



**UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA**

**THE FORMULATION OF GUIDELINES FOR AN OCCUPATIONAL HEALTH AND SAFETY
PROGRAMME TO ADDRESS WOMEN'S HEALTH CONCERNS OF MINeworkERS AT A
SELECTED COALMINE IN MPUMALANGA, SOUTH AFRICA**

Princess Nelisiwe Msibi

Submitted in fulfilment of the requirements for the degree

Philosophiae Doctor in Nursing Science

in the

Faculty of Health Sciences

at the

University of Pretoria

OCTOBER 2017



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Promoter: Dr RS Mogale

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DECLARATION

Student number: _____

I, Princess Nelisiwe Msibi declare that the thesis:

“THE FORMULATION OF GUIDELINES FOR AN OCCUPATIONAL HEALTH AND SAFETY PROGRAMME TO ADDRESS WOMEN’S HEALTH CONCERNS OF MINEWORKERS AT A SELECTED COALMINE IN MPUMALANGA, SOUTH AFRICA”

is my original work. It has not been submitted at any other institution before for any degree or examination. All the sources used and quoted were acknowledged by means of complete references in the text and bibliography.

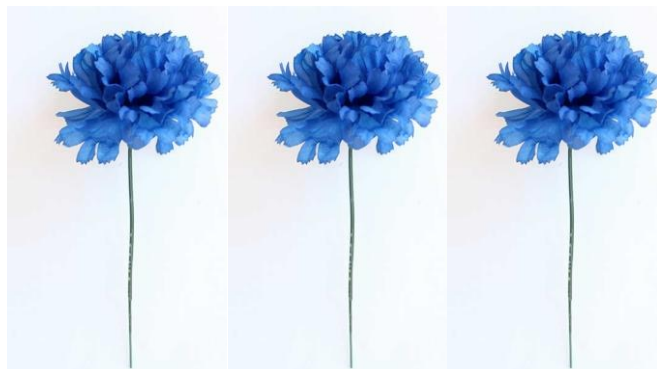
Princess Nelisiwe Msibi

Date

DEDICATION

I dedicate my dissertation to the women working in the mines. As an occupational health nurse and a researcher, I continue to learn about the struggles that women continue to fight against inequality in the mining industry. You risk your lives and experience the challenges inherent in working in dangerous environments to provide for your families. I salute you for the unrelenting commitment in the struggle and fight against mining-related hazards and diseases, as you work to eliminate poverty and discrimination. Against all odds, you were defiant. *Aluta Contunua!* May you continue to persevere and voice your concerns to protect your health and safety.

I also dedicate this work to the women in my family, past and present. A memorable gratitude goes to my late grandmother, Elinah Mchunu. She was very supportive in my upbringing and never stopped believing that one day I will acquire this university qualification. Unfortunately, she never witnessed even my first graduation ceremony. To you *na Malinga*, when I look back and think of your sacrifices and the support you gave me, I say thank you to you *Mcusi, Hlanguza, Mdladla!* To my mom, u ma Mchunu, your encouragement and honest prayers for me speak volumes, *Ndabezitha*. Allow me to say, “*You are indeed Imbokodo!*” You have walked this path with me from day one.



ACKNOWLEDGEMENTS

I wish to thank the following people for their support to my dissertation:

My sincere appreciation goes to the Democratic Nursing Organisation of South Africa. Without your financial support since 2015, this thesis would never have materialised.

I am most grateful to my dissertation supervisory team at the University of Pretoria. It would not have been possible to complete this thesis without the guidance and support of my supervisor, Dr Ramadimetja Shirley Mogale. She has been supportive and excited about my research from day one. When this PhD journey was tough and the road was bumpy while I was still conceptualizing this work, and could hardly fully articulate its complexities, she was my inner voice. I continued to hear her voice of encouragement saying: "Don't stress, take one step at a time; in time, it all shall be well!" If it was not for her, I would not be where I am today. Thank you so much, Dr Rama.

To my co-supervisor, Dr Maretha de Waal, thank you for the academic critique, support and encouragement for so many years. You never lost hope and trust; you still continue to support and believe in me. In simple words, I am full of gratitude; I acknowledge and thank you! To Prof. Fhumulani Mavis Mulaudzi, thank you for your continuous leadership, guidance and support. Thank you to Dr Ronell Leach for your guidance in the initial stage of the project.

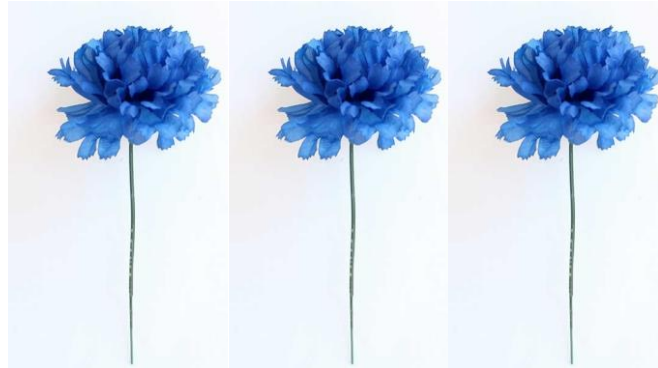
To the student support service team, I am grateful to all of you. I would also like to thank the Medical Library personnel: Mr Sagren Naidoo, the Senior Information Specialist Health Sciences, and Mr Richard Mbokane, the Interlibrary Loan Specialist, for helping me to perfect my library search skills, Thank you for your support and assistance. A special thank you also goes to Nomathemba Ngcobo, the Instructional Designer, and to Johan Slabbert, the System Administrator, for givin me your time and everything you did as you assisted with the online system. A special word of thanks to Mmatlhapi Mhlakaza, the UP Senior graphic designer, for her professional work.

To the research participants, a special thank you to all the women mineworkers at the coalmine who shared their work and life experiences with me. Another special appreciation and acknowledgement goes to the professional nurses and the coalmine, as well as the mine management. Thank you for sharing your knowledge and experience of the coalmine industry.

Additionally, I acknowledge the involvement of the experts who participated on the online platform, thank you for your immense and knowledgeable contribution. Without your ideas, I would not have been able to refine the guidelines that we needed to complete and conclude this thesis.

I thank my family for their unwavering support. I owe sincere thankfulness to my parents, Annah and Petrus Mtshali, for your unlimited support and encouragement. You are my pillars of strength. You have walked this path with me from day one and I am grateful for having had such reliable and always encouraging parents. To my sister, Delisile Maboea, and my brother, Thabo Mtshali, thank you for your support and confidence you gave me during this journey. I would not have coped with the studies and looking after our three children, if it was not for my beloved husband, Nico Msibi. Your unwavering support, love and patience during this PhD journey was extremely delightful. To my son, Thubelihle, and daughters, Nontobeko and Nomakhwezi, I thank you for your understanding and patience when your mother was concentrating on her studies, instead of assisting you with your own studies. You were truly amazing and tolerant children.

Finally, thank you to God my provider, who made all this possible. His love and grace lifted me up again!



ABSTRACT

The inclusion of women in mining and the growing number of women working underground in South Africa are by no means indicative of a woman-friendly and gender equal work environment. The impact of the hazardous underground mining environment on women's health has been well documented. However, occupational health and safety legislation and regulations do not specifically address women's health concerns, and guidelines to address and incorporate women's health concerns into their onsite Occupational Health Services (OHS) do not exist. Consequently, women's health concerns are often considered to be non-work related and are therefore excluded from the services offered by onsite OHS centres.

Thus, this study aimed to: 1) explore and describe women's health concerns of underground coalmine workers, and 2) formulate guidelines to address women mineworkers' health concerns in the mine's OHS programme. A case study research design was followed. The study was conducted in two phases. In the first phase, the researcher explored the women's health concerns of mineworkers, the perceptions of the professional nurses working at the OHS centre on women's health at a selected mine, and the mine managers' expectations regarding the implementation of the guidelines to address women's health concerns. Primary data was collected by means of semi-structured interviews. Data analysis led to the development of a set of initial statements that were further developed as guidelines in phase 2 of the study.

In the second phase of the study, the researcher used an E-Delphi technique and an online platform with support from University of Pretoria's Learning and Management system. The online platform was used to facilitate discussions among a sample of occupational health and safety experts on the draft guidelines. The E-Delphi process was implemented in four stages: preparatory, exploratory, consensus and verification phases.

Eight guidelines were formulated to respond to the women's health concerns at the coalmine. The guidelines related to the following aspects: 1) enabling a supportive organisational environment wherein women mineworkers can function to their full potential; 2) effective measures for controlling hazardous environments that could affect women mineworkers; 3) a 'fit for work and fit for life' work environment for women underground coalmine workers; 4) supportive structures that facilitate a conducive environment in which women underground coalmine workers can express

their health concerns; 5) processes that uphold women underground mineworkers' human dignity and adhere to the human rights framework for non-discrimination against women; 6) procedures needed to adhere to safety procedures in reporting accidents and injuries; 7) measures to enhance accessibility, availability and relevant on-site health care services to promote women mineworkers' health and wellbeing, and 8) methods to capture the needs, inspiration of hope and resilience of women underground coalmine workers.

Substantial effort is needed to improve the safety of and quality of healthcare for women mineworkers. Implementing the guidelines could advance attainment of this goal, both for women and men at the selected coalmine. When women's human rights are upheld, women and men benefit, together with positive outcomes for productivity.

Key words: AGREE II tool, E-Delphi, guidelines, coalmine worker, women's health concerns

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LIST OF ABBREVIATIONS AND ACRONYMS

AGREE - Appraisal of Guidelines for Research & Evaluation

AIDS - Acquired Immunodeficiency Syndrome

BCEA - Basic Conditions of Employment Act

BDPA - Beijing Declaration and Platform for Action

BMC - Biomedical construction

CEDAW - Convention on the Elimination of Discrimination against Women

CI - Critical issues

COIDA - Compensation for Occupational Injuries and Diseases Act

COP - Code of Practice

CR - Critical Realism

DME - Department of Minerals and Energy

DMR - Department of Minerals and Resources

DPM - Diesel Particulate Matter

EC - European Commission

EEA - Employment Equity Act

ENT- Ear, nose and throat

ER - Emergency Response

EU - European Union

ES - Emergency Services

EST - Ecological systems theory

HBA - Haemoglobin A

HBS - Hazardous Biological Substance

HCP - Hearing Conservation Programmes

HCS - Hazardous Chemical Substance

HIV - Human Immunodeficiency Virus

HOD - Head of Department

HPD - Hearing protection devices

HR - Human Resources

HSEC - Health, Safety, Environment and Community

HSECQ - Health, Safety, Environment, Community and Quality

IFC - International Finance Corporation

ILO - International Labour Organisation

IMT - Incident Management Team

IOD - Injuries on duty

LRA - Labour Relations Act

MBOD - Medical Bureau for Occupational Diseases

MHSA - Mine Health and Safety Act

MHSC - Mine Health and Safety Council

MoH - Minister of Health

MOSH - Mine Occupational Safety and Health

MPRDA - Mineral and Petroleum Resources Development Act

MSD - Musculoskeletal disorder

MSDS - Material Safety Data Sheet

NCSBN - National Council of State Boards of Nursing

NGT - Nominal Group Technique

NIHL - Noise-induced hearing loss

NUM - National Union of Mineworkers

ODMWA - Occupational Diseases in Mines and Works Act

OHC - Occupational health care

OH - Occupational Hygienist

OHP - Occupational Health Practitioner

OHS - Occupational health and safety

OHSA - Occupational Health and Safety Act
OHSC - Occupational Health and Safety Centre
OMP - Occupational Medical Practitioner
PHC - Primary health care
PPE - Personal protective equipment
PN - Professional nurse
PTSD - Post-traumatic stress disorder
RRI - Responsible Research and Innovation
SA – South Africa
SADC - Southern African Development Community
SANS - South African National Standard
SEM - Socio-Ecological Model
SOP - Standard Operating Procedure
TB - Tuberculosis
UN - United Nations
VDU - Video display units
WIM - Women in Mining
WHO - World Health Organisation

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION AND BACKGROUND

Chapter one provides the orientation to the research study that was conducted to address the health concerns of women miners working underground at a selected coalmine in Mpumalanga, South Africa. The chapter provides a synopsis of the entire study with an emphasis on the problem of the research, research questions, the research aim with its objectives and the significance of the study.

Historically, no women could work underground in the mines (International Labour Organisation (ILO) 1935:np) in many countries, including South Africa with a view of protecting women against dangerous work in the post-World War II era. This led to the mining sector becoming a male-dominated industry with its associated manual labour, occupational hazards and health risks (Badenhorst 2009:55). Women's work was relegated to the informal economy and domestic labour (Messing & Ostlin 2006:5).

However, through the promotion of women's human rights and the right to equality in international and national law (Constitution of the Republic of South Africa, Act No 108 of 1996 (South Africa 1996b:1247), women increasingly entered the labour market in general and in the mining sector in particular. The introduction of Women in Mining (WIM) remains challenging, because mining continues to be perceived as dangerous, hazardous and not suitable for women (Benya 2009:1). In 2002, the South African Minerals Act, No. 50 of 1991 Section 31 (South Africa 1991), that prevented women from working underground, was repealed and replaced by the Mineral and Petroleum Resources Development Act No 28 of 2002 (South Africa 2002). Together with the Mine Health and Safety Act No 29 of 1996 (South Africa 1996a), the legislative framework opened opportunities for women to enter underground occupations (Benya 2009:6).

The inclusion of women in mining and the growing number of women working underground, however, is not indicative of a woman-friendly and gender equal environment in mining. Literature cites that the hazardous underground environment might interfere with women's reproductive systems resulting in miscarriages, spontaneous abortions and stillbirths, as well as low birth weight

and health conditions of infants (Kuyek 2004:2). These health and safety concerns of women mineworkers do not receive prominent attention. For example, sanitary facilities, toilets and hand washing facilities are often not provided. The unsanitary underground environment contributes to women's gynaecological conditions and urinary tract infections. Additionally, the obligatory wearing of personal protective equipment that is designed for a male body structure compounds these conditions. The challenges in underground mining are associated with unfair gender based discrimination and poor gender relations in mining. This is attested by Hermanus (2007:532) and Zungu (2012:10) who indicate that the mining tools and equipment are designed to be used by average-sized men. These factors urge researchers to gain an in-depth understanding of women's health concerns in the mining industry.

1.2 RATIONALE FOR THE STUDY

The researcher has worked for a decade as an occupational health nurse at a coalmine in Mpumalanga Province. She noticed that there was little focus on the impact of mining on women employees' health and wellbeing, especially in relation to their primary health care needs. Women often delayed or even neglected to seek health care services outside of the mine complex if the required service was not available onsite. She also noted that, in the absence of information on the women mineworkers' health concerns, mine managers were unable to plan and provide adequate services to optimise women's health and safety. This practice gap warranted an urgent need to conduct this current study to explore and describe women's health concerns at a coalmine and to formulate guidelines to address the women mineworkers' health concerns.

1.3 PROBLEM STATEMENT

A global trend has been for women in the mining sector to be employed in administrative positions. Globally and in South Africa, the number of women working underground has recently been increasing. According to Heemskerk and Ketani (2006:6), the number of women mineworkers was estimated to be approximately 25% within the Southern African Development Community (SADC) region. In South Africa, the South African Mining Charter (2004:12) set a target of 10% for women in core mining jobs. Several mining companies are already exceeding this target (Women in Mining Fact Sheet). The uptake of mining as available employment for both men and women has contributed to the improvement of women's economic status and livelihood of their families.

However, it is also known that mining increases the burden of chronic diseases on individuals, organisations and societies (Berger & Hobbs 2006:465). Various studies indicate that the conditions in the mining environment continue to negatively affect the health of both women and men (Hermanus 2007:538; Kauppinen et al. 2003:83; Lahiri-Dutt 2011:3). The most common

health conditions from coalmining are short and long term respiratory and cardiovascular diseases (Kuyek 2004:2). For pregnant women, coalmining effects are associated with poor growth of the fetus and miscarriages (Kuyek 2004:2).

Despite the hazardous effects of coalmining, there are women who work in coalmining throughout their lifespans. While working at the mine, this researcher noted a 50% increase in the number of women working as coalmine workers over the past decade. During the current study, the total number of underground workers at the selected mine was 1549, of which 155 were women.

Regardless of the given number of women presently working at a selected coalmine, there was a practice gap for occupational health nurses on how to address the health concerns of women underground mineworkers. The mine management was equally challenged. Without relevant guidelines in place to allocate resources needed to address the health concerns of the women underground mineworkers, a better understanding of how these women's needs were (un)met or could be met became indispensable. This gap, prompted and grounded the need for this study to 1) gain an in-depth understanding of women's health concerns, and 2) formulate guidelines that could be used to address women underground coalmine worker's health concerns.

1.4 RESEARCH QUESTIONS

The two main research questions that this study sought to answer were:

- 1) What are the common women's health concerns of underground coalmine workers?
- 2) How might women's health concerns be addressed, using occupational health guidelines?

From these main questions, the subsidiary research questions were:

- What are the perspectives of women underground coalmine workers, occupational health nurses, and mine managers regarding women's health concerns and needs?
- How are these women's health concerns currently (un)met?
- What are the perceptions of professional nurses regarding incorporating women's health services as part of the OHS programme?
- What are the expectations of the mine management about resources that would be required to address and incorporate specific women's health services into the current OHS programme?

- How will occupational health and safety experts (engaged by using the e-Delphi approach) refine guidelines addressing women's health concerns originating from perspectives of underground female coalmine workers, occupational health nurses, and mine managers?

1.5 AIM AND OBJECTIVES OF THE STUDY

The overall aims of the study were to explore women's health concerns, and formulate guidelines to address the identified health concerns

To achieve the aims of the study, the objectives were to be addressed in two phases.

The objectives of phase 1 were:

- To explore and describe the women's health concerns of mineworkers at a selected coalmine;
- To explore and describe the perceptions of the professional nurses working at the OHS centre of a selected coalmine regarding guidelines that incorporate specific women's health services into the mine's OHS programme; and
- To explore and describe mine managers' expectations of guidelines to incorporate specific women's health services into the existing OHS programme at the selected coalmine.

The objectives of phase 2 were:

- To formulate guidelines that would support implementation of women's health services of mineworkers into the current OHS programme at the selected coalmine.
- To refine guidelines that would ensure that specific women's health concerns of mineworkers are addressed within the current OHS services at the selected coalmine.

1.6 SIGNIFICANCE OF THE STUDY

The findings of the study might bring changes at the selected coalmine and in the South African mining environment. Subsequently, the findings might increase compliance with health and safety regulations to improve the health and wellbeing of women mineworkers. The formulated guidelines may support women's right to health, including sexual and reproductive health as envisioned in the international and national regulatory frameworks. The assumption is that, when women's health needs are met, women are more likely to be productive in the workplace. Besides, it may in the long term reduce identified practice gaps and barriers to accessing health care within the selected

coalmine. The guidelines may assist mine management to introduce OHS services that address women's health concerns at the selected coalmine.

1.7 CONCEPT CLARIFICATION

In this study, the following concepts were used:

1.7.1 AGREE II TOOL

The AGREE II Tool is an internationally known instrument used to evaluate the methodological rigour and transparency of the resulting guidelines developed in phase two of this study. The focus of the 6 domains of the AGREE II tool that were used when evaluating the guidelines were: Domain 1 scope and purpose, Domain 2 stakeholder involvement, Domain 3 rigour of development, Domain 4 clarity of presentation, Domain 5 applicability, and Domain 6 editorial independence. In the current study, the AGREE II Tool was used to evaluate the formulated guidelines to address women's health concerns of women underground coalmine workers.

1.7.2 E-DELPHI

E-Delphi is an online communication technique to facilitate consensus building among experts. In this study, this technique was used to enable a panel of experts to participate in an asynchronous and anonymous manner. The investigator assembled ideas online in order to reach consensus in the process of guideline development (van der Linde et al. 2005:694), that incorporated women's health issues for the OHS at the selected coalmine. In this study, the researcher collaborated with the University of Pretoria's Learning Management System, who established and set-up the E-Delphi online platform by means of discussion forums. The experts identified and recruited to participate in the study, based on their knowledge expertise on the Occupational Health and Women's Health sectors. The platform allowed these study experts to brainstorm the scope and purpose of the guidelines and subsequently formulate the guidelines to address women's health concerns at the selected coalmine.

1.7.3 GUIDELINES

According to the WHO (2012b:4), guidelines are recommendations intended to assist providers and recipients of health care and other stakeholders to make practical and informed decisions. In this study, guidelines were defined as standard procedures to be implemented by OHS centre staff to assist women underground mineworkers regarding their different health concerns.

1.7.4 COALMINE WORKER

A coalmine worker is a woman or a man who works in the coalmine, either on the surface or underground (Zungu 2012:8) and who occupies roles such as geologists, surveyors, welders, brake operators, engine operators and miners. When performing such jobs, underground coalmine workers are obliged to wear suitable safety equipment to protect themselves from mining related risks and hazards such as fire damp. In this study, the coalmine workers were women working underground and involved in different roles.

1.7.5 WOMEN'S HEALTH CONCERNS

According to Mishra, Cooper and Kuh (2010:4), researchers must explore and/or describe women's health concerns from a life course approach to better understand the effects of biological, social, and behavioural factors on their current and future health. Such an approach might focus an investigation on the harmful effect of exposures to gestation, childhood, adolescence and adulthood. In support of this description, Phillips (1995), as cited by the Faculty of Medicine, University of Ottawa (2014:np), expounds on women health concerns that include women's emotional, social, cultural, spiritual and physical wellbeing, that is determined within the social, political, cultural and economic context of women's lives. According to Steel, Frawley, Dobson, Jackson, Luke and Tooth (2013:7), early intervention is essential in preventing and reducing the impact of such health concerns and illnesses, as there is a link between health and health events of women, which passes through different stages of life.

In the current study, the women's health concerns revolved mostly around musculoskeletal conditions and reproductive health problems as well as underground health issues of safety and lack of sanitary conditions during underground coalmining.

