the GDH;
4. The Principal Investigator shall promptly inform the above mentioned office of changes of contact details or physical address of the researching individual, organisation or team;
5. The Principal Investigator shall inform the above office and make arrangements to discuss their findings with GDH prior to dissemination;
6. The Principal Investigator shall promptly inform the above mentioned office of any adverse situation which may be a health hazard to any of the participants;
7. The Principal Investigator shall request in writing authorization by the HOD via PPR for any intended changes of any form to the original and approved research proposal;
8. If for any reason the research is discontinued, the Principal Investigator must inform the above mentioned office of the reasons for such discontinuation;
9. A formal research report upon completion should be submitted to the Director: Policy, Planning and Research of the GDH with recommendations and implications for GDH, the Directorate will make this report available for the HOD.

This approval is granted only for a research proposal submitted to GDH by M R Phaladi-Digamela"A competency-based curriculum framework to standardize Genetic and Genomic education for advanced midwifery "

AGREEMENT BETWEEN THE GAUTENG DEPARTMENT OF HEALTH (GDH) AND THE RESEARCHER

Sue le Roux
Director: Policy Planning & Research

Date: 18/03/2013

Signature:

Name and surname of Principal Researcher

Research/Academic Institution

Date:

Signature:

This approval is granted only for a research proposal submitted to GDH by M R Phaladi Digamela"A competency-based curriculum framework to standardize Genetic and Genomic education for advanced midwifery"

APPENDIX H

GAUTENG PROVINCE

REPUBLIC OF SOUTH AFRICA

Ga-Rankuwa Nursing College
Private Bag X 830
PRETORIA
0001
29 JULY 2013

Enquires: Mrs NA Maringa
☎ (012) 5600448ext 119
Fax: 012 560 0459

Attention: Mrs MR Phaladi- Digamela

Dear Madam

RE: REQUEST TO CONDUCT STUDY AT THE COLLEGE

TITLE: "A COMPETENCY –BASED CURRICULUM FRAMEWORK TO STANDARDISE GENETIC AND GENOMIC EDUCATION FOR ADVANCED MIDWIFERY."

Receipt of your letter dated 23 July 2013 is acknowledged.

Permission is hereby granted for you to conduct the study as according to the approval by the University of Pretoria Faculty of Health Sciences Research Ethics Committee and Gauteng Department of Health (Policy, Planning and Research Directorate).

The permission is granted subject to the following:-

- That the college incurs no costs in the course of your study.
- That you make prior arrangement with the relevant nurse educator's in a manner that will not interrupt/ compromise the daily provision of service.

Yours Sincerely

DEPUTY DIRECTOR
2013/07/29

.....
DATE

APPENDIX I

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management sub-component
10 – 103 Natalia Building, 330 Langalibalele Street
Private Bag x9051
Pietermaritzburg
3200
Tel.: 033 – 3953189
Fax.: 033 – 394 3782
Email.: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference : HRKM 229/13
Enquiries : Mr X Xaba
Tel : 033 – 395 2805

Dear Ms M. R. Phaladi-Digamela

Subject: Approval of a Research Proposal

1. The research proposal titled 'A competency based curriculum framework to standardise genetic and genomic education for advanced midwifery' was reviewed by the KwaZulu-Natal Department of Health.

   The proposal is hereby approved for research to be undertaken at King Edward VIII campus of the KZN College of Nursing.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200 and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

Dr E Lutge
Chairperson, Health Research Committee
Date: 02/09/2013.

APPENDIX J

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KWAZULU- NATAL COLLEGE OF NURSING
P/Bag X9089, Pietermaritzburg, 3200
Tel.: (033) 264 7800, Fax: (033) 394 7238
e-mail: joan.makhathini@kznhealth.gov.za
www.kznhealth.gov.za

Enquiries: Mrs. S. Maharaj
Telephone: 033 – 264 7806
Date: 22 August 2013

Principal Investigator:
Mauwane Rebecca Phaladi-Digamela
C/O UNIVERSITY OF PRETORIA

Dear Madam

RE: PERMISSION TO CONDUCT RESEARCH AT THE KZN COLLEGE OF NURSING

TITLE: A COMPETENCY-BASED CURRICULUM FRAMEWORK TO STANDARDISE GENETIC AND GENOMIC EDUCATION FOR ADVANCED MIDWIFERY

I have the pleasure in informing you that permission has been granted to you as per the above request by the Acting Principal of the KZN College of Nursing

Data Collection sites:

Campus
King Edward V111 Campus

Please note the following:

1.1 Please ensure that you adhere to all policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
1.2 This Research will only commence once this office has received confirmation of approval from the Provincial Health Research Committee in the KZN Department of Health.
1.3 Please ensure this office is informed before you commence your research.
1.3.1 Permission is therefore granted for you to conduct this research at all the KZN College of Nursing Campuses
1.4 The KwaZulu-Natal College and its NEI's will not provide any resources for this research.
1.5 You will be expected to provide feedback on your findings to the Principal of the KwaZulu-Natal College of Nursing.