1.8 RESEARCH PARADIGM AND PHILOSOPHICAL ASSUMPTIONS

1.8.1 PARADIGM

The constructivist paradigm was used in this study. Constructivism is referred to as the belief that knowledge is based on human and social creative ability (Colliver 2002:49). Adopting a constructivist approach allowed the researcher to give meaning to the women's health concerns at the selected coalmine. This approach also enabled the identification of factors that otherwise could not be easily exposed or described (Bisman & Highfield 2012:6). In this study, the researcher interacted with the participants to develop an understanding of reality, as described by Denzin and Lincoln (2000:1). The participants created an understanding for the researcher about the phenomenon of the study that was being explored. The researcher believed that there were many constructed realities. The reality was influenced by all the study participants' experiences and

perceptions through interactive communication in relation to the coalmine as the social environment (Ponterotto 2005:130). A detailed discussion on the constructivist paradigm will follow in Chapter 2. The discussion of the constructivist paradigm is directed by ontology, epistemology, axiology and methodology.

1.8.2 ONTOLOGY

Ontology refers to existence, or the nature of reality (Lee 2012:406). It focuses on questions that help to determine the problem relating to the ultimate nature of things. An ontological question speaks to facts, so that one can state what exists or does not exist in the world (Stinchcombe 2005:6). LoBiondo and Haber (2006:124) confirm that the constructivist's viewpoint about reality differs with different individuals. For example, what is essential to the mine manager may not necessarily be important to the women underground coalmine workers.

In this study, all the participants discussed (the ontology of) women's health concerns and health services they receive when presenting with such concerns at the Occupational Health and Safety Centre (OHSC) of the selected coalmine. The professional nurses working at the OHSC spoke of the reality of delivering services, the nature of the services they provide to underground coalmine workers, challenges and opportunities for addressing women's health concerns there. Mine managers conferred about their reality of meeting their employer's expectations for productivity and dealing with resource needs and demands for women's health services at the coalmine.

For the researcher to understand participants' actions, Yin (2014:13) as well as Baxter and Jack (2008:555), affirm that through a constructivist approach, the participants discuss their opinions of reality. Starke (1995:100) also confirms that in constructivism, the participants' reality is what they have experienced and believed, rather than what they have proven externally. In addition to the epistemological underpinnings of constructivism summarized below, philosophical assumptions of the study are discussed in detail in Chapter 2.

1.8.3 EPISTEMOLOGY

Epistemology examines how the inquirer explores knowledge and relates with study participants (Lee 2012:407). In this study, the researcher's main objective was to develop an understanding of what should be known and how to gain such knowledge to understand the study process (Bliss & Rocco 2013:27). The researcher communicated with the participants about the women's health concerns. The researcher focused on knowledge gathering and engaged with the participants in an ethically and socially appropriate manner to understand their perceptions and expectations about women mineworkers' health concerns at the selected coalmine.

Since epistemology is about correct knowledge, it was, therefore, essential for the researcher and the study participants to have a relationship to gain that accurate knowledge. In this study, the participants expanded the researcher's knowledge and enriched the understanding of women's health issues during their interactive relationship (Polit & Beck 2012:13; Krauss 2005:759-761) and by using semi-structured interviews. The researcher believed that the participants' multidimensional experiences and perceptions on women's health concerns in a mining context could inform the development of culturally and workplace appropriate occupational health guidelines.

1.8.4 AXIOLOGY

According to Baeva (2012:73), axiology is the philosophical explication of study values. Axiology is the collective term for ethics and aesthetics. Value is the effort of a human to clarify the meaning and significance of an individual's existence; it is an act of freedom, expression of subjectivity based on personal experience and preference.

In this study, the researcher regarded values as being meaningful and having important purposes of existence; that values reflect information regarding the subject and express the most important longing for self-perfection. Values express the maximum amount of information about the subject under study. The participants' perceptions cannot be separated from their experiences and/or expert knowledge; hence, the researcher's role in conducting research and she acknowledged research results are a product of a collaborative-reiterative process. The researcher believed that her constructivist position in the study required her to have close and prolonged interaction with the study participants (Ponterotto 2005:131). For over five months, the researcher interacted with the participants to explore their perceptions in phase one of the study. In this study, it is safe to say that participants informed the findings that both revealed a crucial part of their mining related and/or women's health experiences, and the development of OHS guidelines for the selected coalmine.

1.9 THEORETICAL FRAMEWORK

A theoretical framework is a group of related ideas that guide a research project (Croyle 2005:5). According to Merriam (2009), without a theoretical or conceptual framework to guide research, researchers would not know what to do in conducting their research. In addition to an overview presented below, the theoretical framework is discussed in detail in Chapter 2.

In this study, the socio-ecological model offered the best fit for creating a contextual understanding of women's health concerns to formulate guidelines to address these concerns in an existing

Occupational Health and Safety programme at the selected coalmine. Bronfenbrenner's (1977:515) ecological system framework, outlined four types of systems, namely: influential factors such as relations and actions that impact individual characteristics and experiences (microsystems), interpersonal relationship and interactions among different microsystems such as family and peers (mesosystems), principles and shared practices in underground coalmines (macrosystems) and policies that inform practices inform OHS (exosystems). The macro system is the most overarching concept in the ecological framework, which encompasses the entire network and interconnects all the four systems (i.e. microsystem, mesosystem and exosystemic) (McLaren & Hawe 2005:10).

1.10 SOCIO-ECOLOGICAL MODEL

In this study, the microsystem referred to the individual underground workers; the mesosystem referred to relationships within the context such as study participants interacting with each other; Exosystem referred to external social influences at the coalmine, and macro system referred to the socio-cultural context of the selected coalmine.

The Social Ecological Model (SEM) was used to explore and describe the interaction between, and interdependence of aspects within and across all levels of the women's health spectrum (Croyle 2005:10). This perspective emphasised the multiple dimensions for example, physical environment, social and cultural environment, personal attributes, multiple levels such as individuals, groups and organisations. It also emphasised the complexity of human situations like objective and subjective qualities, various scales of immediacy, and cumulative impact of events over time (McLaren & Hawe 2005:12).

The SEM assisted the researcher to understand how the health of women underground mineworkers was influenced by the work they performed. For example, women underground mineworkers' health, fertility, reproduction, interpersonal and social systems are dynamic and interact with each other. These interacting systems are influenced by determinants of socio-economic and reproductive health such as age, years of coalmine employment, economy and employment, fertility and health status (D'Souza, Somayaji & Nairy 2011:1965). The researcher's approach was to develop an understanding of the relationship between the underground environment, policies, health concerns of women underground coalmine workers and the lifestyle of these individuals.

1.11 DELINEATION OF THE STUDY

While there are numerous health and safety risks and service needs within the coalmine environment, which vary from physical, biological, chemical, ergonomic and lifestyle (Berger & Hobbs 2006:465), this study focused only on the health concerns of women underground mineworkers at the selected coalmine.

The study was limited to the selected coalmine, and therefore the transferability of the findings to different mining environments may be limited. Additional study limitations will be discussed in detail in Chapter 7. Notably, the strength of this study may be that findings can offer a good comparison for other OHS programmes. The researcher also realises that similar and distinct women's health concerns may be shared in other South African, regional, and transnationally among women underground coalmine workers.

1.12 RESEARCH DESIGN AND METHODOLOGY

Methodologically, for the researcher to gain insight in and understanding of the study over a period, a single holistic case with a context of professional nurses and mine managers was used. Case study research was most appropriate given the different populations relevant to the study within one environment (Clarke & Reed 2010:238, cited by Polit & Beck 2012:236). The E-Delphi was utilized to aid formulation of OHS guidelines to address women's health concerns.

1.12.1 PHASE ONE – EMPIRICAL STUDY

Phase one of the study was empirical and the researcher explored and described the women's health concerns of mineworkers and the perceptions of the professional nurses working at the OHS centre. Additionally, the mine managers' expectations were also explored. The researcher used semi-structured interviews to collect data upon obtaining the necessary permission from the mine management and from the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria. The interviews allowed participants and the researcher to communicate in a conversational style. The conversation was not rigid, but fluid, covering different areas of the phenomenon under study with each participant to get rich, detailed data (Yin 2014:106; Polit & Beck 2012:394). The disadvantage of this type of interview was that it lasted longer than the anticipated period due to the advance preparation. The researcher knew what to ask due to the advance preparation, but did not know what the responses would be from the participants (Polit & Beck 2012:394). The researcher's role was to encourage participants to talk freely about their women's health concerns and to prompt for elaboration to obtain rich data (Polit & Beck 2012:394).

1.12.2 DATA COLLECTION AND ANALYSIS

Data collection and data analysis occurred concurrently. Though this was a case study design, the researcher did not use theoretical propositions but used an interview guide to shape the data collection. The researcher used inductive content analysis as described by Elo and Kyngäs (2008:109) to analyse the data with assistance of the supervisors to achieve immersion and gain a sense of the whole. Chapter 3 will discuss research methods and methodology in detail.

1.12.3 PHASE TWO – GUIDELINE DEVELOPMENT PHASE

In phase two, the researcher formulated and refined the guidelines through consensus using an E-Delphi technique with experts in OHS. These experts included professional nurses with occupational health experience, researchers and a sociologist. The formulation of the guidelines was based on the findings of phase one. The researcher used the six domains of the AGREE II (Appraisal of Guidelines for Research and Evaluation) instrument to provide a methodological evaluation for the formulation of the draft guidelines. Details on the profile of the experts and AGREE II instrument are discussed in Chapter 6.

1.12.4 TRUSTWORTHINESS

The framework used in this study to address trustworthiness was based on the analytical assessment discussed by Yin (2014:45). suitable knowledge of what would be explored during the study (Burns & Grove 2009:190). The researcher ensured credibility by ongoing iteration and feedback given by experts, which according to Engles and Kennedy (2007:436), could be viewed as member checks. To ensure that dependability was achieved, the researcher included a range of experts (Cornick 2006:64). Confirmability was assessed by maintaining a detailed description of the E-Delphi data collection and analysis process, while transferability was established using verification of the applicability of E-Delphi findings (E-Delphi process will be discussed in Chapter 6 on formulation of the guidelines). In Chapter 3, the researcher discusses how the different criteria for trustworthiness such as integrity, fidelity, and legitimacy were met and the different strategies that she used to ensure rigour in the study.

1.13 ETHICAL CONSIDERATIONS

1.13.1 PROTECTING HUMAN SUBJECTS

In this research, human subjects were part of the study; hence, specific ethical considerations were necessary. The Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria and the authorities of the selected coalmine in Mpumalanga, provided the formal approval of the study to protect the human subjects. The researcher did not consider the official approval as a formal inspection process but conducted it responsibly with care and delicacy (Yin 2014:78).

The study was conducted after the approval of the study protocol by the University of Pretoria Faculty of Health Sciences Research Ethics Committee (Appendix F). Permission to conduct the study was obtained from the selected coalmine (Appendix E), and informed consent was granted by study participants (Appendices A1-A3). The Research Ethics Committee of the Faculty of Health Sciences, University of Pretoria, as such was responsible for the formal approval and ensured that the human subjects were monitored and reviewed before commencing with the study. Protecting human subjects also incorporated both direct and indirect interaction, for example, documents usage, including archived documents.

The following principles were adhered to in the study:

Informed consent

The principle of informed consent, which stipulates that the participant participates in the study after submitting the relevant information, was followed (Fox & Bayat 2007:148). The researcher notified the participants about the study and their right of informed consent and that they could decide to withdraw from the study at any time (De Vos et al. 2011:116; Gray 2009:78). The participants were provided with the participation information leaflet and informed consent form (See Appendices A1 – A3) to be signed before committing to an interview. An explanation regarding the purpose, objectives and the type of study was given to the participants, and they were informed that they were free to withdraw their participation even after the start of the interview (Polit & Beck 2008:172; Burns & Grove 2009:190).

The participants gave written consent to participate in the study. All participants were treated fairly in a non-judgemental manner, which complements the accord set out in the informed consent (Burns & Grove 2009:198; Lo Biondo-Wood & Haber 2010:580).

Protection from any harm and avoiding the use of any deception

The participants had the right to be protected from any harm based on the principle of beneficence where the researcher seeks to do well and above all, do no harm (Burns & Grove 2009:198). The participants were notified by the researcher about possible benefits and risks involved with the study (Polit & Beck 2012:172). They were also informed that there was no harm intended to them when taking part in the study.

In keeping with these ethical principles, the researcher met participants' needs and ensured that participants' rights were clearly delineated during the consenting processes and reiterated during data collection. The participants were informed about every step of the data collection process to prevent ill-treatment and exploitation (Lo-Biondo-Wood & Haber 2010:298).

Protection of privacy and confidentiality

As indicated by Gray (2009:79), “information on names, telephone numbers, email and postal addresses and any other identifying features should be restricted.” The participants were notified of their freedom to choose to share or withhold information.

Data for the women mineworkers and professional nurses were collected in a private area at the OHS centre at the selected coalmine, whilst data for the mine management were collected in a boardroom of the administrative offices at the selected coalmine. The researcher assured the participants that no information would be shared about the subject under study without the participants’ permission (Polit & Beck 2012:180).

Fox and Bayat (2007:148) echo the importance of confidentiality in ensuring that the information made available would not identify the participants and would also not be accessed by anyone who was not directly involved in the study. Precautionary measures were taken to ensure confidentiality of the personal information of the participants and to reduce the effect of the study on their physical, intellectual and social morality (World Medical Association 2008:3). No identifying information was made available in the research report or articles published in academic research journals (De Vos et al. 2011:119).

In this study, confidentiality and anonymity were secured through the following standards:

- Every participant was issued with a code number;
- The code numbers were utilised on the transcribed interviews and during data analysis and discussion; and
- The main register with all participants’ names and matching codes, all transcribed and analysed data would be kept confidentially and safely for 15 years after the completion of the study.

1.13.2 Protection of vulnerable groups

Although there were no vulnerable groups such as children or people with disabilities in the study, the researcher emphasised that the participants would be subjected to fair and courteous treatment without prejudice and were notified that there was no financial gain for taking part in the study (Polit & Beck 2012:180). The interviews were based on the principle of respect for all the participants (Burns & Grove 2009:189).

1.13.3 Equitable selection of participants

To ensure the participants were selected fairly, recruitment targeted women as they were returning from their annual leave. The researcher invited women returning from their leave on a weekly basis. This may have helped to eliminate recruitment bias. Participants who were willing to participate were selected, and those who were not interested were excluded.

1.14 ORGANISATION OF THE STUDY

The organisation of the chapters is outlined below:

Chapter 1: Orientation to the study, where the overview of the study on the research is provided, including the problem, rationale of the study, research questions and aim of the study, significance of the study and concept clarification.

Chapter 2: Philosophical assumptions and theoretical framework, in which constructivism as a paradigm and socio-ecological model are described.

Chapter 3: Research design and methodology are described with the focus on Phase 1 of the study. This chapter includes the research design, research methods, setting (context of the mine) population, selection of participants, data collection, data analysis and trustworthiness.

Chapter 4: Analysis and interpretation of the data from phase 1 is discussed in detail.

Chapter 5: Discussion of the findings.

Chapter 6: Formulation and refinement of guidelines to address women's health concerns.

Chapter 7: Summary, recommendations and conclusion of the study are discussed.

Figure 1 provides a schematic outline of the organisation of the entire study.

1.15 SUMMARY

In this chapter, the orientation of the study was provided, including on the research problem statement and the rationale for the study. The research questions, the aims and objectives of the study were indicated. The significance of the proposed study was described, and the key concepts were defined. The philosophical assumptions and the theoretical framework including the outline of the research methodology and the two research phases were presented. The ethical considerations and trustworthiness were explained. In chapter two, the philosophical assumptions and the theoretical framework will be discussed extensively.

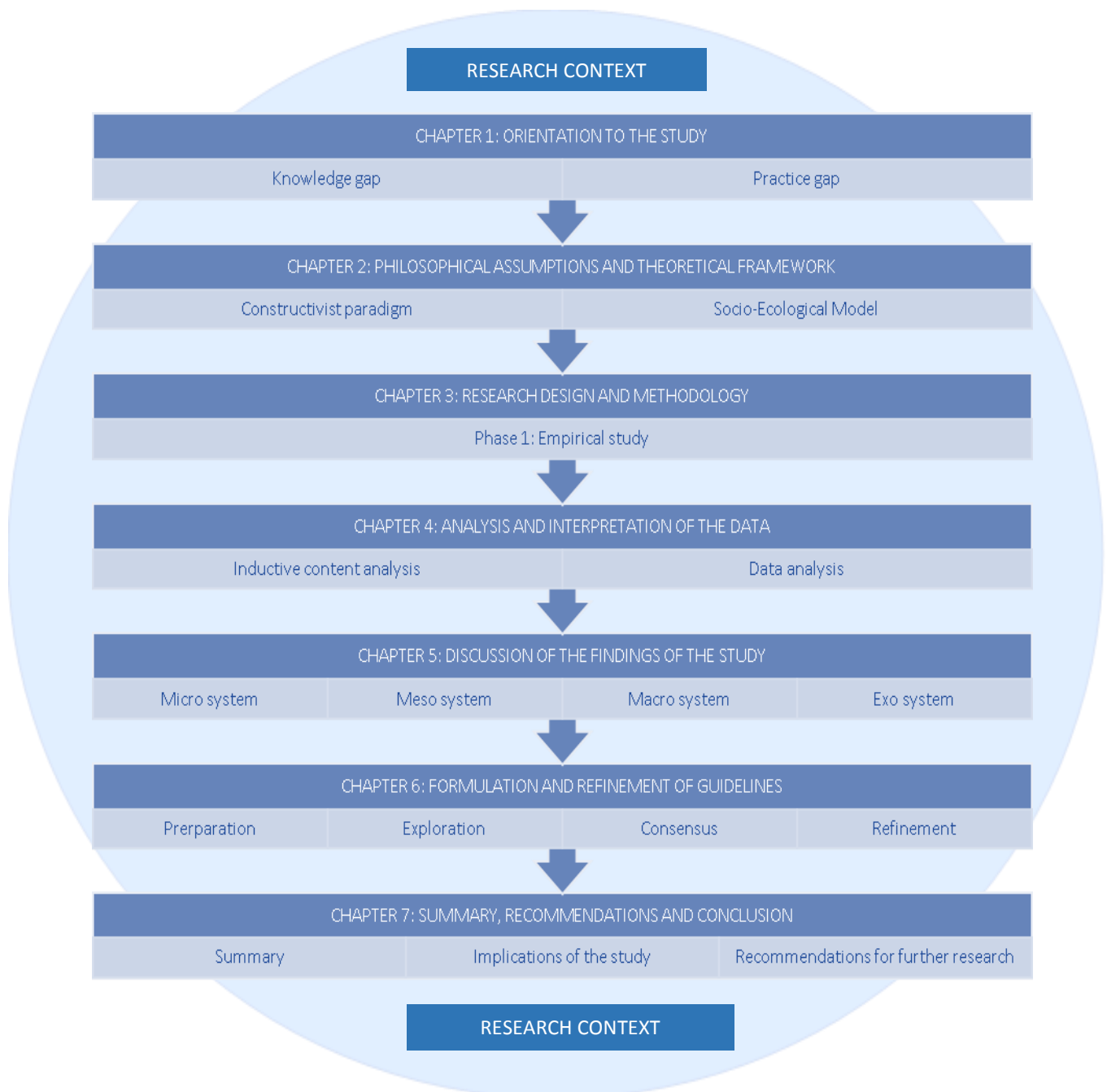


FIGURE 1: PICTORIAL OVERVIEW OF THE OUTLINE OF THE STUDY

CHAPTER 2

PHILOSOPHICAL ASSUMPTIONS AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION

Chapter two presents the philosophical, theoretical assumptions and Socio-Ecological Model (SEM) as a conceptual framework for the entire research, including the formulation of the guidelines.

2.2 PARADIGM

The word *paradigm* is derived from the Greek phrase *paradeigma*, which means a pattern or design. This term was initially utilised by Thomas Kuhn (Olsen et.al 1992:292) to signify the conceptual framework, which was distributed by a group of experts who supplied them with an appropriate design to explore challenges and acquire some resolutions. Thomas Kuhn defined paradigm as “an integrated cluster of substantive concepts, variables and problems attached with corresponding methodological approaches and tools” (Olsen et al.1992:292; Lauckner & Krupa 2012:1).

Kuhn in Olsen et.al. (1992:292), further describes a paradigm as a philosophy which includes opinions, merits and beliefs which are common to the group of researchers concerning the nature of the phenomenon under study, as well as research conduct (Olsen et al. 1992:293); Ponterotto refers to a paradigm as a “set of interrelated assumptions about the social world which provides a philosophical and conceptual framework for the organised study of that world” (Ponterotto 2005:127-128). Olsen et al. (1992:16) summarises a paradigm as “a pattern, structure and framework or system of scientific and academic ideas, values and assumptions”. Research paradigms lay the philosophical framework for the investigator’s studies (Lauckner & Krupa 2012:5).

In this study, the researcher followed the constructivist paradigm to capture individual feelings and opinions, and to knowledge their human and social creative ability or interactions (Colliver 2002:49; Baerveld 2012:157). The researcher interacted with the participants to develop an understanding of reality regarding the health concerns of women mineworkers at the selected coalmine (Denzin & Lincoln 2000:1).

The researcher believed that there were many constructed realities about women's health concerns. However, adopting a constructivist approach allowed the researcher to give meaning to the way things were. This paradigm also enabled identification of factors that could not be easily exposed or described regarding women's health concerns at the coalmine (Bisman & Highfield 2012:6). Lauckner and Krupa (2012:5), further noted that in qualitative research, the case study approach offers the flexibility of integrating different (mixed methods) within the constructivism with an aim of collecting data on the occurrences collectively.

This study was grounded and informed by questions arising from nursing practice experiences and a decade of skilled OHS clinical wisdom. The constructivist paradigm offers a scientific and theory-based analysis where people can learn from and construct their knowledge based on their experiences (Mertens 2015:76). In this study, the constructivist's focus is more on the identification of multiple values and viewpoints through qualitative methods. Martin (2011:179) also describes constructivism as a process. The constructivist paradigm is described below regarding its ontological, epistemological, axiological and methodological assumptions.

2.2.1 ONTOLOGICAL ASSUMPTIONS

Ontologically, the researcher explored the nature of reality and that of individuals (Lee 2012:406) in the context of women's health concerns prevailing in a coalmine. Ontology describes what exists or does not exist in the world (Stinchcombe 2005:6). LoBiondo and Haber (2006:124) confirm that the constructivist's viewpoint about reality differs with different individuals. For example, what is essential to a mine manager may not necessarily be relevant to the women underground coalmine workers.

Ontologically, the researcher as a constructivist, believed that the participants were aware of reality only when such expressions were portrayed during the interviews. Therefore, there were no multiple realities in life, only one, which changes the way we think about the universe (Lee 2012:406). The researcher in this study stressed that knowledge emanated when participants used their intellectual capacity to co-create their understanding of women's health concerns with the researcher. Through conversational interviews with the different participants on women's health

concerns, the construction of evidence from multiple perspectives could be organised in a meaningful manner.

The researcher believes that there were many constructed realities at the selected coalmine. Reality is subjective and influenced by all the study participants' experiences and perceptions, the social environment of the coalmine and the communication between the researcher and the participants (Richard et al. 2011:309). The researcher affirms that for each study participant, the truth was reasonable and was determined by each participant's viewpoint. In this study, multiple realities of the different study participants were explored. All the participants expressed their views on the realities on women's health concerns. The women mineworkers related their health concerns (ontological) and health services they receive when presenting at the OHS centre. The professional nurses working at the OHS centre related how they render services to the women underground mineworkers, to address women's health concerns at the selected coalmine. The mine management spoke about the reality regarding the employer's expectations of addressing women's health concerns at the selected coalmine.

2.2.2 EPISTEMOLOGICAL ASSUMPTIONS

Epistemology is a theory of knowledge which explores the relationship between the inquirer and the respondent (Lee 2012:407). Epistemology is about the relationship between the knower (study participants) and the enquirer (researcher), including their mutual understanding with one another during the interview. In this study, the researcher's main objective was to develop an understanding of what should be known and how to gain such knowledge to understand the study process (Lee 2012:408; Bliss & Rocco 2013). Barillaro et al. (2006) echoed that the constructivist epistemology, as a theory of knowledge, was developed in response to the criticisms that emerged regarding positivist approaches to science and learning. The constructivist researcher believed that learning is a process of actively interpreting and constructing the person's knowledge representations, and dismissed the belief that there is one knowable truth.

Epistemology is about the truthful knowledge. It was, therefore, essential for the researcher and the study participants to have a relationship to gain that truthful knowledge. In this study, the participants and the researcher subjectively valued truthful knowledge during their interactive relationship (Polit & Beck 2012:13; Krauss 2005:759-761). The researcher interacted with the participants to develop an understanding of the reality regarding women's health concerns of mineworkers at the selected coalmine (Denzin & Lincoln 2000:1). The participants created an understanding for the researcher about the phenomenon of the study being explored. Individual communication between adults is seen in the constructivist paradigm, and it helped the researcher to gain knowledge and skills from the participants (Philpott & Batty 2009:923).

Social interaction, is part of an effective learning process which brings a new understanding and improvement of a person's ability to make informed decisions leading to effective change (Davies 2001:54). In this study, the constructed meaning of the interviews between the researcher and participants assisted the researcher to understand each participant's experience relating to women's health concerns of female underground mineworkers. The researcher further understood that the important form of learning was that the researcher and the participants were actively engaging one another with significant health problems of women underground mineworkers at a selected coalmine. It was during those engagements that the researcher asked questions and probed for more answers where new problems arose (Philpott & Batty 2009:923) and rich data were collected.

2.2.3 AXIOLOGICAL ASSUMPTIONS

According to Baeva (2012:74), axiology is the philosophical study of value. It is the collective term for ethics and aesthetics. Value is the effort of a human to clarify the meaning and significance of an individual's existence; it is an act of freedom, expression of subjectivity based on personal experience and preference. The participants' perceptions cannot be separated from their beliefs; hence, the researcher's role in acknowledging such beliefs during the research process. The researcher further believes that her constructivist position in the study requires her close and prolonged interaction with the participants to be able to study their perceptions (Ponterotto 2005:131).

In this study, the researcher regarded values as meaningful and having significant purposes of existence; that values reflect information regarding the subject and expressing an essential longing for self-perfection. Values express the maximum amount of information about the subject under study. There is no universal answer to any problem; therefore, the researcher was not a problem solver in this study. The researcher engaged the participants to co-construct knowledge about women health concerns.

The constructivists' other focus is on researchers to be knowledgeable about their own positions and values. However, life-changing researchers with a clear instruction, work harder to influence and change the current situation (Ponterotto 2005:132; Mertens 2015:81). Furthermore, the researcher's personal view was a mutual understanding of the participants about the subject under discussion. In addition, her view was that the information shared ethically was going to assist in the formulation of guidelines for an OHS programme to address the women's health concerns.

2.2.4 METHODOLOGICAL ASSUMPTIONS

Methodological assumptions are referred to by Mertens (2015:77) as propositions indicating the use of scientific methods, which permit the expert to embrace laws about human behaviour based on practical experience and natural setting experimental designs. These methodological assumptions focus more on analysis of the methods used to collect information during the study. According to Creswell (2003:198), methodological assumptions consist of methods utilised by the qualitative researcher based on own experience in both collecting and analysing data. Methodologically, for the researcher to gain insight and understanding of the study over a period, a single holistic case with a context of women mineworkers, professional nurses and mine management was used. The methodological assumptions reflected the researcher's views on how the evidence was obtained. Case study research was most appropriate in light of the different populations relevant to the study within one environment. Case study research explored a phenomenon in its context and assumed that this context was of significance to the phenomenon (Clarke & Reed 2010; Polit & Beck 2012:235).

Phase one of the study investigated the women's health concerns of mineworkers, the perceptions of professional nurses regarding women's health problems of mineworkers, and the expectations of mine management regarding the employer's responsibility to address health concerns of female underground coalmine workers within the existing OHS services. In phase two, the researcher developed and refined the guidelines, based on the findings of phase one, to progressively incorporate women's health services into the current Occupational Health and Safety programme at the selected coalmine.

The methodological assumptions in constructivism is described as the theoretical, and systematic analysis of methods, where different ideas about the production of knowledge and its construction is collected by groups and individuals (Pitsoe 2007:10). Methodologically, constructivism illustratively advances and outlines the individual construction correctly to analyse and differentiate it argumentatively with the aim of reaching and generating a substantial consensus (Dieronitou 2014:7).

In this study, the researcher used a case study approach to gather information on the women mineworkers' health concerns at the selected coalmine. A case study is an empirical inquiry that investigates "a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not evident" (Yin 2009:13). A single-case study was an appropriate design as the objective was to gain an understanding (Yin 2014:40-42) of the women's health concerns in the selected coalmine. The understanding of women's health informed the processes (Yin 2014:40-42) of the development of guidelines as indicated by Dyer and Wilkins (1991 cited in Barratt, Choi & Li 2011:332). The single case study approach enabled the

researcher to capture women's health concerns in much more detail within the context. Additionally, a case study as an empirical inquiry was used in a mining context as the boundaries between the phenomenon of interest and [work] setting is not clearly evident (Yin 2014:2) 2), i.e., women's health concerns in a coalmine.

In phase one of the study, the methodology followed by the researcher was the single case study. The researcher asked each participant similar semi-structured questions, to generate knowledge which assisted her during the guideline formulation. In phase two of the study, the methodology followed by the researcher was the e-learning platform. The E-Delphi technique was used to draft guidelines based on the data collected and analysed during the first phase of the study.

The E-Delphi technique was chosen to reach consensus with the experts who were unable to convene in one place, deliberate and take decisions on the formulation of guidelines for the study under discussion (Bardhan et al. 2012:25; Oosthuizen 2014:3). This technique will be discussed in detail in Chapter 6.

Constructivism was appropriate for this study due to the researcher's belief to analyse and critique the underlying assumption of the problem, triangulate multiple methodologies and emphasise multiple perspectives on the problem (Polit & Beck 2012:238).

2.3 CONSTRUCTIVISM

The source of the Constructivism dates back to the late 1700s from many philosophers including Kant and Husserl's work, between 1781 and 1970 (Mertens 2015:78). Amongst the theories mentioned, Immanuel Kant and Socrates are also referred to as the fathers of constructivist theories. With Kant focusing more on some aspects of human knowledge of the physical universe, which are the products of our cognitive apparatus; and Socrates' teachings on constructivism were done via questions (Brown 2006:5).

Constructivism has been seen to have similarities with other paradigms. Brown (2006:5) describes constructivism as an "epistemology, a philosophical explanation about the nature of knowledge". The constructivist's belief concerns the relationship between theory and research. However, research that is based on constructivism is associated with the importance of inductive logic through arguing from the specific to the general to develop qualitative research skills and competencies (Hussain 2012:183). Amongst the three types of constructivism, radical and social constructivism were seen to be having similarities in the sense that they are stronger than cognitive constructivism (Doolittle 1999:2). Delanty (1997:38) argues that in critical social science, constructivism and critical realism share mutual concerns.

Constructivism has been viewed to be different from other paradigms, for example Gray (2014:21), mentions that with positivism, reality that is external to the researcher exists and should be investigated. The constructivist's belief is that the truth and meaning do not exist in the external world but through interaction and engagement. Lee (2012:405) agrees that the social constructivist focal point is more on collective generation of meaning while radical constructivism's advocacy is more to the individual's intellect which active exclusively in the meaning-making activity.

Additionally, Guba and Lincoln (2005:165) indicate that constructivism is characterised by local and specific constructed realities while positivism, also known as naive realism, outlines that reality is real, but apprehendable. Furthermore, constructivism is viewed by Doolittle (1999:3) as a continuum to solve problems and collaborate work skills, not a unitary theoretical position. Unlike in interpretive paradigm with the belief that reality is socially constructed, with no single path to knowledge, constructivism believes in learning with multiple ideas and previous experience (Alvesson & Gergen 2009:49). While constructivism provides an explanatory lens through learning and teaching in an organisational setting, positivism usually attempts to discover and describe the new policies and procedures (Delanty 1997:13).

Different types of constructivism are described by Riegler (2012:241). For example, cognitive constructivism is viewed to be more compatible with career and technical education. Cognitive constructivism is further recommended to serve as a learning theory on which to base career and technical education in the future. However, Doolittle (1999:2), considers cognitive constructivism as 'weaker' than knowledge constructivism due to its non-adherence to core and straightforward assumptions and recognising two of the epistemological tenets within constructivism.

Radical constructivism is seen to be embracing the first three epistemological tenets and representing the opposite end of cognitive constructivism. Also, radical constructivism includes a greater degree of construction, structure and meaning, unlike the cognitive one with one structure (Chambers et al. 2013:108).

Unlike the previously mentioned constructivism, social constructivism supports the four epistemological tenets which are explained as: knowledge is not passively accumulated, but is the result of active cognizing by the individual; cognition is an adaptive process which functions to make individual's behaviour more viable given a particular environment; cognition organises and makes sense of individual's experience, and is not a process of rendering accurate representation of reality; and knowledge has a root of biological/neurological construction and social, cultural and language based communication. Furthermore, social construction's belief is that the truth is amongst different individuals' intellect, rather than from one person's mind. According to Alvesson and Gergen (2009:49), social constructivism and critical realism are two options, which summarise

the development of social science. However, the difference is that social constructivism is a very broad field, which includes different approaches with multiple ideas, while the influence of critical realism has some limitations. In this study, such was observed during the interviews where the researcher was limiting the participants who were elaborative in their responses.

2.3.1 KEY COMPONENTS OF THE CONSTRUCTIVIST APPROACH

Kahveci and Ay (2008:125) believe that the individuals' knowledge is based on their already existing conceptual frameworks. These theorists further confirm the learner's previous experiences with the world and invent the new method of thinking about the world. Clements and Battista (1990:34) relate that a constructivist environment should have a culture of negotiation, involvement, sharing and evaluation. Clements and Battista (ibid) further emphasise that the interpretation of the world is based on experience and social engagements. Knowledge and reality respectively refer to the view of knowledge and secondly it means the theory of learning (Colliver 2002:50). In this study, when the researcher and the participant interacted, learning took place, and that exercise was called social constructivism. Constructivists view learning as the construction of meaning by learners and focus on education policies, education models and educational processes (Brown 2005:2).

2.3.2 ASSOCIATED PARADIGMS AND THEORIES

Critical Realism (CR) is located under the umbrella of post-positivism, and it offers a modified objectivist perspective. Positivism involves a single, concrete reality, while CR covers multiple perceptions about a single, mind-independent reality. A critical realist believes that reality exists, but that it cannot be wholly or perfectly understood; due to perceptions that have some level of flexibility and the differences between reality and people's perceptions of reality (Churchland 1979; Guba 1990; Healy & Perry 2000; Bisman & Highfield 2012:9).

Contrarily, constructivism does not represent metaphysical reality, but only claims that it is believed to have support for actions taken to attain the set goals to reach appropriate results. Also, constructivists believe that when knowledge claims are supported, set goals will be met easily rather than verified by explaining that they correspond to reality (Colliver 2002:49). Critical realists, on the other hand, look at constituting valid conclusions which consist of outcome patterns that are an expression of the relationship between mechanisms and context. In CR, there is no argument, but a complex dialogue relationship where knowledge is shared by the researcher and the participant (Peters et al. 2013:338).

A constructivist researcher encourages authority, which approves one view of knowledge in education, which is constructivism over realism and behaves as if these are principles of learning which apprehend the hidden learning process. Such a process includes world making rather than world mirroring. Furthermore, the process of learning involves creating rather than finding, with more focus on activities rather than on things and substances (Colliver 2002:50). However, CR acknowledges that there are numerous levels and approaches of undertakings where there is a relation between a researcher and a participant (Parpio et al. 2013:490). It layers ontology into the levels of reality, of actuality and that of the empirical experience (Parlour & McCormarck 2012:309; Rieger 2012:236). In this study, the researcher, as a constructivist, communicated with the participants in a simple manner, unlike a realist with the complex cognitive scheme, conveying complex messages (Kitamura & Takahashi 2002:90). The critical realist dissociates itself from both methodological individualism and holism but stresses the social as relational and emergent. However, its belief is that experiment has much to command regarding its capacity to generate underlying information (Alvesson & Gergen 2009:43).

CR offers a modern understanding of context, where the difference is highlighted between the real, the actual and the empirical or experience. In this study, it was observed that the environment has a negative impact on the women's health, and a researcher as a critical realist may evaluate and transform through interaction. Kontos and Poland (2009:5) agree that "mechanisms can coincide under real world conditions to produce emergent properties contingent in time and space, properties which are irreducible to those of their constituents."

Willmott (2002), Meckler and Baillie (2003), Kincaid (1996:45) and Hunt (1990:9) confirm that, given the socially constructed and value-laden type of theories, it is not easy for the researcher to choose theories. However, it is essential to know that these knowledge attributes do not make science inappropriate with the goals of truth and objectivity nor does it render science impractical. Despite all these adversities, a judgemental rationality is possible and vital to science for the critical realist. Nevertheless, the CR believes that the long-term benefit of a scientific theory is in inductive realism because it gives individuals reasons to believe that something like the entities contained in the theories does exist (Hunt 1990:10; Danermark et al. 2001:117). The researcher in this study followed the appropriate method to improve perceptual processes, thereby accomplishing a detailed description and understanding of the world (Hunt 1990:10; Danermark et al. 2003:117).

2.3.3 HOW IS CONSTRUCTIVISM USED IN NURSING/HEALTH RESEARCH

Scholars in Nursing Science often utilise constructivism in their research. Scammel (1996) used constructivism as a lens on reflective practice in medical nursing. In addition, Huebner and Betts (1999:340), in their study of the Fourth Generation Evaluation methodology, used a constructivist

lens to examine the collaboration between the community and university regarding the youth. The strengths of constructivism include the involvement of multiple stakeholder groups, exposure to multiple perspectives, and support for later programmatic developments. Similarly, Koch and Webb (1996), followed constructivism in their evaluation of the biomedical construction of ageing.

2.4 THE SOCIO-ECOLOGICAL MODEL

In this study, the researcher utilised the SEM to explore and describe women's health concerns of mineworkers at the selected coalmine and to formulate guidelines for the Occupational Health and Safety programme (Golden & Earp 2012:1). The SEM assisted the researcher to understand how the health of women underground mineworkers was influenced by the work they performed. Women underground coalmine workers have personal systems like illness, health, fertility, reproduction, interpersonal such as work, emotions, safety, relations and social such as support, independence, finance, choices, participation systems which are dynamic and interacting with each other. The interacting systems are influenced by the social determinants of health such as age, years of coalmine employment, economy and employment, fertility and health status (D'Souza, Somayaji & Nairy 2011:1965). Wilford (2015:349) agrees that to develop strategies to improve a system within a society or organisation, it is important to anticipate and come up with possible solutions to the envisioned challenges.

The Socio-Ecological Model (SEM) consists of a set of theoretical principles which involve an understanding of relationships between individual and environmental factors in human health. These involve physical, social, cultural, and historical aspects of context including qualities and behaviours of individuals within such environment (MacLaren & Hawe 2005:6; Richard et al. 2010:308).

Urie Bronfenbrenner, a Russian-American psychologist, who developed SEM, focused on the interaction between research and policy on child development (Bronfenbrenner 1994:38). He also emphasised that theory and practice should always relate to one another. The SEM has been used for decades as a research framework to explore possibilities for health (Cardenas et al. 2009:137), health promotion and disease prevention (Richard et al. 2010:308). Golden and Earp (2012:1) indicate that health patterns are affected by the active interaction between the biologic, behavioural, and environmental factors. SEM also recognises that people who are within large social systems are influenced by interactive traits of individuals and their environments, which in turn determine health consequences.

According to the SEM, the agreement between people and their environment is considered a significant predictor of wellbeing (Richard et al. 2010:310), while a human environmental system is a heuristic tool that restructures investigation of human-environment interaction (Binder et al. 2013:18). In addition, SEM ascertains that an individual's age, gender, race, ethnicity, and socio-economic characteristic differences create the framework in which individuals work and influence health risks and resources (Cardenas et al. 2009:135). With SEM, advocacy and social justice focus on the policy environment and seeks to change organisational policies as well as administrative practices (Greenleaf & Williams 2009:8).

The researcher preferred Bronfenbrenner's theoretical framework compared to that of Stokols, because Bronfenbrenner objectively summarised different stages of decisions. For instance, intrapersonal sphere, interpersonal and institutional practices, community and public procedure (Richard et al. 2011:309), unlike Stokols' health promotion interventions which focus on establishing and improving behavioural change. Bronfenbrenner's strategies are essential in emphasising the environmental change approach (Bronfenbrenner 2004:4).

The SEM emerged from developments in different disciplines such as Psychology, Sociology and Public Health where individuals communicate in various environmental systems (Bronfenbrenner 1993:38). Also, ecology established five environmental systems which provide the structure in which psychologists and sociologists study the relation of people's surroundings within their neighbourhood and the population as a whole. The researcher concentrated on the micro, meso, exo and macrosystems.

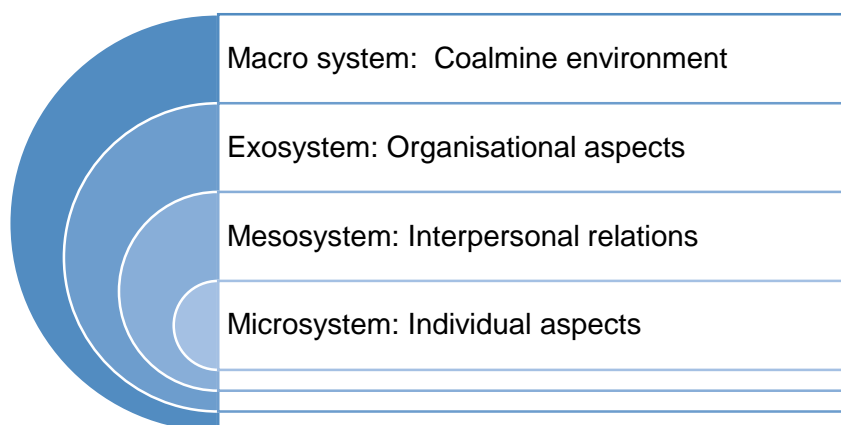


FIGURE 2: THE SOCIO-ECOLOGICAL MODEL

In this study, the micro related to intrapersonal aspects of individual participants, the meso to interpersonal relationships of participants, the exo to organisational, which was the selected coalmine, and macrosystem to the community, the coalmine environment and policy factors,

postulated to affect health problems. These systems are described in detail in the paragraph below. This perspective emphasised the multiple dimensions (for example, physical environment, social and cultural environment, personal attributes), multiple levels (for example, individuals, groups, organisations), and complexity of human situations (for example, objective and subjective qualities, various scales of immediacy, cumulative impact of events over time) (Richards et al. 2008:181). Furthermore, the microsystem (individual) development is affected by the mesosystem (a person's milieu) and its macrosystem (surroundings).

Applied to the study, the socio-ecological model guided the researcher to explore and describe the interaction between, and interdependence of aspects within and across all levels of the women mineworkers' health spectrum (Croyley 2005:10).

The SEM delineates social, institutional and cultural contexts of people-environment relations. This model emphasises the multiple dimensions (physical environment, social and cultural environment, personal attributes), multiple levels (for example individuals, groups, organisations), and complexity of human situations (for example objective and subjective qualities, various scales of immediacy, cumulative impact of events over time) (McLaren & Hawe 2005:12). Golden and Earp (2012:1) confirm that the socio-ecological model embraces multiple levels of influence that are interdependent and vigorous. Such principles include macrosystem (environmental factors) and microsystem (personal factors), where in this study under discussion the environmental factors were not conducive to the women mineworkers' health and safety.

In this study, the ecological framework was relevant in creating an understanding of women's health concerns, professional nurses' perceptions and mine management's expectations to formulate guidelines for women's health services to be incorporated into the current OHS programme at the selected coalmine. In addition, since ecological framework involves human being's development from childhood to adulthood, it assisted in ensuring that the researcher focused on the individual's environments from family to societal structures. The macrosystem is the most overarching concept in the ecological framework, which encompasses the entire network and interconnects microsystem, mesosystem and exosystem (McLaren & Hawe 2005:10).