Thanking You

Ms JT Makhathini
Acting Principal: KwaZulu-Natal College of Nursing

uMnyango Wezempilo. Departement van Gesondheid
Fighting Diseases, Fighting Poverty, Giving Hope.

APPENDIX K

health
Department of
Health
North West Province
REPUBLIC OF SOUTH AFRICA

2nd Floor Tirelo Building
Cr. Albert Luthuli Drive
Mafikeng, 2745
Private Bag X2068
MMABATHO, 2735

Tel: (018) 387 1786
Fax: 018 392 6710
kshoqwe@nwpg.gov.za
www.nwhealth.gov.za

POLICY, PLANNING, RESEARCH, MONITORING AND EVALUATION

To : Ms R.P Digamela

From : Policy, Planning, Research, Monitoring & Evaluation

Subject : Approval Letter- A competency based curriculum framework to standardize genetic and genomic education for advanced midwifery

Purpose

To inform the researcher that permission to undertake the above mentioned study has been granted by the North West Department of Health. The researcher is expected to arrange in advance with the chosen districts or facilities, and issue this letter as prove that permission has been granted by the provincial office.

Upon completion, the department expects to receive a final research report from the researcher.

Kindest regards

Acting Director: PPRM&E
Mr. L Moaisi

28/10/2013
Date

DEPARTMENT OF HEALTH
PRIVATE BAG X2068
SUPERINTENDENT GENERAL

Healthy Living for All

APPENDIX L

health
Department of
Health
North West Province
REPUBLIC OF SOUTH AFRICA

Mmabatho College of Nursing
Dr. Albert Luthuli Drive
MMABATHO Unit 2, 2735

Private Bag X2178
Mafikeng, 2745

Tel: (018) 384 1123
Fax: (018) 3841257
Mamotale@nwpg.gov.za

MMABATHO COLLEGE OF NURSING

15 October 2013

To : Ms R. Phaladi – Digamela

From: Mrs M.G. Montshioa
Mmabatho College of Nursing

Subject: Approval for Data Collection

Your letter dated 05 August 2013 has reference.

The purpose of this communiqué is to inform you that permission to interact with Midwifery and Neonatal Nursing (Advanced Midwifery) lecturers for your research has been granted. However, you are requested to attach approval letter from the North West Department of Health.

There are currently two lecturers that can participate in your study as they meet the inclusion criteria.

All the best with your study in generating knowledge.

Regards.

Signed

Mrs M.G. Montshioa
Campus Head

APPENDIX M

UNIVERSITY OF JOHANNESBURG

FACULTY OF HEALTH SCIENCES

ACADEMIC ETHICS COMMITTEE

26 July 2013

Dear Ms MR Phaladi-Digamela

REQUEST TO CONDUCT RESEARCH

At the AEC Meeting which was held on **25 July 2013** the following research proposal was presented for the student.

A competency-based curriculum framework to standardise genetic and genomic education for advanced midwifery course

Ms MR Phaladi-Digamela research was approved by the Academic Ethics Committee pending approval from Head: Institutional Planning Unit: Prof Neels Fourie (nfourie@uj.ac.za)

Yours sincerely,

Prof H Abrahamse

Academic Ethics Committee: Faculty of Health Sciences

APPENDIX N

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

28 October 2013

Dear Ms Digamela

The purpose of this letter is to grant you, as a post graduate student at the University of Pretoria permission to conduct your research which includes interviewing of the Advanced Midwifery staff members at University of KwaZulu- Natal, School of Nursing and Public Health (Nursing Discipline). Our understanding is that the reviewed study protocol for the project titled, **A competency –based curriculum framework to standardise Genetic and Genomic Education for Advance Midwifery** included:

- A description of the research activities to be done at the site for which you seek permission.
- Purpose of study.
- Description of and number of subjects or participants to be included.
- The duration of the study

A copy of this permission letter has been forwarded to the relevant Advanced Midwifery staff in the Nursing Discipline.

While we respect the independence of your research findings, this permission is granted with the understanding that:

1. The researcher will respect the confidentiality of the participants and the organization.
2. Participants reserve the right to voluntary participation
3. The research is only conducted as part of your studies towards a Post Graduate Degree/Diploma

We wish you all the best with your studies

Yours Sincerely

Professor Gugu Mchunu
Head of Discipline: Nursing

School of Nursing and Public Health
Howard College Campus
Postal Address: Private Bag X54001, Durban, 4000, South Africa
Telephone: +27 (0)31 260 2499 **Facsimile:** +27 (0)31 260 1543 **Website:** www.ukzn.ac.za
ling Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

INSPIRING GREATNESS

APPENDIX O

A. Genetics competencies identified in the stakeholder workshop

1. History taking up to the 3rd generation and drawing the pedigree,
2. Screening, diagnosis and interpretation of genetics problems,
3. Basic genetics counselling including bereavement
4. Identify:
    - Patterns of inheritance
    - Single gene defects
    - Risk assessment
    - Causes of genetic disorders
5. Manage, refer and follow-up genetics conditions
6. Physical assessment of new-born
7. Knowledge of genetics terminologies and ethical issues
8. Knowledge of priority genetics conditions in South Africa.

B. Teaching hours

Forty (40 hours and 4credits). performed