These levels emphasised the multiple dimensional perspectives of the women's health concerns of underground mineworkers at the selected coalmine. Put clearly, the study was designed to explore and describe women's health concerns, including physical, social and cultural factors at individual, group, organisational and environmental levels. Each level is described below.

2.4.1 MICROSYSTEM

In this study, the microsystem refers to the intrapersonal aspects of individual women underground coalmine workers. The microsystem is the approach that is directly linked to the person and his or her direct acquaintances, for example, home, school, and work. Like a child that interacts with the parents and surroundings, the underground coalmine worker as a microsystem consistently incorporates family, colleagues and associates. This is the most powerful level of the ecological systems theory (Richard et al. 2011:309). To understand the person, the researcher explored the study participants' background, reported health care needs, concerns and experiences in the mine context (Gregson et al. 2001:512). The personal or individual structure was the most specific level of influence in this study, with more focus on the person's expressed knowledge, attitudes, beliefs and experiences as underground coalmine workers. The individual system also included reported illness, health, fertility and reproductive health concerns of women workers (Croyle 2005:11).

2.4.2 MESOSYSTEM

Mesosystem includes interaction and inter-relationships of individuals in the microsystem with, for example, peers, family, co-workers, supervisors and professional nurses. Power imbalances may occur in the mesosystem. In this study, issues around job satisfaction, emotions and safety were viewed as the mesosystem factors of women mineworkers. The mesosystem in this study represents the interrelationships between environments in which the individual participants work and live. For example, the coalmine environment links the participant and her family. Such interrelationships between the surroundings inform women mineworkers' health concerns (McLaren & Hawe 2005:12). From the occupational health nursing perspective, interpersonal relationships have a major influence on patient/client care and wellbeing (Engebretson & Littleton 2001:227).

2.4.3 EXOSYSTEM

The exosystem is referred to the mine's business operations and its organisational structure as an external social influence, which indirectly affects environmental operations. In this study, such operations pertain to the environment of the underground section at the selected coalmine. Bronfenbrenner, in his framework of human development, refers to the exosystem as a linkage between surroundings where individuals may or may not be directly involved in, but are less appropriate due to their influence on her immediate environment. For example, in this study, the exosystem refers to the coalmine, neighbours of participants and mining sector politics (McLaren & Hawe 2005:10).

According to Bronfenbrenner (1993:40), exosystem is known as the area that excludes the individual as an active participant; however, it still has an impact to this participant. In this study,

management's decisions and practices were relevant to the individual mineworkers, although the latter were not directly involved in the management processes. Women mineworkers were represented in trade unions, who negotiated on their behalf with mine management. Women underground mineworkers were, however, directly affected by management's decisions, for example in the regard to the provision of health care services rendered by the professional nurses as per the company policy.

In this study, the development of guidelines for implementation of occupational health services that meet women's health care needs, may bridge this gap between women's health needs and mine management's policies (Gregson et al. 2011:58).

2.4.4 MACROSYSTEM

In this research, macrosystem is referred to as the socio-cultural context of the work environment of the selected coalmine. This level of ecological systems theory encompasses the environment in which the person lives and all other systems that affect them (Richard et al. 2011:311). The macrosystem incorporates the cultural values, societal groups, political and economic systems of the participants. The macrosystem can have either a positive or a negative influence on the human beings (McLaren & Hawe 2005:11).

In macrosystem, support, independence, finance, choices and participation systems are dynamic and interacting with each other through rules, regulations and resources (Gregson et al. 2001:55). It also includes the policies and procedures of the Department of Minerals and Resources, which governs the conduct of the selected coalmine, and the coalmine's insurance provider's policies. Although policy decisions are influenced by certain situations, traditions and customs, the researcher's approach in this study was to develop an understanding of the relationship between the underground environment, policies, and health concerns of women mineworkers including the professional nurses' perceptions and mine management's expectations.

2.5 SUMMARY

In this chapter, the philosophical assumptions and theoretical framework were discussed and included constructivism as a paradigm and the socio-ecological model. These theoretical perspectives assisted the researcher in the empirical study as well as in the formulation of guidelines for occupational health and a safety programme to address women mineworkers' health concerns at a selected coalmine. SEM model was used to inform the data collection and analysis processes to understand specific levels or factors that included but are not solely delimited by: a. Individual ("Ontological") factors including psychosocial characteristics; history/experiences b.

Interpersonal (“Microsystem”) factors (behavior and relationships context such as WIM and mine management) c. Community (“Exosystem”) factors (structures, institutions, social networks in a coalmine context) d. Socio-cultural (“Macrosystem”) factors (practices, and convictions shared in a larger mining context)

The SEM factors used in this study are discussed further in the next chapter, which articulates the research methods (design, study setting, recruitment and selection of study participants, data collection and analysis and application of rigor) for phase one of the study.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter focuses on phase one of the study and covers the research design, research method, the setting as the context of the selected mine, population, selection of participants, data collection, data analysis and trustworthiness. The objective of phase one was to explore and describe the women mineworkers' health concerns, professional nurses' perceptions of women's health concerns and the mine management's expectations regarding women's health services at the selected coalmine. Hereunder is the discussion of the research methodology that was used to conduct this phase of the study.

3.2 PHASE 1: EMPIRICAL STUDY

In phase one of the study, the researcher conducted semi-structured interviews with women mineworkers, professional nurses and mine managers at the selected mine. The semi-structured interviews focused on women's health concerns and the expectations of mine management regarding health services a. In this phase, the intention was to generate knowledge through empirical research to develop initial statements on women's health concerns. From the results of this phase, the guidelines were formulated and refined in phase 2 of the study, to progressively incorporate women's health services into the existing OHS programme.

3.3 RESEARCH DESIGN

The case study is a research design defined by Yin (2014:24) as "the logic that links the data to be collected and the conclusions to be drawn to the initial question(s) of the study." This research design provided the researcher with an overall plan for addressing the research questions, including specifications for enhancing the study's integrity (Yin 2014:27). A case study is an empirical inquiry that investigates "a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not evident" (Yin 2009:13). A single-case study was an appropriate design as the objective was to gain an understanding (Yin 2014:40-42) of the women's health concerns at the selected mine.

In this study, the researcher gained insight and understanding of the study over a period of time, where a single longitudinal case of a coalmine was used. Case study research was most appropriate given the different populations relevant to the study within one environment. Case study research explores a phenomenon in its context and assumes that this context is of significance to the phenomenon under study (Clarke & Reed 2010:283). In the study, each case was individually explored to promote involvement and richness to understand the women's health concerns from the perspective of the different study populations (Lauckner & Krupa 2012:6).

An understanding of women's health informed the processes (Yin 2014:40-42) of the formulation of guidelines as indicated by Dyer and Wilkins (1991, cited in Barratt, Choi & Li 2011:332). A single case study design enabled the researcher to capture women's health concerns in much more detail within the coalmining context. In the coalmine context, the boundaries between women's health concerns and coalmining were not evident (Yin 2014:2).

3.3.1 LONGITUDINAL SINGLE HOLISTIC CASE STUDY DESIGN

In this study, a longitudinal single case study design was used (Yin 2014:51). According to Yin (2014:51), a longitudinal single case comprehends the same single case at two or more different points in time. In this study, the two separate areas were the underground and surface sections as the parts of the selected mine. The researcher sought to identify how individual participants' health needs and practices change (Yin 2014:53) while they are underground and on the surface of the coalmine.

To ensure that the evidence addressed the research questions and to avoid biased conclusions, the researcher considered the components of the case study research.

3.3.2 COMPONENTS OF CASE STUDY RESEARCH

The elements of case study research design apply to qualitative studies, with more focus on the logical problem, rather than the logistical problem (Yin 2014:27). The essential components of case study research that were applicable to this study was defining the case and bounding the case, as explained below.

Defining the case

In this study, the case was the selected coalmine. For the researcher to be able to collect appropriate data from each study participant, questions and semi-structured interview guides were necessary. Relevant questions such as, 'how long had you been working underground at this

mine?’ were posed, and suggestions on how to address the women’s health concerns were probed (Yin 2014:31).

Bounding the case

Bounding the case is an essential part of unit analysis, which follows the case definition. Yin (2014:34) expounds that bounding the case refers to the focus on the specific populations, which is specific within the coalmine environment, and the time spent with the populations. In this study, the focus was not on all the mineworkers at the selected coalmine, but on female women underground mineworkers, the professional nurses working at the OHS centre and mine management. These study participants were relevant for collecting suitable data on women’s health concerns, given the type of work they performed as linked to their period of employment within the selected mine.

By following the research questions and the evidence from the literature, the researcher could direct the case study analysis. This assisted the researcher in arranging the complete case study and describing possible interpretation (Yin 2014:136).

3.4 RESEARCH METHOD

The study setting was carefully considered in developing the process that the researcher followed in structuring the study, including gathering and analysing data systematically (De Vos et al. 2011:109), as described below.

3.4.1 STUDY SETTING

The research setting is the physical position or place selected for data collection and the order in which data collection (Polit & Beck 2012:766). Kitson et al. (1998:150) also refer to a setting as a context or environment in which the proposed change is to be implemented. The study was conducted in the selected mine in Mpumalanga Province. The selected coalmine was identified as the setting of the study as it had both the surface and underground sections. The selected coalmine used to have villages where mineworkers were residing. However, due to legislative changes, all villages were relocated, and mineworkers with their families were moved to different townships around the coalmine.

Like every other mine, at the main entrance gate there is a security office where everybody who enters the mine, including staff and visitors, registers. Random searches are conducted for all visitors and mineworkers upon entering the mine premises for safety purposes. All the mineworkers working at the selected coalmine had clock cards which assisted in entering the premises.

The OHS centre is located on the surface section, on the west side near the plant. The OHS centre offered the following services: medical surveillance, services that relate to injuries on duty, occupational diseases such as tuberculosis (TB), pneumoconiosis, noise-induced hearing loss, silicosis and other work-related conditions. Most of the occupational illness management, TB management, and medical surveillance, including chronic disease management and monitoring are done at the OHS centre. Such illnesses are reported by the professional nurses to the Medical Bureau of Occupational Diseases for Compensation (DMR Guidelines Minimum Standard of Fitness to perform work on Mines 2010). However, the workers collect medicines from the public clinic or hospital.

The administrative block of the mine is next to the entrance. In this block, the offices of the entire mine management are located. The management of the coalmine comprised of the Mine Manager, the Human Resources Manager, the Risk Manager, and Technical Manager. Within this block, there are mine clerks and office administrators of both sexes. The mine clerks and administrators work the straight shift of 06:00 – 16:00 from Monday to Friday. The extraordinary circumstance is that the mine clerks and office administrators are compelled to wear closed, comfortable shoes even when working in the offices.

Mineworkers run the stores department and both sexes worked the same number of hours as the mine clerks and administrators. At the stores department, mineworkers always wear Personal Protective Equipment (PPE), but without the goggles and dust masks. This was because they were not exposed to any dust, fumes and gases inside the stores department.

The plant is where mineworkers worked in a high-risk environment. It is compulsory for the mineworkers in the plant to always wear their PPE when on duty. The PPE included safety overalls, safety boots, hard hats, goggles, gloves, reflective vests and dust masks to protect themselves from hazards within the work environment.

The underground section of the selected coalmine is 20km away from the OHS centre and 55km away from the nearest healthcare centre in the nearest town. This distance poses a challenge to the mineworkers' health and safety. For example, in cases of emergency where a mineworker needs advanced medical assistance, the injured or sick mineworker may experience complications and fatalities before reaching an emergency treatment centre in town. Such may lead to more costs and the selected coalmine may be fined. The fines range from the process of initiating a claim with the insurer for the payment of the injured mineworker, or fatality payment to the beneficiaries of the deceased mineworker.

3.4.2 POPULATION

Three different study populations were included. The populations were the women mineworkers, the professional nurses and the mine management. During the time of this study, women represented 15% of the overall underground workforce. The professional nurses are responsible for rendering health care services to the mineworkers at the selected coalmine. There were only four professional nurses working at the OHS centre at the time of the study. A total of four mine managers were working at the selected coalmine at the time of the study. The mine managers were responsible and accountable for the health and safety of all their workers through OHS policies and programmes, to reduce health and safety risks in the work environment (South Africa. 1996a; Mine Health and Safety Act, Act No 29 of 1996).

3.4.3 SAMPLING

3.4.3.1 WOMEN MINEWORKERS

Thirteen women mineworkers were selected from a group of 155 permanent women mineworkers at the selected coalmine. The researcher used purposive sampling for selecting the women working underground. The sample size was based on the information needed (De Vos 2011:224) and the availability of participants who met the substantive and conceptual needs and benefited the study (Holloway & Wheeler 2010:10).

The participants were appointed as coalmine workers and had been employed for at least 12 months. These female underground workers were selected after returning from annual leave while undergoing obligatory medical examinations. The researcher selected women underground mineworkers from different age groups. See table 2. It was important to include workers across the age range as the different age groups presented with various women's health concerns. Data saturation guided the researcher in selecting the number of participants; meaning that selection was carried out until no more new information emerged from the interviews and sufficiency was achieved (Guest et al. 2006:74). Saturation was reached with the 13th participant. As this was a qualitative case study, a sample size of 13 women is adequate (Polit & Beck 2014). These interviews were conducted from October 2015 until January 2016.

3.4.2.2 PROFESSIONAL NURSES

Since there were only four professional nurses working at the OHS centre at the time of the study, the researcher invited all of them to participate. They all agreed to and signed the consent forms. The interviews were conducted between January and February 2016. See table 3.

3.4.2.3 MINE MANAGEMENT

Since mine management comprised of only four managers, the researcher invited all of them to participate in the study, and they all signed the consent forms. They were interviewed in March 2016. See table 4.

3.4.3 SELECTION OF PARTICIPANTS

The researcher used purposive sampling to recruit and select the participants. According to De Vos et al. (2011:392) purposive sampling involves “taking the population parameters into consideration and then basing the sample on these parameters.” The sample size was based on the information needed and willingness of participants to be part of the study. The purpose of considering the parameters enabled the researcher to select the sample by her own knowledge of the population, thereby ensuring that a sample that is rich in information was included (Simons 2009:36). The researcher, therefore, consciously selected a sample based on her knowledge of the participants’ health concerns. The researcher recruited the participants purposively when they were returning from their annual leave during their induction week at the OHS centre. This was due to insufficient space at the training facility where the selection of participants was initially arranged. The researcher introduced herself to the participants, explaining the aim of the study.

The selection of participants took place at the OHS centre where the researcher sought authorization from the General Manager. To identify those willing to participate in the study, the Risk Manager was then assigned to assist and collect the researcher at the entrance gate of the selected coalmine. The researcher made appointments to meet the prospective participants and requested them to give informed consent for taking part in the study. The mining production was not disturbed since the interviews took place when the participants were attending their induction. The induction included medical surveillance at the OHS centre after their annual leave and before they commenced their duties. Due to the insufficient space at the training facility, mine management arranged that the interviews take place at the OHS centre since it had an extra building with many offices.

3.5 DATA COLLECTION

The study received clearance from the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria and the necessary permission from the General Manager of the selected coalmine before the collection of data. Semi-structured interviews were used to collect data from the three populations. The three populations provided the study with triangulation as a

rigour strategy (Eisenhardt, 1989; Choi & Hong, 2002 cited in Barratt, Choi & Li 2011) to increase the credibility of data (De Vos et al. 2011:420).

3.5.1 DEVELOPMENT OF INTERVIEW GUIDES

The researcher used semi-structured interviews to gather information on participants' ideas, experiences and opinions (Polit & Beck 2014:394) regarding the health concerns of women mineworkers. De Vos et al. (2011:348) indicate that semi-structured interviews provide one of the most practical processes of gathering oral information from study participants. The researcher constructed beforehand the list of questions to ask each participant. The researcher followed the semi-structured interview guide when asking questions to the participants (Blandford 2013:2). The body of knowledge or preliminary findings from the semi-structured interviews assisted the researcher in the formulation of the guidelines for the OHS programme to address the women's health concerns of mineworkers.

The semi-structured interview questions were prepared in consideration of flexibility when listing the key issues relevant to the three population groups (see Appendices B1,2,3). The process involved in the preparation of the interview guide followed a progressive adaptation and filtration to ensure that the questions were clear and understood by the study participants. The researcher requested the supervisory team to review the interview guides. The questions were piloted even though this was a qualitative study. The piloting of the questions afforded the researcher an opportunity to practise, rather than going through the issues in her office.

The open-ended Interview questions focused on different aspects of women health concerns of female mineworkers. This included pertinent health concerns among female underground miners, women's health services perspective from professional nurses related to implementing guidelines, and expectations for incorporating women's health services as part of the current OHS programme.

3.5.2 CONDUCTING SEMI-STRUCTURED INTERVIEWS

The researcher only commenced with collecting data after the participants had signed informed consent forms. The researcher started the interviews by initially recording the demographic information about the participant, which included the age, sex, job title and place of residence. Such information was useful to the researcher during the data analysis and report writing (Blandford 2013:23). In this study, the individual semi-structured interviews were conducted on a face to face basis and were audiotaped with the permission of the interviewees. Numerous approaches to strengthen interviews were followed for example handling the interview, having

fundamental listening skills and stimulating the interviewee with sensitive probing (Russell et al. 2002:128). Probing by the researcher was of importance in ensuring that complete and consistent information was gathered from all study participants (Harrel & Bradley 2009:27).

Probing was used as it is a fundamental element of semi-structured interviews, especially during validation of data; it could however be intimidating to some participants. For this reason, the researcher was discreet and subtle in ensuring that the interviews were conversational or non-threatening. As a result, rich data and more information was obtained from the participants.

Semi-structured interviews lasted for approximately 45 – 60 minutes per participant, depending on the availability of the interviewee (Simons 2009:48). Open-ended questions were asked. However, some issues that were not included in the interview guide were asked as matters of importance to the interviewee came up or were noticed. Open-ended questions allowed the participants to provide more detailed information and allowed the researcher probe and make follow up clarifications (Turner 2010:756). The researcher used similar wording in all the interviews.

Recording what the participants said was essential to ensure that the actual verbatim responses were the participants' actual data. This also assisted in ensuring the researcher draw from both the recorded information and the field notes (Holloway & Wheeler 2010:95).

After each semi-structured interview, the researcher wrote field notes to document the behaviour, expressions and words of the participants and the researcher's thoughts and observations (Yin 2014:110). The researcher collected data from the selected participants in the following order: firstly, interviews were conducted with women mineworkers, then the professional nurses, followed by interviews with mine management. By interviewing mine management lastly, the researcher avoided being influenced by the ideas of managers before identifying the health concerns of women mineworkers.

3.5.3 ADVANTAGES AND DISADVANTAGES OF SEMI-STRUCTURED INTERVIEWS IN THIS STUDY

In qualitative research, interviews are the best tools to use due to their high flexibility and participants feel free to relate their problems, concerns and words were changed without changing the meaning of the question (Holloway & Wheeler 2010:88). The benefit of these interviews was that the participants and the researcher could communicate in a conversation style (Harrel & Bradley 2009:35).

The conversation was not rigid, but fluid; covering different areas of the phenomenon under study with each participant to get rich, detailed data (Yin 2014:106). The questions in the semi-structured

interviews evolved as the interview proceeded (Dearnley 2005:21). In this study, during the interview, the researcher used discretion about the order in which questions were asked, but the questions were standardised. The researcher further probed for more answers with a view to ensuring that the responses given by the participants provided rich data.

The disadvantage of this type of interview is that it may last longer than the anticipated period. The researcher usually knows what to ask due to the advance preparation, but does not know what the answer will be from the participant (Holloway & Wheeler 2010:94). The researcher's role was to encourage participants to talk freely about health concerns that impact women employed at the mine. Thus, obtaining rich data from the participants (Yin 2014:107) was likely. For example, some participants took more than the estimated time for the interview and the researcher had to stop the conversation in an appropriate manner and move to the next question to ensure that all questions were asked and answered by the participant. However, the researcher noticed that the participants did not easily accept this.

3.5.4 SEMI-STRUCTURED INTERVIEWS WITH WOMEN MINEWORKERS

The availability of office space at the OHS centre offered a conducive setting that ensured privacy for interviews with female underground mineworker participants. The semi-structured interviews with women mineworkers were conducted in a private office at the OHS centre. The researcher provided each participant with an information leaflet (See Appendix A1) that contained all the necessary information to allow each participant to make an informed decision to participate voluntarily in the study.

The women mineworkers were interviewed over a period of four months. The researcher asked a set of four questions which were followed by probes (See Appendix B1). The interviews were conducted in English and Isi Zulu, in which the researcher is conversant, as these are the common languages used by mineworkers at the selected coalmine. The questions asked ranged from biographic information, medical issues, occupational injuries or diseases, reproductive health concerns or needs and concerns.

3.5.5 SEMI-STRUCTURED INTERVIEWS WITH PROFESSIONAL NURSES

As initially arranged, the semi-structured interviews with PNs, who were interviewed after the women mineworkers, were also conducted in a private office at the OHS centre. The researcher provided each participant with an information leaflet (See Appendix A2) that contained all the necessary information to allow every participant to make an informed decision to participate voluntarily in the study.

The PNs were interviewed over a period of two months. The researcher asked the PNs a set of 4 questions (See Appendix B2) which were followed by probes. The semi-structured interviews were conducted in English, in which the researcher is conversant, as this is the common and formal language used by PNs at the mine's OHS centre. The questions asked ranged from biographic information; services provided at the OHS centre for women mineworkers, specific women's health problems, which women underground mineworkers presented and occupational injuries or diseases.

3.5.6 SEMI-STRUCTURED INTERVIEWS WITH MINE MANAGEMENT

The researcher interviewed mine management last. By interviewing mine management lastly, the researcher avoided being influenced by the ideas of managers before identifying the health concerns of women mineworkers. The semi-structured interviews with mine management were conducted in a private boardroom at the administration offices of the coalmine. The researcher provided each participant with an information leaflet (see Appendix A3) that contained all the necessary information to allow each participant to make an informed decision to participate voluntarily in the study.

The mine management were interviewed over a period of one month. The researcher asked the mine management a set of 4 questions which were followed by probes (See Appendix B3). Likewise, the interviews were conducted in English, as this is the official language used by the mine management. The questions asked ranged from biographic information, services provided at the OHS centre for women mineworkers, specific women's health problems which women underground mineworkers presented with and occupational injuries and diseases.

3.5.7 CHALLENGES ENCOUNTERED DURING THE DATA COLLECTION

Challenges with conducting semi-structured interviews with different study populations indicated the following: balancing of power relations, control over and direction of interaction, a need for balance between open-ended and focused interviewing, participants' cooperation and trust with the researcher.

Power relations

Power relations were evident in the interviews. All the professional nurses at the OHS centre knew the researcher. The interviews with them lasted longer than the other participants because they knew how the health services were rendered before the outsourcing of the health service. The interviews were different from the others because they were more relaxed and PNs sometimes called the researcher by first name. While in interviews between the researcher and the women

who worked in the underground coalmine were not as personal because none of them knew the researcher. However, although two of the mine managers did not know the researcher, they had heard about her from their colleagues and may have seen her name in the mine's archived documents.

Qualitative research promotes a balancing of power in the researcher–participant relationship. In this regard, the researcher adopted an egalitarian approach in an endeavor to rebalance power and encourage participants by using a conversational interviewing approach. This rebalancing helped the researcher to understand the space and background of female mineworkers. This approach resonated with or was enhanced by the researcher's training background. As a nurse, the researcher also drew upon aspects of patient-centred or relationship-centred care during interviews. Both the researcher and the participants made significant contributions to the research (Epstein et al. 2005:1517; Suchman 2006:540).

Control over and direction of interaction

Initially, the researcher controlled the direction of the conversation by asking questions. This shifted as the participants became more comfortable with the interview and commenced with the narration, which nearly exceeded the timeframe for the interviews. As the interviews proceeded, most participants became comfortable and started to have control over or direct the discussions by including information, which was not always immediately pertinent. However, the researcher remained focused as directed by the questions.

A need for balance between open-ended and focused interviewing

As semi-structured interviews allow for open-ended questioning, it was challenging for the researcher to remain focused on those pre-determined questions. Simultaneously, *extra* information surfaced during interviews.

Participants' cooperation and trust with the researcher

Some participants were not fully cooperating when responding to the question. This was observed when some were withholding valuable information, not because they did not understand the question, but because the participant was uncomfortable with the question asked. Therefore, the participant preferred to say, "I do not know", even if he or she had an answer. Some of the participants were reluctant to respond to the questions, mentioning that the mine might victimise them. However, after being re-assured by the researcher that the interviews were confidential, they opened up and answered the questions freely.

Sugar-coating the engagement

Some of the participants were responding to the questions in a way that seemed to be more pleasant and acceptable just to finish the interview. The sugar-coating responses were from those participants who were familiar with the stance of the researcher as a former employee of the mine. This position implicated some participants not to respond to some questions, even after following up by repeating the question.

Demand characteristic effect

Mineworkers in South Africa developed a working communication dialectic called Fanakalo (Benya 2009:29) to facilitate interaction as they are from different ethnic groups. This is what is referred to as the demand characteristic effect (McCambridge et al. 2012:2) which was noticed during the interviews. Moodie (1994:13) describes Fanakalo as a lingo to communicate across language divides. The researcher could not understand some of the words and she asked for clarification. However, the participants did not have an English word for them, for example words like *stortings* referring to heavy bleeding, *stick site* or *madala site*, referring to the old unused section of the mine.

Social desirability

Researchers are sometimes challenged by ensuring that participants provide truthful rather than socially desirable responses. According to Van de Mortel (2008:41), social desirability is the tendency for participants to present a favourable image of themselves during data collection (Johnson & Fendrich 2005:1661). The participants appeared to think that the information they are providing might conform to socially acceptable values, avoid criticism, or gain social approval (Van de Mortel 2008: 41). This usually occurs in cases where sensitive questions are asked (King & Brunner 2000 81). In this study, some participants responded to the questions in a manner that they believed was the preferred answer rather than the truthful or socially undesirable answer (van de Mortel 2008: 41; Barriball & While 1994:331). The researcher handled this by encouraging participants to express their views in a truthful manner.

3.5.8 COMPILATION OF FIELD NOTES

In the case of the study research, the greatest part of the database is the investigator's field notes that were recorded during the data collection process. Field notes are written records, which comprise of what is seen, heard, experienced and thought about by the researcher during the interview (De Vos et al. 2011:359). Since there was no field observer during the interviews, the researcher explained to the participants not to be distracted when they noticed her writing some

notes, which were to be utilised by the researcher during data analysis. Such field notes are classified into personal and observational notes (Holloway & Wheeler 2010:95). The researcher wrote both personal and observational field notes.

Personal field notes

Personal field notes are the researcher's opinions, which are noticed during the interview. Personal field notes encompass the reflections relating to ethical dilemmas (Polit & Beck 2014:408). In this study, the field notes were handwritten. These field notes were systematically compiled, classified and gathered in a diary format. The field notes were stored so that it became easier to retrieve when needed at a later stage. The researcher was aware that the field notes should not be edited at the reporting stage (Yin 2014:120). The researcher wrote field notes after each interview, to document the behaviour, expression and words of the participants' as well as the researcher's thoughts and observations (Holloway & Wheeler 2010:96).

Observational fieldnotes

When taking field notes, the researcher organised and took accurate notes so that it became easier for her to interpret the data. The researcher used descriptive words to document what she observed so as not to end up with assumptions about what the researcher meant during the final report writing (Harrel & Bradley 2009:57). For example, instead of noting that the room appeared "comfortable," the researcher stated that the room included soft lighting and cushioned chairs that could be moved around by the study participants. When writing the field notes, the researcher described the social environment and the way in which participants communicated. This was done by recording the patterns of interactions, the frequency of interactions, the direction of communication patterns, non-verbal communication and patterns of specific behaviours (Holloway & Wheeler 2010:95). The researcher further described the participants' characteristics and their roles within the mine. Field notes included the exact quotes or comments made by the study participants. When writing fieldnotes, the researcher reflected on, for example, the ideas, impressions, thoughts and criticisms of the participants, including the unanswered questions and concerns that transpired from analysing the observational data.

3.6 DATA ANALYSIS

In qualitative research, it is common for data collection and data analysis to occur concurrently (Yin 2014: 128). In this study, data analysis consisted of probing, categorising, tabulating and testing qualitative evidence to address the research questions. Hsieh and Shannon (2005:1278). explain data analysis as a research method for the subjective interpretation of the content of text data

through the systematic classification process of coding and identifying themes or patterns. According to Burns and Groove (2011:93), data analysis is the mechanism of reducing and organising data to produce findings that require interpretation by the researcher.

The researcher used inductive content analysis as described by Elo and Kyngäs (2008:107) to analyse the data. Since minimal studies are dealing with the phenomenon under study, the inductive content analysis was relevant for the study (Elo and Kyngäs 2008:107). When using content analysis, the aim was to analyse the collected data from the women mineworkers, professional nurses and mine management to describe the phenomenon. Data analysis is discussed in detail in Chapter 4.

3.7 TRUSTWORTHINESS

The researcher used the framework for trustworthiness to ensure rigour as described by Lincoln and Guba (1985:315), as described below.

Credibility

Credibility refers to confidence in the truth of the data and interpretation thereof. It further deals with the question of how compatible are the findings with reality. Tracy (2010:842) describes credibility as the trustworthiness, verisimilitude, and plausibility of the results of the research.

Dependability

Dependability, according to Shenton (2004:71), is the stability of the data over time and conditions. This criterion is met once the researcher has demonstrated the credibility of the findings.

Confirmability

Confirmability refers to objectivity, the potential for congruence between two or more independent people about the data's accuracy, relevance or meaning. Shenton (2004:72) refers to confirmability as the researcher's equal concern to objectivity.

Transferability

Transferability implies the potential for extrapolation, or the extent to which the findings can be transferred from one specified settings or groups to another (De Vos et al. 2011:420). D'Souza et al. (2013:3) suggest that transferability is also enhanced through detailed description of data, which includes field notes.

The strategies employed by the researcher to achieve data trustworthiness are summarised in Table 1.

TABLE 1: STRATEGIES TO ENSURE RIGOUR

Approaches to rigour	Strategies
Credibility	<p>Prolonged engagement – the researcher spent sufficient time at the site with the participants to gain full understanding of the phenomenon.</p> <p>Triangulation – several participants were used to study the phenomenon to be able to confirm the data and to ensure the data were complete (Begley 1996; Shih 1998, Casey & Murphy 2009 cited in Houghton et al. 2013).</p> <p>Peer debriefing – the researcher used an independent qualitative researcher who checked if they agreed with the data labels and the logical paths taken to arrive at those labels (Graneheim & Lundman 2004).</p>
Dependability	<p>Audit trail – the researcher outlined the decisions made throughout the research process to provide a rationale for the methodological and interpretative judgements of the investigator (Houghton et al. 2013).</p> <p>Reflexivity – the researcher kept a reflective diary to provide a rationale for decisions made, instincts and personal challenges that the researcher experienced during the research (Primeau 2003; Rolfe 2006).</p>
Confirmability	<p>Audit trail - the researcher outlined the decisions made throughout the research process to provide a rationale for the methodological and interpretative judgements (Houghton et al. 2013).</p> <p>Reflexivity - the researcher kept a reflective diary to provide a rationale for decisions made, instincts and personal challenges that the researcher may have experienced during the research (Primeau 2003; Rolfe 2006).</p>
Transferability	<p>Thick descriptions – the researcher provided sufficient details about the study's design and methodology, and the participants.</p>

3.8 SUMMARY

This chapter focused on phase one of this study, which covered the research design, the research method, the setting as the context of the mine, the population, the selection of participants, which included the women underground mineworkers, the professional nurses working at the OHS centre and the mine management of the selected coalmine. In addition, data collection, using semi-structured interviews, and trustworthiness were discussed.

The next chapter of this study outlines the data analysis and interpretation in detail.

CHAPTER 4

ANALYSIS AND INTERPRETATION OF THE DATA

4.1 INTRODUCTION

In this chapter, the researcher analysed the collected data and the interpretation thereof. It is a demanding task for the researcher to present the findings from the qualitative content analysis (Schilling 2006:34). The qualitative content analysis does not create counts and statistical significance, however; patterns, themes, and categories which are of importance to women's health concerns were retrieved and visually presented (Huberman & Miles 1994:433; Patton 2003:111). When presenting qualitative content analysis results, the researcher's aim was to create the stability or equilibrium between explanation and interpretation of data. Qualitative research is fundamentally interpretive, and interpretation represents the researcher's personal and theoretical knowledge of the women's health concerns at the selected coalmine (Patton 2002:504). The researcher used inductive content analysis as described by Elo and Kyngäs (2008:107) to analyse the data. The aim was to analyse collected data from the women mineworkers, professional nurses and mine management to describe their different perceptions of women's health concerns.

In this study, the researcher did the verbatim transcriptions of all the audiotapes herself. Verbatim transcription is referred to as the replication of the precise words, which are captured in an audio or video recording (Poland 1995:290). The audiotapes, which were transcribed, included 13 for women mineworkers, four for the professional nurses and another four for mine management. Transcriptions took a long time, and each interview took between 5-6 hours to transcribe. The following processes were followed: the researcher listened to each recorded audiotape carefully, with an effort to capture a word-to-word reproduction of the recorded data. The researcher also paid attention to involuntary vocalisations such as coughing, sneezing, laughing and crying, responses signs such as hmm, ok, yah, oh, um and non-verbal communication which included nodding the head, hand gestures, restlessness, nervousness and pausing. These sounds had meaning and provided some explanation of the discussion between the researcher and the participant (Poland 1995:291).

The researcher familiarised herself with the data by repeatedly listening to the recorded audiotapes. Furthermore, the researcher documented words or concepts that constantly came up during the interview, to single out the first impressions. The researcher became familiar with the data and identified the first impression concepts or words that came up. Fieldnotes were sorted and transcribed so that the researcher became aware of essential issues in the data. All transcripts were printed out as hard copies, arranged and filed separately for women mineworkers, the professional nurses and the mine management. The researcher followed the inductive content analysis approach that is described below.

4.2 INDUCTIVE CONTENT ANALYSIS

The inductive content analysis is described by Schilling (2006:28), as “a systemic rule-based process of analysing verbal and textual data such as interviews, group discussions, and documents”. Canavagh (1997:6) agrees that through content analysis, it is possible to reduce words into fewer content-related categories. It is assumed that when classified into the same categories, words and phrases share the same meaning. Content analysis was done in an inductive way to achieve the aims of the study (Hashemnezhad 2005:60). The rationale for using inductive content analysis approach was to condense the raw data into categories or themes based on valid conclusions and interpretations (Patton 2002:432).

Yin (2014:131), as well as Polit and Beck (2014:510), suggest starting the analysis with a minor question, and then identifying the evidence that addresses the question as ideal. In this study, the minor question included for example “which health services are provided for women underground mineworkers at this coalmine”? The participant who was the mine manager responded by asking, “apart from the annual medical”, and the researcher’s response was “yes”. The participant elaborated by mentioning HIV and AIDS services, the employee wellness programme which entails counselling for not only women mineworkers, but all mineworkers. After probing by the researcher, the participant explained in detail everything about the health services.

In this study, the content analysis used inductive reasoning to elicit themes and categories from the data through examination and comparison. In the inductive content analysis, the process of analysis moved from the specific to the general, so that particular instances were observed and then combined into a larger whole or general statement (Chinn & Kramer 1999).

The researcher followed a series of steps when analysing the data from the women mineworkers, professional nurses and mine management, as detailed below.

Step 1: Preparation Phase

The inductive analysis consists of three main phases that is, preparation, organising and reporting. However, there are no systematic rules for analysing data. The key feature of all content analysis is that the many words of the text are classified into much smaller content categories (Burnard 1996:279). The preparation phase started with selecting the unit of analysis (Guthrie et al. 2004:288), which in this study was a word or a theme (Polit & Beck 2014). For the researcher to decide what to analyse in what detail, sampling considerations were important factors before selecting the unit of analysis (Cavanagh 1997:7).

Selecting the unit of analysis

The unit of analysis refers to the objects of study, for example, a person, a programme, an organisation, or a classroom, a clinic, community, state or nation (Patton 2003). A unit of meaning can consist of more than one sentence with several meanings. On that account, using it as a unit of analysis would make the analysis process overwhelming and difficult (Graneheim & Lundman 2004:109). The researcher's role was to define the unit of analysis, which in this study meant the basic unit of the text that was categorised or grouped during the content analysis. The researcher ensured that the messages were separated into units before being coded. Individual themes were utilised as the unit for analysis in the form of a paragraph. This process included open coding, creating categories and abstraction.

Making sense of the data

The researcher attempted to make sense of the data and to learn 'what was going on' to acquire a sense of the whole (Burnard 1991:461). According to Elo and Kyngäs (2008:109), when reading the data, the researcher focuses on who was telling? Where it was happening? When did it happen? What was happening? As well as why it is happening? The researcher's intention was to become involved in the data, which is why the transcribed interviews were read through several times (Burnard 1991:462). This process of becoming involved in the data was used to become more conversant with the participants' experiences regarding women's health concerns. After making sense of the data, the researcher started to organise the data (Kyngäs & Vanhanen 1999).

Step 2: Organisation of data

The organising phase entailed open coding, creating categories and abstraction. During open coding, the researcher wrote the notes and headings in the text while reading it. The written material was read through again, and as many headings as necessary were recorded in the margins to describe all aspects of the content of the transcribed interviews (Burnard 1991:462; Hsieh & Shannon 2005:1281). The different types of coding are described below.

Open coding

Open coding meant that the notes and headings were written in the text while reading it. The written material was reread through by the researcher. Multiple headings were drafted down in the margins to describe all aspects of the content (Hsieh & Shannon 2005:1278). After the accomplishment of adequate and acceptable coding consistency, the coding rules were applied to the whole text compilation. The researcher used a reasonable and standardised process to develop and verify the coding scheme early in the process. Coding the data sample was ideal in ensuring uniformity and simplifying category definitions. During the coding process, the researcher checked the coding repeatedly, to prevent a move of what the codes meant (Schilling 2006:33). Coding continued. As new data were collected continuously, new themes and concepts were developed and added to the coding manual.

After coding the sample, the researcher checked the coding consistency which was done through an assessment of inter-coder agreement. In cases of the low level of uniformity, the researcher revised the coding rules, where there were difficulties and uncertainties were regarding the definitions of categories, coding rules, or categorisation of specific cases, these were explained and conclusions made (Schilling 2006:34). The process of coding sample text, checking coding uniformity, and revising coding rules was a repetitive step, which carried on until adequate and acceptable coding uniformity or consistency was achieved (Elo & Kyngäs 2008:112).

Verification of the consistency of the coding sheets

After coding the entire data set, the researcher re-checked the consistency of coding. The headings were collected from the margins onto coding sheets and categories, which were freely generated at this stage (Burnard 1996:279). According to Elo and Kyngäs (2008:109), it is not safe to assume that, if a sample is coded in a consistent and reliable manner, the coding of the entire text is also consistent. The researcher understood that the categories, as well as the rules and regulations for coding, might change over time; and may lead to a wider inconsistency (Huberman & Miles 1994:428).

Grouping of lists of categories

After the open coding, the lists of categories were grouped under higher order headings (Burnard 1996:280). The main intention of grouping data was to reduce the number of categories by collapsing those that are similar or dissimilar into broader higher order categories (Burnard 1991:462). The researcher understood the identified themes and categories, together with their properties. Furthermore, the researcher made presumptions and presented reconstructions of

meanings derived from the data. In this step, the researcher explored the properties and elements of categories, identified the relationships between categories, acknowledged the patterns, and tested the categories against the whole kind of data (Guthrie et al. 2004:288). This step was essential in the analysis process, and its accomplishment was dependent on the researcher's capability of reasoning.

Categorisation

Creating categories was not merely bringing together similar or related data; instead, data was classified as 'belonging' to a particular group. This implies a comparison between these data and other specific data that do not belong to the same category. In this phase, the researcher's purpose of creating categories was to provide means of describing the phenomenon, to increase understanding and to generate knowledge (Cavanagh 1997:8). When formulating categories by inductive content analysis, the researcher decided, through interpretation, as to which aspects to put in the same category (Elo and Kyngäs 2008:111).

Abstraction

Abstraction is referred to as the formulation of a general description of the research topic through generating categories (Burnard 1996; Polit & Beck 2014). Each category was named using content-characteristic words. The researcher grouped subcategories with similar events and incidents together as categories and categories were grouped as main categories (Kyngäs & Vanhanen 1999:7). The abstraction process continued as far as was reasonable and possible.

Step 3: Reporting and analysing process and the results

The analysis process and the results were described in as much detail as possible so that another reader could have a clear understanding of how the analysis was carried out and its strengths and limitations (Patton 2002:504). This contributed to the content validity. The results were described in categories; the content of the categories was described through subcategories. For the content analysis to succeed, the researcher analysed and simplified the data and formed categories that reflected women's health concerns in a reliable manner (Kyngäs & Vanhanen 1999:8) and thereby enhancing the validity of the results (Graneheim & Lundman 2004:109). For this study to have an ultimate product of academic research, the researcher comprehensively monitored and reported the analytical processes (Patton 2003:110). Furthermore, the researcher believed that the decisions and processes regarding coding approach and techniques were utilised to establish the trustworthiness of the study. Figure 3 below represents the data analysis process.

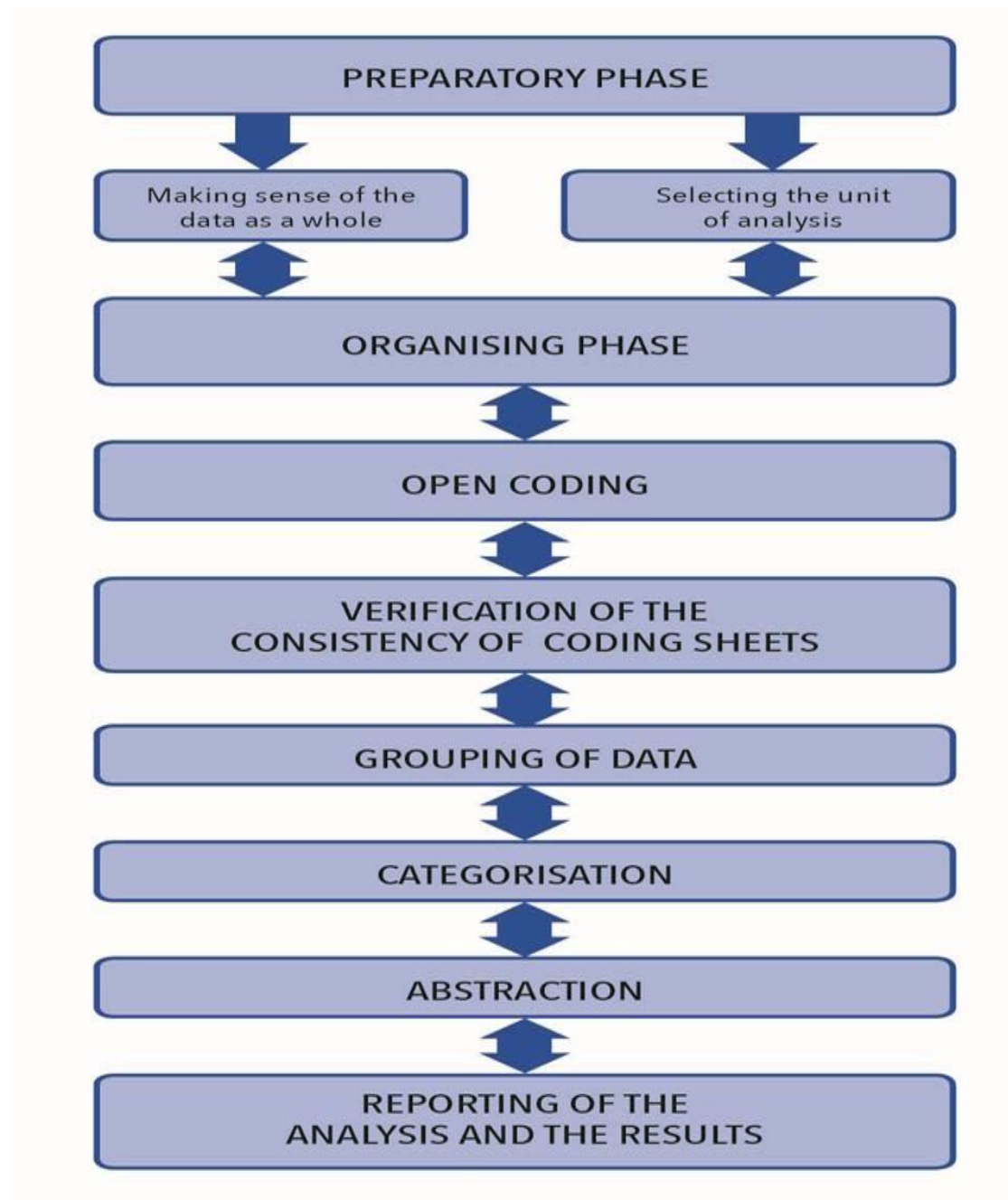


FIGURE 3: CONCEPTUAL MAP OF THE DATA ANALYSIS PROCESS

4.3 PROFILES OF THE STUDY PARTICIPANTS

Thirteen women mineworkers were interviewed. Their age groups were as follows: nine of them were below 30 years old; three of them were between 30 and 39 years of age, while one was above 40 years old. One participant was married, seven were engaged, and five were single. Four participants did not have children, eight had one or two dependants, and one had three and more dependants. Two women mineworkers' years of experience were below two years, 6 of them had

been working at the mine for 3-5 years, 4 of them used to work for 6-10 years, and one worked for more than 11 years. Twelve of the participants worked underground, and one on the surface.

TABLE 2: PROFILE OF WOMEN MINEWORKERS

DESCRIPTION	NUMBER OF PARTICIPANTS	DESCRIPTION	NUMBER OF PARTICIPANTS
Gender		11 years and above	1
Female	13	Employment status	
Race		Permanent	12
Black	12	Shift worker	
White	1	Yes	11
Age		No	2
Below 30	9	Job title	
30-39	3	General worker	2
40 and above	1	Millwright	1
Marital status		Electrician	3
Single	5	Belt attendant	2
Engaged	7	Miner	1
Married	1	Learner	2
Number of dependants		Roofbolt operator	2
None	4	Reason for clinic visit	
Below 2	8	Periodic medical examination	10
3 and above	1	Job change due to pregnancy	2
Years of experience		Post-maternity leave	1
Below 2 years	2	Medical aid	
3-5 years	6	Yes	12
6-10years	4	No	1
Non-permanent	1		

There was one participant who was working as a learner at the mine and she was not permanently employed. The other 12 participants were permanently appointed. Out of the 13 participants, 11 were working night shifts, and two were working day shift. Those working day shifts were a learner diesel mechanic and learner technician. The participants' job titles were as follows: two of them were general workers; three were electricians, one millwright, two belt attendants, one miner,

two roofbolt operators and the two learners. Ten of the participants were at the OHSC for their periodic medical examinations, two of them were visiting the OHSC for the job change due to pregnancy and one was there for post-maternity leave examination. Eleven participants had medical aid while one did not have any. The other one was a member of her mother's medical aid.

TABLE 3: PROFILE OF PROFESSIONAL NURSES

DESCRIPTION	NUMBER OF PARTICIPANTS	DESCRIPTION	NUMBER OF PARTICIPANTS
Female	3	Qualification	
Male	1	Degree in OHS	1
Race		Diploma in OHS	1
Black	1	Certificate in OHS	2
White	3	Experience	
Age		Below 2 years	1
Below 45	1	3-5 years	2
46-55	1	6-10years	1
56 and above	2	Job Status	
Relationship		Permanent	4
Single	0	Non-permanent	0
Engaged	0	Shift worker	
Married	4	Yes	0
Children		No	4
Yes	4		

Four professional nurses were interviewed: three women and one man. The male participant was the unit manager of the OHS centre. Three of the professional nurses were white. One of them was aged below 45 years, while the other two were above 56 years old. One participant was black and aged between 46 and 55 years of age. All four of the participants were trained as professional nurses. One of them held a B-Tech in Occupational Health Nursing, the other one held a Diploma in Occupational Health Nursing, and the other two held a certificate (short course) in Occupational Health Nursing.

Two participants had been working at the OHSC for 3-5 years, one was only working for less than two years while the other one had been working at the selected mine for seven years; two years which were with the new outsourced service provider. The outsourced service provider permanently employed all the participants and they all worked a straight shift from 07h00 to 16h00.

TABLE 4: PROFILE OF MINE MANAGEMENT

DESCRIPTION	NUMBER OF PARTICIPANTS	DESCRIPTION	NUMBER OF PARTICIPANTS
Gender		3-5 years	1
Female	2	Six years and above	2
Male	2	Job Status	
Race		Permanent	4
Black	0	Non-permanent	0
White	4	Job title	
Age		Underground Manager	1
Below 35	1	Manager Production Planning	1
36-40	1	Human Resources Manager	1
41 and above	2	Health, Safety and Environment Business Partner	1
Relationship		Specialty	
Single	1	Mining	1
Engaged	0	Technical	1
Married	3	HR	1
Children		Risk	1
Yes	2	Shift worker	
No	2	Yes	0
Experience		No	4
Below 2 years	1		

The researcher interviewed four mine managers. All four of the participants were white: 2 women and 2 men. One male participant worked as a Manager Production Planning at the technical department, while the other one worked at the risk department as a Health, Safety and Environment Business Partner. The two female participants worked as an Underground Manager in Mining and a Human Resources Manager respectively. All four in mine managers were permanent employees who worked from 06:00 to 16:00. Two participants had been working at the mine for six years and above, one had worked between 3–5 years, and one had worked for less than two years.

4.4 DATA ANALYSIS: WOMEN UNDERGROUND MINeworkERS

The interviews with the underground mineworkers were conducted in their ethnic languages; as such the researcher decided to write some of the quotes directly as the voices of these participants with an insertion of direct translation for academic purposes.

Table 5 depicts framework for the analysis of data obtained from women mineworkers.

TABLE 5: FRAMEWORK OF CATEGORIES FOR WOMEN MINeworkERS

Sub categories	Generic Categories	Main Category
Portable toilets, Showers, Scarcity of water	Sanitation	Health and safety milieu
Heat exhaustion, Cold symptoms	Variant Temperature	
Long walking distance, Lifting heavy equipments, Prolonged working hours	Mining work and masculinity	
Chemical exposure Gas Radiation Dust Noise Vibration	Risk exposures	Hazardous working environment
One piece overall, Number of overalls issued, Bright colour overall, Incorrect PPE after laundry	Personal Protective type of equipments	
Illumination, Slippery ground, Ergonomic/ musculoskeletal needs	Physical needs	Psycho-social working area
Pregnancy Menstruation Nursery or child care Union representation Transport	Psycho-social needs	
Training, Promotion, On the job satisfaction	Professional growth	Professional career development
Job knowledge needs, Underground experience needs	Productivity	
Hydration, Treated with dignity and respect, No favouritism and harassment	Personal needs	Health and safety needs
Eliminate gender discrimination, Promote transformation	Social needs	
Prevent occupational injuries Prevent occupational illnesses.	Health needs	

4.4.1 HEALTH AND SAFETY MILIEU

Health and safety environment is the first main category in the women mineworkers' framework. In the mining sector, health and security environment is key in the lives of all the mineworkers. In this paragraph, the health and safety environment is under the main category, which has three generic categories, that is sanitation, variant temperature and mining work and masculinity.

4.4.1.1 Sanitation

Sanitation in this study means the development and application of sanitary measures for the sake of cleanliness to protect the health of the women mineworkers. This generic category has four subcategories, which are toilets, bathrooms, showers and scarcity of water.

- **Portable toilets**

The underground section does not have fixed structures. It has portable toilets that need to be removed when the section moves, during the mining process. Toilets at the selected coalmine were dirty, in other sections, they were not emptied, and the smell was bad. According to participants, in those that were cleaned, they only poured the blue chemical which stops the smell. However, when women mineworkers utilised those toilets; they suffered from urinary tract infections. During the semi-structured interview with the researcher, some of the participants raised their concerns about the sanitation conditions at the selected coalmine's underground section. One of them mentioned that she was working because there was nowhere to get employment.

(Key: W=women; PN=professional nurse; MM =Mine management)

W5 said:

“Ngiyakhona ukusebenza, but ama toilet wa underground vele it's a no no kimi [I can work, but the underground toilets to me it's a no-no]. Angiwakhoni [I cannot tolerate them] Mawuvula i toilet and then uyithola ingcolile (frowning) iyanyanyisa [because if you open the toilet and find it dirty, it is disgusting]”.

The majority of the participants said when one was lucky to have a female colleague, they accompanied one another to the stick-side (furthest place to hide) and urinate there. Those working alone said they did not drink nor eat underground because the toilet was a problem and the stick side was far, dark and unsafe to go alone as a woman.

The health needs of the women underground mineworkers were unmet due to dirty ablution facilities. The participants mentioned that they preferred not to take bathroom breaks, but rather to hold urine until they finished work, and then utilised the toilets on the surface. One participant

alluded to the fact that she had tried several times to practice on urinating in the she-wee (a device used to urinate), but she experienced difficulties. To support this **W13's** words were:

"It's difficult to adjust, even the overalls, angisho kucosa uqgoke ngaphansi. It is a struggle nje. Ngayole she-wee. Cause angisho inomlomo o duin so. So kumele uyi aligne kahle that cuff. Vele if umistile vele uyozechamela. Eyi I don't know yazi. But minavele..Abanye bathi kumele uyi practise e shower kuqala and then bese uyayisebenzisa". [It's difficult to adjust, even the overalls we wear and underneath clothing. It's a struggle, really with this she-wee, because it has a thin opening. You need to align it well to fit, if you miss it, you will mess yourself when urinating. I really don't know, but others say you need to practice it first in the shower, before utilising it].

W9 said:

"Inkinga like I said, ama infection anokungiphathan ngoba siholda umchamo isikhathi eside. Bake basinika ama she-wee ukuthi siwasebensise, kunokuthi uchame phansi, but manje lama she-wee awekho comfortable. Njengami nje mina angiyijwayelanga vele". [It is a problem like I said, i usually suffer from infections because I hold the urine for a long period. They usually give us the she-wees to use, instead of urinating on the ground, but I am not comfortable using it, I really struggle, and I am unable to use it]

W12 shared her frustration of not having clean toilets and the inability to utilise the she-wee and said:

"And this thing basinika and we are not trained. Mawufika le emgodini uthi uyachama uthola sowumanzi, after that amadoda sewakubhekile sewuba uncomfortable. They never, we never asked but they just give to us" [And they give us the she-wee without training us on how to use it. When you are underground and try to urinate into it, you find that you are wet and the male colleagues are looking at you, and you feel uncomfortable].

W7 mentioned that in her section the cleaners tried to clean the toilets, but the cleaners sometimes go on strike for up to six weeks, like it had happened the previous year:

"So we don't go to the toilets. We go actually around the stick site in madala site, in the old; let's say in the old, old site of the section. You go there; you tell them you know you are going. I am going there because I really need to go to the toilet now. And then you do it, you make sure you have tissues with you. And then you just cover it up with the dust or with the coal. Just cover it up and then you go on if you want because it's much healthier to do it that way than to go to the toilet".

W8 said:

“Into engiyenzayo ukuthi amatoilet angisawasebenzisi. Cause manjengi sebenza duza nene cage, so mangifuna ukuya etoilet vele ngiyaphuma or uma ngiphatheke serious ngine emmer lapha eworkshop. Nginalo ku tool box yami. Mangifuna ukuchama ngiyachamela kulo bese ngiyahamba ngiyochitha. Kunezindawo nje zakudala ama stick side so, uchitha noma kukuphi. Even e workshop, kune drain ene pump ngingavele ngithelekhona then kune horse pipe. Ngivele ngithathe i horse pipe ngiyathela lapho kuleyo drain”. [What I do now is I no longer use the toilets underground because I am working nearer the cage, and if I want to use the toilet, I just go out to surface. If I am too pressed, I just take my bucket from my tool box in the workshop and urinate, then go and throw the urine at the stick side. I can throw the urine even at the drain pipe inside the workshop and later use the hose pipe to clean the drain].

The toilets at the selected coalmine were on the surface. When one needed to use them, one needed to go out of the underground section making it easier to do so during knock off time. There was a cage transporting all mineworkers when going underground and back after the shift. There was no cage which transported individual mineworkers out of the underground section except during emergencies. **W11** alluded as follows:

“Thina abomama vele nje ikakhulukazi, vele ngoba i mining industry kahle kahle from kudala angisho bekuya bobaba, so thina vele for kithi kusese nzimanyana. Mara ngoba phela umsebesenzi umsebenzi, siyasebenza. Especially underground”. [We, women are still faced with challenges because historically, the mining industry was for men. So, for us, things are still tough].

W7 further said:

“And it will just pile up and pile up and pile up. So, the toilet seat will be here (pointing at the drawing), and the pile up will be here. You don’t even sit.. you squat. In fact, the toilet is not to sit, in that situation you don’t even go to the toilet because it is just smelling”.

W12 added the following:

“When it’s coming to izindaba zama toilet thina abo mama we are not covered kangako neh. Cause those toilets are too dirty and thina ama infection angena masinyane” [When it comes to toilet matters, we women are not included that much. Because the toilets are too dirty and we get exposed to infections].

- **Showers**

Regarding the showers, the participants voiced their dissatisfaction about the insufficient hygienic standards and lack of privacy. **W10** mentioned that:

“Nanoma akhona nawo, angcolile vele”. And the guys have access to the same toilets. U complaina kubani futhi about that? Noma ungatshela o responsible for the section uzothi OK sizoyikhuluma, but there has never been a follow-up.” [Even if they are there, they are dirty, and the males have access to them. Who do you complain to? Even when you want to complain, nothing will be done. The responsible person will be told, but there has never been a follow up].

According to **W12**, their privacy was compromised:

“Ngapha ama toilet ngapha ama shower. While you are showering, omunye wenza unumber 2, abanye bahleli ngale emabhentshini, kuhlanguhlangu nje”. [This side its toilets and that side its showers. While you are showering, the other one is defecating. Others are sitting on the benches; it is a confusing situation]. “You can see umuntu oshawayo lapho, niyabhekana. So, I can say maybe there is no privacy that much, cause some of us are afraid to expose our bodies. And if uyogeza in front of abanye abantu baloku bakubhekile, even nawe uba uncomfortable”. [You can see another person showering there, you are facing one another. And if you shower whilst others are watching you, you feel uncomfortable].

- **Scarcity of water**

The underground section did not have taps for drinking water, and mineworkers carry their 2-litre bottles to hydrate themselves. The participants who worked with other female colleagues mentioned that they took their drinking water from the surface to the underground section. When in need of the toilet, they relieved themselves at the stick-side, however few of them mentioned that they brought drinking water and when duty called, they hid and urinated in the 5-litre buckets that they kept in their places of work. Due to the scarcity of clean water underground, mineworkers said they kept their water and food with them while working. When asked the reason, it was explained that they did not trust one another and could not leave food or water anywhere. **W7** said:

“We work whilst our food is within our bodies”.

The participants also mentioned that they did not even wash hands before eating. When the mineworker was lucky to have an artisan in the section, they asked for the cloth which they used

when cleaning and servicing underground machines to wipe the dirty hands before eating. Other participants also used the same cloth; where the cloth was placed on the ground and mineworkers urinated on it. Participants said they did that to prevent dust from entering their private parts while urinating, which could cause infections.

4.4.1.2 Variant temperature

Under variant temperature, there were two subcategories; that is heat exhaustion and cold symptoms.

- **Heat exhaustion**

Due to underground heat, mineworkers may suffer from heat exhaustion. Participants complained that the underground environment was sweltering, especially when working with multiple underneath clothing. According to the participants, their overalls were too big since they were initially designed for men. For the overalls to fit the women mineworkers, they had to wear three long john pants underneath and the overall on top. Such also assisted them during the cold weather underground. However, when working hard, the mineworkers sweat with this type of clothing. The participants raised the concern that it became uncomfortable to work freely and one could cause injury. **W2** stated that:

“Sigcoka amakarapo, ama vest bese siyajuluka masisebenza” [Because we wear a lot of clothes, we sweat when working]

The mine management believed that the environment at the selected coalmine is conducive for all mineworkers. **M3** explained that:

“The air, the sufficiency should be there. The temperature is moderate because of the underground effect. Eh.. if you think exposure to....to physical activity. We have got ventilation which we bring in from surface”.

- **Cold symptoms**

Underground is also very cold, especially during nightshift. When mineworkers were not wearing enough warm clothes, they could experience cold symptoms. **W1** said:

“Layindleleni khona ngingathi kungcono but akunabuncono. Cause eish. La emachifini so, kuma night shift kuyabanda emgodini. Kuyabanda. Kuyabanda, especially ebusuku. Day and afternoon akunankinga, kungcono. Ebusuku kuyabanda”. [Mnhh. On the road to the shaft I can say its better, but not that better. Cause eish... In shifts, especially night shift, it

is cold underground. It is cold. it's cold, especially at night. During the day and in the afternoon there is no problem, it is better. At night, it's cold].

W7 further alluded that:

“Underground is cold, we are wearing an overall with thermal vests and long johns, but it is still sometimes cold. The coldness underground, it makes it difficult for that time, period of the month”.

W12 was not comfortable with cold water in the shower rooms. She said,

“Ebusika siya affecteka kakhulu cause mawufika e surface labanye sebagezile. Uthole ukuthi amanzi sewayabanda, wena you have to shower ngamanzi abandayo. Amanzi ashisayo bathi aphelile. Le issue le sihlala siyi addressa each and every year. Last year basitshela ukuthi i usage of i electricity is too high. So ba adjusta i heat kulama geyser” [In winter we get affected a lot because when we arrive on surface, others have already showered. We always shower with cold water because the hot water finishes. Every year we raise this issue and last year they told us that the electricity usage was very high, that is why they adjust the heat in those geysers].

4.4.1.3 Mining work and masculinity

Mine work was initially meant for men because of their physical structure to perform heavy work (Nayak & Mishra 2005:5). Mining labour and masculinity were the third generic category, which had three subcategories; long walking distance, lifting heavy equipment and prolonged working hours. **W5** mentioned that:

“Cause mina I won't make it. Ivili letoro lisinda kangaka, ngiyalazi ukuth lisinda kangakanani, ngiyolikhapha kanjani?” [Because I won't make it. That type of a wheel is very heavy. I know how heavy it is, how am I going to remove it from the machine].

W12 mentioned that:

“Ukulayisha lama roof bolts, they are too heavy for us. Most of ama ladies they got injured ngaloko. Most of the time ubawedwa. Iya cause mawuyiguga ku cosa unike your partner, lo partner ku cosa abekhona. Cause phansi isuswa vele wuwe”. [Lifting roofbolts is too heavy. Most of the ladies got injured because of lifting heavy objects. Most of the time you do this job alone and lift it from the bottom and give it to your partner].

- **Long walking distance**

According to some participants, the long walking distance of more than 12km from the cage to the section was very strenuous especially for the older women. Some of the older women were perceived as incapable, and that posed a danger where they could be removed from underground.

W7 explained about the long distances they travelled:

“From the cage to the other section is about 5-6km in. So, what we normally do we walk in so, it’s 9km. Then we work, let’s say then maybe there is a breakdown; we must go to the other section then is about 1km -1.5km from the one section to the other section. And from there on it will be another 6km back to the shaft. But if it’s only on one section, let’s say section A which is 9km for the day, you will have to walk back 9km again; so, it’s around 18km a day”.

- **Lifting heavy equipment**

Power relations were witnessed where male underground mineworkers were not prepared to assist their female colleagues in lifting heavy equipment such as a Dino wheel. One participant who worked as a diesel mechanic mentioned that her male colleague once told her that they all earn the same salary, so women underground mineworkers should be able to work equally with their male counterparts. **W5** responded by saying that:

“Ngiyazama ukuthi la ngihluleka khona ngibona ukuthi no, I can’t and then ngiyababiza. Kuba nabanye angisho bathi angisho sisebenza sonke, sithola imali elinganayo sonke”. Meaning [I try even though it is difficult and where I can’t, I then call them. There are those who say we are working together; we are earning the same money, so we should work equally].

W7 stressed that underground work was strenuous for women by saying:

“For me from the bar attendant side, it’s more the belts as well. The structure of the belts...ehh..it’s heavy. It’s heavy to pick up. So, when it comes to that time of the month, sometimes it is very painful, because of the heavy lifting up and so”.

- **Prolonged working hours**

Working for many hours without resting can be dangerous. According to the participants, they worked for extended hours, which sometimes due to breakdowns could exceed 12 hours per shift. The extended work hours were physically and mentally demanding; such required repetitive high vigilance. Women mineworkers could be fatigued, and that could lead to accidents due to the impaired concentration, poor judgement, reduced eye-hand- coordination and slower reaction

times. Physical fatigue has been identified as a causal factor in heat exhaustion and attributed to several physiological disturbances such as excessive cardiovascular strain and hyperthermia.

W6 wished that the working hours could be reduced to at least 6 hours, in particular for the older women said:

“Laba asebhulile so uyabona. Uthole ukuthi lapha sometime kunamanzi uyabona ukuhamba emanzini, uthole ukuthi usuhlushwa amathambo umzimba ushlezi ubuhlungu.”

[Those who are older, you find them walking where there is water. You find them suffering from bones and body aches].

She further mentioned that:

“Ngibona ngathi bangabanciphisela ama hour maybe 6 hours.” [I think it will be better if their hours can maybe be reduced to 6 hours].

Sometimes during the long hours of work, the male colleagues do not assist, according to **W13**:

“Umuntu owumama bamu respecte, masithi kusebenza abobaba abay i5 nabomama abayi 3, at least kube ne respect ngoba amandla wethu awafani. Manje bekungaba kuhle labobaba shame bamu respecte lomuntu owumama yabo. Baluhlaza ngingasho njalo bathi 50/50” [They do not respect a woman. We see five male mineworkers working with three women mineworkers. At least there should be respect because our strengths are not the same. It would be better if these men can respect women. They are rude and tell us it is 50/50].

4.4.2 HAZARDOUS WORKING ENVIRONMENT

The hazardous working environment was the second main category in the women mineworkers' framework. It had two generic categories, which were risk exposures and PPE.

4.4.2.1 Risk exposures

Risk exposure from biological, physical and chemical hazardous chemicals were witnessed by all the mine workers at the selected coalmine, including the women mineworkers. An SOP establishes the process for the management of persons accidentally exposed to bloodborne pathogens. Mine management ensures that the SOP protects the mineworkers who are accidentally exposed to bloodborne pathogens. Risk exposure has the six subcategories, namely chemical exposure, gas, radiation, dust, noise and vibration.

- **Chemical exposure**

Chemical exposures at the selected coalmine, including the blue solution poured into the portable toilets underground, were posing a danger to the reproductive health of the women mineworkers. Some participants mentioned that some of them were having reproductive organ infections due to these chemicals. **W8** said:

“Nama toilet wethu ala emayini. Lama chemicals abacleana ngawo awekho right. Ugcina sowune infection.” [And our toilets in this mine are not suitable. The chemicals used to clean the toilets are not conducive because we end up having infections].

W9 said:

“Cause thina la sisebenza khona ku area yami lasisebenza khona amantombazane siyi two kuphela. So, soyi two siyakwenza lokho, naye unalo ibhakede lakhe nami nginelami. Into nje esayicabanga cause amatoilet lawa a feila and nalama chemical lawa asenzela ama infection.” [In our section, we are two women. Each one of us has a bucket to relieve ourselves, we thought about this idea because of the unhygienic toilets with the cleaning chemicals make us suffer from different types of infections].

All mineworkers at the selected coalmine are protected from being exposed to HBA (Hazardous Biological Substances) and HCS (Hazardous Chemical Substance) at work. The SOP further stipulates that it established baseline data on the mineworker’s health status, monitored for changes over time and discovered specific physical and mental conditions, which may endanger the health of the mineworker in a specified occupation, or other mineworkers of the selected coalmine through biological monitoring and medical screening.

- **Gas**

Different types of gases and fumes underground may affect the women mineworkers, even though they are issued with dust masks. Most of the women mineworkers mentioned that they could not work throughout the shift with the dust mask because it was irritating. It made them uncomfortable, especially when sweating while working.

One participant (W2) stated that:

“Emgodini angisho kuna this... kunama.. kunezinto eziningi nje, ama chemicals, ama dust, and i dust yasemgodini nayo ingaku affecta, uma soloku uyihogela i affecta umntwana”.

[Underground there are lots of risks, the chemicals, dust, and the dust underground can affect you. If you keep on breathing it in, it affects the foetus].

- **Radiation**

Underground there are different types of radiation, which may affect the foetus or may cause malfunctioning of the baby after birth. According to the mine's SOP, its aim was to establish and maintain a guideline for quality X-Ray taking to assess and diagnose effectively. During medical surveillance, it was of importance that the women mineworkers disclosed any pregnancy to avoid taking the chest X-Ray which could be harmful to the unborn baby. Radiation passes directly through the mother's body and may harm her eggs or the foetus. In addition, radiation exposure may lead to infertility, miscarriages, congenital disabilities, low birth weight, developmental disorders, and childhood cancers (Batstone et al. 2001:32). **W8** related her ordeal by saying:

“Ngike ngaba nenkinga, like bengigula so mangiyobona u Dr, wangitshela ukuthi like bengi pregnant and bengingazi mina. Ngathola i miscarriage leso sikhathi leso. I did not know. Bengiza. angisho like emayini mawu pregnant awuyi emgodini”. [I once had a problem, I was sick and went to see the Dr who told me that I was pregnant. I had a miscarriage, but unaware at that time, I kept on coming to work. But the policy in the mine says a pregnant woman should not work underground].

- **Dust**

The coalmine industry is a dusty environment, due to blasting and other mining related processes. In this study, few participants mentioned that they worked in a dusty area, but they were issued with dust masks; which according to them were not 100% protective. Their concern was that when working, the dust mask could not be used all the time because one would be unable to breathe properly.

The DME Guideline Minimum Standard of Fitness to perform work on mines has a specific objective of assisting the OMP charged with the task of preparing a COP (Code of Practice). If implemented and complied with, it would be to establish a baseline against which to measure subsequent changes in the health status of the employee, such as illnesses like COAD, TB, pneumoconiosis and silicosis. **W8** said:

“Njengami so, ngize la emayini nginganako lokukwama sinus. Lokukhwehlela now and then because of i dust. Since ngiqale ukusebenza la emayini nginalokhu.” [Like myself, when I came to this mine, I never suffered from sinusitis and inconsistent coughing due to dust. Since I started working here, I suffer from these conditions].

W2 said:

“ezinye izinto angeke ukhone ukuzi preventa. Ok, akhona ama PPE for... Kona kuyaku minimise but like aku preventi ukuth ungabi nama sinus cause la sisebenza khona obviously kune dust emgodini”. [There are things which you cannot prevent. There are PPEs, which are effective in minimising, but not in preventing sinuses; because where we work it's underground and it's dusty].

W6 indicated that:

“Yes, and I make sure ukuthi if ngisebenza somewhere, ene kune dust; ngisebenzisa i dust mask.” [Yes, and I make sure that if I work in a place full of dust, I wear a mask].

- **Noise**

Despite the improvement to the Mine Hearing Conservation Programmes (HCP), noise-induced hearing loss (NIHL) continues to cost the mining industry some billions of rands annually in compensation claims. Furthermore, NIHL negatively impacts on mine productivity and profitability, including the women mineworkers' quality of life. Previous research emphasised the need to improve mineworkers' awareness and understanding of excessive noise as a hazard, as well as the consequences of exposure. This promotes compliance with safe work procedures, which include the correct use of HPD.

Most mineworkers ignore wearing hearing protection devices when working in a noisy environment. However, through the effective medical surveillance programme, NIHL may be identified earlier, and the mineworker may be removed from the noisy area before severe damage occurs. It is the selected coalmine's responsibility to ensure that mineworkers are aware of this illness and emphasise the fact that it is irreversible. The mine's SOP is used as a gold standard. The intent of this standard operating procedure is to establish and maintain a guideline for effective and efficient implementation of the audiometric testing, recording and accurate record keeping. Underground is a noisy environment; some sections have noise that is above 85 Decibels. According to this SOP, all mineworkers are protected from such exposure by testing their hearing as required by the Minimum Standard of Fitness; the MHSA. **W4** advised about some safety measures:

“Ungalandela nje imithetho yala emayini ukuthi endaweni e so ufaka leyo mask, especially njenga kuma bore holes ama ear plugs kumele uhlale ukugcokile uma usemgodini”. [You can follow the rules of this mine and ensure that in a particular area, you put on a dust

mask. And in areas especially where there are boreholes, you need to wear ear plugs at all times].

- **Vibration**

Vibration is different from sound in that it moves in solid surfaces such as workstations, equipment or the floor. Examples of those exposed to body vibration encompass bus and truck drivers, farm vehicle and tractor operators, textile machine operators, vehicular body stamping operators, mining and machine tool operators. Examples of occupations that encounter vibration in parts of their body include; chain saw operators, electric grinder operators, mining and pneumatic tool operators and wood products manufacturing. Previous studies confirmed the evidence of reproductive effects of occupational exposure to vibration. Furthermore, the body vibration may lead to women's health issues such as menstrual problems, miscarriages and stillbirths; even possible work-related hearing loss to the unborn baby (Batstone et al. 2001:31).

A few participants mentioned the heavy flow of menstruation and their doctors told them that it might be due to underground mining work. **W12** stated that:

“Lama transport esiwasebenzisayo ukuya esectionini, nalendlela esihamba kiyo, siyakhuhluzeka isikhathi esiningi. Because most of the time ufika esectionini udiniwe ngalokukhuhluzeka.” [These transports we use to the sections, and the roads we travel on we get vibrations most of the time. Most of the time when you get to the section you are tired due to those vibrations].

W5 further stated that:

“Umshini ungavele uwe phezu kwakho that place...siyasebenza ngoba its life.” [The machine might fall on you, that place we are working because it's about life, livelihood].

4.4.2.2 Personal Protective types of equipment

PPE includes the overalls, safety gloves goggles, hearing devices, dust masks, safety lamp, hard hat, safety shoes and reflective vests. Under personal protective types of equipment, there are four subcategories, namely one-piece overall, the number of overalls issued, bright coloured overall and incorrect PPE after laundry.

- **One-piece overall**

According to the women mineworkers, they were comfortable with the other PPE, except the one-piece overalls. It became very uncomfortable wearing the one-piece overall. The gender stereotype

is seen where women underground mineworkers are not allowed to be comfortable being dressed in a two-piece overall when working, this contributes to gender stereotyping. The majority of the participants confirmed that they were promised a long time ago that the two-piece overalls would be considered. When enquiring from the union woman representative, they did not get an answer for the delay in implementing the two-piece overalls as requested.

According to the participants, they experienced difficulties when relieving themselves where they need to take out the overall from top to bottom. According to them, the two-piece overall will be easier worn and removed especially when going to the toilet. **W7** said:

with this one piece overall, we struggle with the changing of the sanitary towel. As a heavy flow, I put 3-4 sanitary towels, because it will be a struggle to undress and change the dirty one. There is not even a place to change your sanitary towel. The other reason why I put multiple pads is to avoid embarrassment from male colleagues”.

- **Number of overalls issued**

The women underground mineworkers are also not comfortable with the insufficient number of PPE issued to them, which due to wear and tear, is easily damaged. Participants blamed the soap used when washing the overalls by the selected coalmine laundry. They mentioned that they got five overalls per annum while others said they were issued with three per annum. **W9** explained her frustrations this way:

“like abobaba bayakhona ukuthi mangabe umuntu i overall ayingcolanga, ayiphinde kayi 2. Thina angeke sikhone, njengoba bengisho ukuthi uma uya kuma periods, angeke uze uyiphinde kayi 2 and ayadabuka ama overall (coughing). Uzosoloku maybe uqgoka i overall edabukile”. [It’s like men can repeat the overall for two days if it is not dirty. We cannot do that, as I mentioned to you that if you menstruate, you will not repeat the overall and it gets torn (coughing). And you cannot keep on wearing a ragged overall].

- **Bright coloured overall**

Darker colours of overalls are also preferred to be worn on a daily basis by women underground mineworkers; however, they mentioned that the coalmine management were delaying because they wanted the darker colour to be worn only when menstruating. The women mineworkers refused to adhere to that proposal, hence the delay. **W7** said:

“We complained about these shocking yellow overalls. During that time of the month if you maybe had an accident on your... on your overall. It shows like ‘Hello, I am here, I am here,

this is this time of the month'. You understand neh? So, tell me which lady is gonna use that colour overall, only for that period. Then everybody is gonna see, but she is on a period. And that is what we don't want. Everybody to see, you know".

W6 supported the previous participant by saying:

"But ama overall...anyway yiyo into e sicomplaina ngayo ukuthi a yellow. So, if mangabe kuna something eyenzakalayo labobaba basheshe babone usagibela emshinini, bazokubona." [But these overalls... anyway that is the main thing we are complaining about the colour which is yellow. So, if you have messed yourself, these men colleagues are the first people to see that whilst you climb on the machine].

According to the Constitution of South Africa and the Basic Conditions of Employment Act No 75 of 1997, the intention and objective of these two documents should be respected in ensuring that every mineworker's right to a fair labour practice is adhered to.

Another participant further stated that as females they relied on other measures. **W12** said:

"I option evane siyenze thina as abomama, uyohlala edakeni cause li black angisho. Ukuze livale that redness." [The option we have as women is to sit on the coal duff because it is black and it will hide the menstrual spot marks on their clothing].

W7 also agreed when saying:

"to hide the menstruation stains, we go and roll, just go and sit down on the duff, the coal dust, we call it duff; so that the blood on the overall looks darker".

- **Incorrect PPE after laundry**

The fact that these women mineworkers are wearing their colleagues' PPE, which was packed by the laundry staff into their lockers, indicates that they are often receiving incorrect PPE after laundry. **W4** said:

"What makes one to wonder is that every mineworker's PPE is boldly marked with her name. The laundry workers still pack the wrong, clean PPE into the lockers, which is only seen when changing before resuming duties".

4.4.3 PSYCHO-SOCIAL WORKING AREA

The psycho-social working area is the third main category of the women mineworkers' framework. It entails two generic categories called physical needs and psycho-social needs.

4.4.3.1 Physical needs

Physical needs have three subcategories, which are illumination, slippery ground and ergonomic or musculoskeletal needs.

- ***Illumination***

It is dark underground, whether it is during the day or at night. The mineworkers used the lamp in front of their hard hats to get better illumination. If you do not have a colleague for support, you end up going alone to the stick-side, which is dark and not safe.

W11 shared her experience where she and a female colleague always worked shifts without rotation like in other sections. She said:

“So enye inkinga ukuthi singa mantombazane uzoya lapha e district sub uyi one, especially ebusuku akusi safe. Mara sakhulumisana naye. Oh, saya ku one of i union wahamba wakhulumisana naye. But manje seku right, sesingena ama shifts onke nabelungu”. (Another challenge is that we are only females and we are expected to individually go to the district sub at night and it is not safe. But we managed to talk with one of the unionists who went to address our concerns. Now all is well, and we are all working shifts, including the whites].

- ***Slippery ground***

Women mentioned that they wore gumboots due to underground water, the source of which they did not know. **W5** mentioned that:

“Ubona ama conveyor belts everywhere, ubona kunamadamu, ku... imishini nayo ngokwayo i dangerous.” [You see conveyor belts everywhere, you see dams, there are... machines on their own, which are also dangerous].

The participants raised the concern that it becomes uncomfortable to work freely and one may cause an injury. **W7** stated that:

“Because you wear a lot of clothes, you slip and fall and get injured.”

According to the MHSA's objective, it is the responsibility of the mine as the employer, to protect the health and safety of the mineworkers; to promote the culture of health and safety, and to provide for the enforcement of health and safety measures. When the underground was slippery, due to water which the participants complained about; that could lead to slipping and falling injuries for women mineworkers which could result in increased costs for a claim of that particular injury.

- **Ergonomic/musculoskeletal needs**

Due to poverty and scarcity of jobs, women mineworkers work hard to fend for their families. They lift the 6 inch and 4-inch pipes to the feeder breaker machine. The participants' main complaint was that the 4 inch was typically carried by one man, while with women two people were needed. **W7** elaborated:

"This is affecting us because sometimes you work alone. The 6 inch is your fresh water line pipe, and your 4 inch is your return pipe where you pump the water from the section out again. Now the 6-inch pipe is about this size and 6 metres long 4 inch around this size and is also 4 metres long".

W5 said:

"But umgodji, truly speaking it's not a place yokuthi umuntu angaze abe lapho That place, siya sebenza ngoba its life." [But underground, truly speaking it is not a place for a woman to be there. That place, we are working because they said it's to survive]

4.4.3.2 Psycho-social needs

Psycho-social needs have five subcategories, namely pregnancy, menstruation, nursery, union representation and transport.

- **Pregnancy**

The Basic Conditions of Employment Act (No 75 of 1997) requires that employers should provide for at least four months' maternity leave. It explicitly forbids employers to make, or allow, a pregnant (or nursing) employee to do work that is hazardous to her health or the health of her child (see Appendix A). Women mineworkers voiced their frustrations to the researcher, stating that they were wasting their time by visiting the OHSC because they were referred to their doctors for antenatal care. There was no sonar, at the OHS centre and one of the participants said these visits or efforts were futile.

According to the participants, it is mandatory for them to submit a letter that states the method of delivery to the Occupational Medical Practitioner (OMP) at the OHS centre when returning to work after maternity leave. The women underground mineworkers at this coalmine were of the opinion that their privacy was invaded when asked for such a letter. They further mentioned that were not comfortable with such demand of the doctor's letter describing the method of delivery to the OMP.

Their private doctors were also not comfortable in issuing the letter as expound by **W9**:

“Sonke thina esithola ama Caesar la masiza la bayasjikisa bathi kosele abhale ukuthi why uthole i Caesar u Dr wakho. Ubuyele ku gynae abhale ukuthi why akwenze i caesar. Angithi i gynae i yazi ukuthi wena usebenza kweyiphi i environment. So yena makathe u right and then ku right.” [All of us who delivered by the caesarean section when we report back to work after delivery, they send us back to our Doctors when we report back to work after delivery, who then write us letters with reasons for caesarian section. The doctor who is a gynaecologist and knows the type of environment I work in].

When the woman mineworker discovers that she is pregnant, it is her responsibility to inform mine management about the pregnancy to enable them to provide an alternate, safe work environment without hazards. According to the FLD, HSEC.STA.031 Pregnancy in the workplace 2012, is intended to ensure the protection of female employees during pregnancy and after childbirth and provides mine management with guidelines to accommodate women.

Women underground mineworkers desire services such as the sonar being rendered at the OHSC, to avoid wasting time and travelling 55km to see a doctor for the test.

- **Menstruation**

There were gender stereotypes where women underground mineworkers at the coalmine work with more male co-workers. These women complained that most of the time they did not feel comfortable because of working alone as a female, with no one to talk to. One participant's concern was that:

“Sometimes that job will wait for you, even if you feel that you are tired; you need to do that job because if you do not do it, nobody will do it for you”.

W12 stated that:

“Then enye into esi affect kakhulu when it's coming to thina abafazi; when we are having our periods i hygiene futhi nakhona ayikho emgodini cause lama toilet lawa angcolile

angeke ukwazi ukuyo change your pads khona. And even if mhlambe uyaziblothela, you can't go out. Amadoda sewayakubheka you become uncomfortable. So, cause there's no. ayikho indawo like especific ebekelwe thina abafazi." [Another thing that affects us women is during menstruation cycle. The toilets underground are very filthy; you cannot even go there and change your sanitary towel. Even after having blood stains from menstruation, you cannot go out of underground section. During that time, the male colleagues are watching you, and you feel uncomfortable. There is no specific place designed for women in the mines].

W1 supported this when stating that:

"Eyi mina mangiya eskhathini ngiyagula kakhulu. Ngithatha ama stopayne". [When I menstruate, I become very sick, and stopayne helps me.]

- **Nursery or child care**

Women mineworkers often leave their children with neighbours. Those with relatives around, rely on their relatives to look after their children. Few of them mentioned that they had grannies staying with them to care for the children. **W3** said:

"Ngimshiye noskwiza sami, ngihamba ngimncelisile. [I left my 4-month-old baby with my sister-in-law, I breastfed her before leaving].

W5 said:

"Wonke umuntu uyafuna ukuhlala nomntwana wakhe. Ene kangingi si end up vele ungahlali nabo ungabi nesikhathi sabantwana. Cause nalama shift esiwangenayo". [Everyone would like to stay with their children. And in most cases, we end up not staying with them. We do not have time for them, because of the shifts we are working].

W3 further mentioned that the safety of their children was not guaranteed with neighbours and said:

"Iya, kungaba kuhle uma kungaba khona i crèche." [Yes, it would be nice if a crèche can be available]

W5 was in consensus on the issue of a crèche she said:

"Omunye ule omunye ule nomunye ule [others are there and there and there]. Maybe, makungaba like a place like a Big Bear. Njengoba e Big Bear sikhone ukuthi sonke early in

the morning uthatha umntwana umusa lapha and then you are going to catch the bus there to work. And then after work izoku dropa lapho and then uthatha umntwana uya endlini [Maybe, if there can be a place like Big Bear. Since at Big Bear we can all manage to take our children there in the morning and then catch the bus to work. And then after work the bus will drop you there and you take the child home].

M3 confirmed that the safety and the lives of mineworkers and their families have changed in the selected coalmine: He said:

“We give them housing allowance which assists them in getting better accommodation”.

- **Union representation**

Even though The MHSA No 29 of 1996 and OHS Act No 85 of 1993 stipulate that: “every worker has the right to representation by the union of their choice,” this is not a reality at this mine. According to a few participants, union representation was not visible at the selected coalmine to assist women underground mineworkers with their health concerns. The mine management did not take the unions seriously and prolonged the implementation of most of their requests. This was indicated by **W7** who said:

“The one piece overall has been outstanding for a longer period and nothing is happening and they don’t respect the female union representative”.

Furthermore, the BCEA No 75 of 1977 states that if the working conditions are not conducive; the worker may refuse to work. In addition, the ILO of 1935 stresses the importance of improving labour conditions and living standards throughout the world, including that of the mining industry.

W12 explained that:

“There is a lady omela abantu besimame, wuye umuntu esimtshelayo. Uyaya a adresse issue abuye athi bazasiphendula. Abuyele futhi bathi ya basasebusy basa researcher bazosiphendula”. [We always relate our issues to the union lady representing women. She always addresses our issues with management and management keeps on telling her that they will respond. She always asks for feedback and they will tell her that they are still researching the problem].

However, mine management at the coalmine agreed that they had three unions, but they only bargained with one. **MM1** said that:

“We’ve got... we’ve got 1 eh... bargaining unit, NUM. So they’ve got the... the most members. Eh... and also women’s wing. We have a couple of eh... UASA and AMCU. But we... we.... we negotiate and bargain only with NUM because they... they.. eh...in a majority”. She further explained that *“NUM is very vocal, they become part of everything as well. And one... one good thing that we’ve seen is they instead of just dumping you with a problem they come with an initiative”.*

- **Transport**

The coalmine was far from town where the hospitals were situated. The other participant cautioned the researcher about the long distance travelled by the ambulance when transporting the sick or injured mineworker from underground to above the section, then to the OHS centre. She stated that the mine policy regarding the ambulance was letting the mineworkers down. The participants’ concern was the delay when the ambulance transported the injured or sick mineworkers to the OHS centre before being transported to the hospital which was 55km away from the mine. **W7** responded on this issue by saying:

“No, services underground are delayed, especially when you are sick. The ambulance comes late and paramedics also delay you”.

W13 was not impressed with the health services especially when someone got sick underground. She said:

“Kukose until uze uphume le phezulu, bese kuthi ke uya kulama paramedics. Bese bona ke baqale baku cheke, bese bakuletha la eclinic mangabe udinga i drip bakufake i drip bese bafonela i ambulance”. [You need to come out of underground to surface and walk to the paramedics. The paramedics will then check you and transport you to the clinic. If you need a drip they will put it up and then call the ambulance].

4.4.4 PROFESSIONAL CAREER DEVELOPMENT

Career development is the fourth main category of the women mineworkers’ framework. Career development comprises of two generic categories called professional growth and productivity.

4.4.4.1 Professional growth

Professional growth has two subcategories namely training, promotion and on the job satisfaction.

- **Training**

Training is an essential tool in ensuring that mineworkers are effective and efficient in what they do at work. Some participants raised concerns of information not being shared by the selected coalmine, such as for their development and promotion purposes. This aspect was not in line with the Mine Health and Safety Act of promoting training and human resources development within the mines. **W8** said:

“When it’s coming to ama learnerships ma uwu mama kukosa ulwe, to get that learnership. Kanjalo nje. (emotional),” [When it comes to learnerships, as a woman, you need to fight in order to get that learnership. Just like that (emotional)].

- **Promotion**

Women in the diverse labour force usually perform different tasks and work in different sectors than men. The conditions of their employment are on average inferior to those faced by men (Tzannatos1998:9). Most participants mentioned that men were promoted more than women at the selected coalmine. **W8** mentioned that:

“Iya the thing is abomama la e mine, I can say they don’t take them that much serious. When it’s coming to izindaba zama promotion, ama promotion kukosa uyilwele la, to get that promotion, especially mawusebenza underground in a section usenkingeni” [Yes, the thing of women in this mine is, I can say they don’t take them that much serious. When it comes to matters of promotion, women need to fight to get a promotion, especially when working underground in a section, you are in trouble].

- **On the job satisfaction**

Participants believed women were not satisfied with doing low level jobs for more than 10 years. One of them had been working for more than 20 years as a cleaner, a workshop grinder and she was still a general worker for more than 6 years. **W13** was very emotional when stating that:

“Ama shift boss awasiphathi kahle. Mawugula bathi awuguli and mawuya e toilet baya khuluma”. [Our shift bosses are not treating us well. When you are sick, you are told you are not sick and if you go to the toilet they also complain].

4.4.4.2 Productivity

Every employment needs productive employees, including the coalmine industry. Previous studies confirm that women are better employees compared to their male counterparts (Marsden et al. 1993:377). One manager also confirmed that during the interview; such will be discussed under the

mine management framework. Productivity has two subcategories; job knowledge need and underground experience need. **W10** mentioned that:

“Like mhlambe, angisho siba nama break downs, maybe sowuthatha isikhathi or something awukhoni ukwenza. Or nje... kuhlala kunepressure ukuthi umshini kumele uhlale u right and umshini mawufile ku cosa uwulungise nge speed”. [For instance, if there is a breakdown that you attend to, and you do not finish. There is always a pressure for the machine to be fixed quicker for production purposes].

- **Job knowledge needs**

The women mineworkers were complaining that they work as general attendants for longer periods than their male counterparts do. They believed the coalmine was not interested in training them for specific jobs so that they could improve their skills and knowledge. This was articulated by **W5** who said:

“Kusho ukuthi bona keke they are allowing us ukuthi senze i diesel mechanic because of that thing yokuthi i gender equality?” [So, does that mean they are allowing us to train as diesel mechanics because of increasing the number of women for the gender equality statistics?] She further raised her voice and further explained her frustration and said, *“Bayaku traina bese bayaku appointa bese mabaqeda lapho bazokukhipha emgodini”.* [They train you, and then appoint you and later remove you from underground] *uye e ofisini or uyi foreman or uyi planner* [to go to the office as a foreman or planner].

- **Underground experience needs**

Few participants’ concerns were that women underground mineworkers did not stay longer as underground mineworkers, like their male counterparts. The mine management at the selected coalmine in Mpumalanga usually transferred them to work either at the plant or in the offices. These women would like to see themselves being trained, developed and become competent underground mineworkers for longer periods. One of the mine managers uttered these words:

“Women do not last for more than 5 years underground, and they are transferred to surface. I would like to work underground for a longer period”.

This was attested by **W5** when stating that:

“But I would like to work at least i 5 years underground.”

4.4.5. HEALTH AND SAFETY NEEDS

Health and safety needs are the fifth main category of the women mineworkers' framework. Health and safety needs include three generic categories called personal needs, social and health needs.

4.4.5.1 Personal needs

Personal needs have the three subcategories which are hydration, being treated with dignity and respect and no favouritism or harassment.

- **Hydration**

Underground mineworkers work hard and they need to stay hydrated. The issue of hydration while underground was supported by **W7** who stated that:

"There is no clean water to drink, and you bring your own water".

- **Treated with dignity and respect**

The mine provides guidelines for diagnosing and treating employees that require medical treatment for medical emergencies, acute illnesses at work and wound care management for IOD (Injuries on Duty). Irrespective of this policy document, the mineworkers continue not being assisted with medication for acute illnesses by the OHS centre personnel at the selected coalmine in Mpumalanga. The participants were not happy with the status quo on healthcare service provision. Hence **W13** said:

"Asazi ukuthi abafazi babo bangathanda maba treatwa kabi. I respect ayikho kulabobaba".

[I wonder how would they feel if their wives are treated like this. These men have no respect]

The BCEA emphasises that every person should be treated with dignity. Some participants believed their dignity should be restored where resources and structures are available. Currently there is a common use of a "she-wee" as a device that inserted for passing urine without and that was issued at this coalmine for women mineworkers. However, the women in this selected coalmine view the use of such a device to urinate as a sign of disrespect from the mine management. And the device is also uncomfortable. **W10** echoed this by saying:

"Most of us cannot use the she-wee, it is uncomfortable and you urinate and mess yourself".

- **No favouritism and harassment**

In the mining industry, the MPRDA No 28 of 2002's intention was to entrench the state power and control over the mineral and petroleum resources of the country. Together with the Mine Health and Safety Act of 1996, these policies reversed the prohibition and opened underground occupations to women. The main aim of these two pieces of legislation was to promote gender equality in the mining sector.

Supervisors continue to harass the women mineworkers. One participant alluded that because she wants to put food on the table for her family, she ignores such supervisors. This is what **W10** uttered:

"Thina la sisebenza khona there's always pressure. So, nanoma bakuthethisa, nje it's a normal thing". [Where we work, there's always pressure. So even when they shout at us, we just take it as normal].

W9 also confirmed this and said:

"I had to report my foreman to HR, where the disciplinary hearing was heard. I was moved from that section."

4.4.5.2 Social needs

Social needs had two subcategories; eliminate gender discrimination and promote transformation.

- Eliminate gender discrimination

The International Labour Organisation is a specialised agency of the United Nations (UN) dedicated to improving labour conditions and living standards throughout the world. However, there are still workers who experience discrimination many years later. Women underground mineworkers complained about their supervisors' attitudes towards some of the participants. Some supervisors disrespected and complained when women underground mineworkers informed them that they were going out of the section to the toilets or stick-side which was furthest from the section, to relieve themselves. One participant mentioned that these supervisors did not treat them equally with fairness, because when other women colleagues visited the toilets, the supervisors did not complain.

But when she was to go, there were some issues. This is what she said (**W10**):

"Laba aba young bayaba favour, bayahamba baye ematoilet ama shift boss angakhulumi."
[The young ones are treated better, they go to the toilets and the shift bosses do not complain].

- **Promote transformation**

In any organisation, all stakeholders normally agree on the organisation's working plan. However, the participants believed at the selected coalmine such working plan was ignored. Many regulations are speaking about transformation, but instead of promoting it, power is exercised in relation to others (women mineworkers). The three stakeholders, which are union, management and women mineworker representation, are likely to mobilise resources to promote the mineworkers' interest of promoting transformation (Kontos & Poland 2009:5).

There was a feeling that women were still not accepted by their male counterparts. The women mineworkers are laughed at when they are not capable of doing heavy jobs, and **W5** said:

"I try so hard, even nanoma... [I try so hard, even when...] The other day bengingaphansi komshini ngibusy ngivula i drain plug leye gear box ngi draina i oil. Yazi makumele ngiphume lapho neh? It was difficult and I am 29, ngisebenza nobaba ona 56" [the other day I was under the machine busy opening the drain plug of the gear box, in order to drain oil. You know when I was supposed to get up it was difficult and I am 29 and working with a 56 years old man].

The participant further said while doing the job, the 56 years old male colleague was watching because when the lady came out he was sarcastic and said:

"Batsho bebazolunga wena uhluleka nje." [Do you think they will make it, whilst you also cannot make it].

4.4.5.3 Health needs

Health needs include two subcategories, which are to prevent occupational injuries and prevent occupational illnesses.

- **Prevent occupational injuries**

The mine has established a process for the management of occupational injuries and disease from initial assessment until the compensation process has been finalised. However, other women mineworkers complained that when injured, the selected coalmine took full responsibility of transporting them to the hospital even for follow up visits. This meant that the process was not followed according to the company document mentioned above. **W8** explained this discrepancy by saying:

“Ngiyakusaba mine emgodini, truly speaking” [i am afraid of underground]. (Raising her voice) “I underground everything lapha ingozi. Yonke into ingozi” [everything underground is dangerous there. Everything is danger] “It’s just not a place la kungafanele kusebenze khona umuntu, net cause sihluphekile sidinga imali, that’s why we go there” [It’s just not a place where an individual needs to work, it is because we are poor, we need money, that is why we go there]”.

Contrary, the mining legislations such as OHS, MSHA, BCEA, amongst the few, stipulate that the mine managers are ensuring that injuries are prevented. **M3** emphasised this by saying:

“We have a high technology to prevent employees from getting injured, for example the machine built in the safety hat can lock if the machine is too close to a person. Injuries have decreased due to such technology”.

- **Prevent occupational illnesses**

The MSHA’s objective clearly stipulates that it is the responsibility of the mine as an employer, to protect the health and safety of the mineworkers; to promote the culture of health and safety; and to provide for the enforcement of health and safety measures. The participants related to the researcher that the health services at the OHS centre were not meeting their health needs. They requested to at least be issued with medication when they consulted the OHS centre at the coalmine, instead of being referred to their own doctors for minor illnesses] **W7** said:

“The law in the mine says you go to the clinic to be referred to your own doctor by the clinic. It is a waste of time, especially in case of emergency. I normally inform my shift boss that I am sick and going to see my doctor, instead of wasting everybody’s time”.

Women underground mineworkers mentioned that they needed a wellness clinic where medication could be issued instead of being referred to their own doctors. They mentioned the need for sonar services during antenatal care visits at the OHS centre of the selected coalmine. Furthermore, the participants told the researcher that they would like to live a healthy lifestyle and have access to the services of a dietician. In addition, women underground mineworkers mentioned that due to the multiple illnesses they were exposed to while working underground, they would appreciate to have pap smear tests to detect and take measures in the prevention of cervical cancer. The participants also mentioned breast cancer tests, and such may enlighten them to be able to know the signs of breast cancer and take necessary measures to live a healthy life.

4.5 DATA ANALYSIS: PROFESSIONAL NURSES

TABLE 6: FRAMEWORK FOR CATEGORIES FOR PROFESSIONAL NURSES

Sub categories	Generic Categories	Main Category
Not being seen during clinic visit, Not honouring the clinic visit, Not coping with underground work	Privacy	Ethical theory
Treat women with respect, Promote women-centred care	Lack of gender sensitivity	
Collaborative working relations, Involvement in health decisions	Transparency and accountability	
Primary health care Effective treatment Health education	Basic health care	Health care services
Adequate staffing, Autonomous nursing practice, Culture of valuing clients	Quality health care	
Clinically competent and qualified health workers, Healthy work environment	Health competency	
Assessment for appropriate care, Consider what is important and urgent	Priority setting	Illness and injury management
Flexibility and adaptability, Confidentiality	Professionalism	
Cost effectiveness, Absenteeism, Management commitment	Productivity	

4.5.1 ETHICAL THEORY

Ethical theory is the first main category in the professional nurses' framework. Ethical theory has three generic categories; privacy, lack of gender sensitivity and transparency and accountability.

4.5.1.1 Privacy

Privacy for the women may include not being seen during clinic visit, not honouring the clinic visit and not coping with underground work.

- ***Not being seen during clinic visit***

Women mineworkers mentioned that they did not want to be seen when visiting the OHS centre, because people draw conclusions about their health status and ability to work. **PN4** said:

“They don’t want people to see them. Most of them have cars, they will drive to there. Eh..., but we are on site”.

According to the participant, women mineworkers normally took a day off from work to access treatment from their doctors in government clinics or from their private doctors.

PN2 further elaborated that women mineworkers came to the OHS centre for family planning, although some do not.

“That is why they don’t want to be seen... With the advent of clinics in the... in the Occupational setups, if I may say. If... if you read about it, people would not want to be seen to be... eh... that they are taking some, not necessarily family planning; but that they are on a treatment of some sort”.

- ***Not honouring the clinic visit***

Mining work should take place in a safe and healthy working environment, WIM have special occupational health and safety needs that must be met on an individual basis with due concern to protecting their wellbeing at work. Participants stated that they were there to ensure that the health and safety of the mineworker was taken care of. However, women mineworkers did not come very regularly for the monthly antenatal care. The participant stated that the final assessment was done by the OMP which included the physical examination. Furthermore, the participant stated that the mineworker bears the responsibility to make regular visits to the clinic. She expounded further by saying:

“They do not come very regularly. They are supposed to, but they do not”.

When asked what could be the reason, the participant’s **(PN1)** response was:

“I do not know. I think they are just disobedient. They know, the doctor tells them they must come monthly”.

PN4 concurred and mentioned that:

“They know that they are supposed to attend antenatal once a month, they do not all come. As soon as she finds out she’s pregnant, she must come here with a proof and a letter from the Doctor. And then she gets taken off underground”.

- **Not coping with underground work**

Underground mining work was associated with men and was a male-dominant sector. There has been progress made where the number of women working underground has increased (Nayak & Mishra 2005:5). During the interview, one participant mentioned that the women mineworkers were not comfortable working underground. **PN2** said:

“Eh...you know in my hind sight, as I read their minds; it tells me to say eh ... eh ... a lighter jo ... a lighter job would even outweigh the money... They would always say how much they envy us, because they are not...we are not in a phy... you know physically demanding job. They will always say it’s hard to be underground”.

Contrarily, **PN1** revealed that the women mineworkers loved their work. She supported this by stating that:

“I was always surprised that they come in as electricians and fitters, and things like that, boilermakers. And if I ask them how you can do that as a woman? They say no, they are coping, they love it. They are enjoying it and they love it”.

4.5.1.2 Lack of gender sensitivity

Lack of gender sensitivity has two subcategories, which are to treat women with respect and promote women-centred care.

- **Treat women with respect**

Helping individuals cope with illness through personal interaction, respect and empathy is the most basic level of support that all health care workers should provide. In this study, professional nurses

are to take several additional steps to help individuals cope. For instance, clarify the nursing diagnosis, the treatment options, side effects and to ensure that the client understands the health condition and her treatment options. According to the participants, all mineworkers were treated with respect. **PN3** said:

“The thing is ..some of them... you get the feeling that they only took the... the job because they needed it. It’s not really that they want to do it. If you ask them, ‘do you enjoy doing the CM operator’?, they say ‘no I hate it, they don’t respect us... I hate it.. it’s not nice.”

PN1 agreed that mineworkers frequently visited the clinic for minor ailments but that had to be stopped since they were there for occupational health related matters. She said:

“We try to help them, we have the basic stuff like a little bit of pain medication. There is a little bit of antibiotics if Doctor wants to prescribe and give them a script. But most of the time they will be referred to a clinic or a Dr, if we can’t help them”.

PN3 confirmed that:

“Doctor is here Monday up until Thursday. But she is not here to consult for minor stuff, it’s more occupational related stuff. That’s what she is doing. So, she doesn’t somaar see the Primary Health Care side”.

Professional nurses are to be knowledgeable about the health of women in order to provide effective health services to the women mineworkers. Such must be applied to clinical practice consistently and interpreted to clients in understandable terms. This could enable them to make the best and most-informed choices possible about how to prevent and detect such health issues. Due to being short staffed, the professional nurses agreed that they did not have enough time for one on one conversations that is why the mine stipulated in its policies that all mineworkers consulting the OHS centre were to be stabilised and referred to external service providers.

PN4 reminded the researcher that:

“I don’t think there can be much difference, because... You cannot make a difference between men and women. They have to be treated the same with any problem, remember mining was considered a man’s place”.

- **Promote women-centred care**

Participants believed there was no promotion of women-centred health care at the OHC centre. Women mineworkers believed they were painted with the same brush, with men mineworkers;

forgetting that women have specific health needs different from their male counterparts; cancer health care awareness, sonar for pregnant women and dietician services to be included in the health care programme of women working underground.

Participants further mentioned that professional nurses are the initial point of contact when the mineworker at the coalmine is sick or injured. However, the health care they receive is inappropriate because they are not examined, but are referred to their own doctors for further treatment and care. Participants confirmed that in cases of emergency, lives could be lost. However, professional nurses believe that they are promoting women-centered care to women. Furthermore, the professional nurses refer the sick or injured women mineworkers to their own doctors, since they have medical aid insurance cover. **PN4** said:

“While we do eh... eh... look after them, eh... if they have obviously problems. We are available for that to refer them to their own Doctors”.

PN3 affirmed this by indicating that:

“We still feel we are accessible by being on site. So they come to us, they are walking. It’s not... it’s a walking distance. Ehh... not good in numerics, but I am sure it is just eh... 1kilometre maybe or less”.

4.5.1.3 Transparency and accountability

Transparency and accountability is a generic category consisting of two subcategories, which are collaborative working relations and involvement in health decisions.

- Collaborative working relations

The participants’ view regarding collaborative working relations within the health sector was essential. Collaborative working relations included the professional relationship of professional nurses in maintaining a good interactive working relationship in a complementary manner. **PN3** reported that:

“We do help them and the Doctor will give you advise or tell you to do this or that. But 80-90% of them are being referred to external health care”.

PN2 said there was no collaboration or networking with other health care service providers:

“I must say on this mine, eh... I’ve said it over and over. I always said go and benchmark with other mines. Most mines have a wellness committee”.

PN 4 confirmed that they do not have agreement with other health centres where they refer the sick patients. She said:

“We don’t have anything else to give them. So we can only just refer them”.

- ***Involvement in health decisions***

Participants said they would like to be part of the solutions when health related matters were discussed and at the coalmine. They said that the policies were formulated at management level and they were never part of the policy making process. One of the professional nurses believed women mineworkers had no choice but to work hard and productively when working at the coalmine. **PN2** said:

“The thing is ..some of them... you get the feeling that they only took the... the job because they needed it. It’s not really that they want to do it. So the situation and the... the environment underground is not nice for them.”

4.5.2 HEALTH CARE SERVICES

Health care services is the second main category which includes three generic categories, i.e. basic health care, quality health care and health competency.

4.5.2.1 Basic health care

Basic health care is the first generic category, which entails three subcategories, which are primary health care, effective treatment and health education.

- ***Primary health care***

According to the participants, they were seeing more primary health care clients than OHS client injuries. The participants believed the majority of the women mineworkers seeking primary health care were contractors and less permanent mineworkers. The most common condition they complained about was flu and chronic management of HIV and AIDS, diabetes mellitus and hypertension. **PN3** said:

“There should be a special nurse for primary health”. Like a wellness nurse, so that we can concentrate and devote more time on occupational health related matters.”

PN4 agreed that there should be basic care rendered and said:

“Summer time you don’t get so many a lot of complaints. Winter time it’s a lot of flu complaints, coughing, headaches. But we don’t treat them, we just refer”.

- **Effective treatment**

Effective treatment was referred to by one participant as the awareness and education of mineworkers about their chronic illnesses, about their diet and healthy lifestyle. According to her there was no effective treatment rendered at the coalmine. **PN1** further said:

“There is always no time to render health care effectively, because we are viewed as unproductive professional nurses”.

PN4 concurred with **PN1** and said:

“As nurses we try to attend to those who consult for minor stuff, but it’s more to occupational related stuff”.

PN1 explained this by stating that:

“Health education one by one but, eh if I do that it takes quite a lot of time. I would like to see a few together. You know, say like 10 diabetics and then explain the whole thing about diabetes and the diets, or the hypertensions. I find here at this mine specifically is that people don’t know about their diseases”... “I do not like it if they go to the canteen and they buy 5 vetcooks and coke. You know, that is wrong. They should instead of buying you know, buying that; they should rather buy half loaf of bran-bread and an apple and a litre of milk”.

- **Health education**

Health education of those seeking medical assistance is very important. The holistic approach of taking good care of a sick person is also pivotal. One of the participants mentioned that health education of the mineworkers at the selected coalmine including women should be an ongoing process. **PN3** stated that:

“What I would like to see especially at this coalmine, is that we do a lot more health education. We do it. I am a strong believer of health education”.

PN2 referred to health education as teachable moments and rephrased it as:

“We would from time to time educate them eh... health education programmes on individual basis, as they come; if they have concerns regarding their health. Obviously we do teachable moments, we used to call it when we do basic nursing”.

4.5.2.2 Quality health care

In order to provide quality health care, the following need to be part of or facilitated at the OHS centre, adequate staffing, autonomous nursing practice, and a culture that values holistic client needs.

- Adequate staffing

Although the participants were not specific regarding the number of professional nurses that they considered adequate, they did indicate that quality care might improve if more nurses were appointed. The other participant gave a suggestion of appointing lower levels of nurses to do basic primary health care where the professional nurse could supervise if needed. **PN4** mentioned this:

“An extra person will always be out. We will never have an extra person. But maybe to have a programme of a day, a day sometimes where we are going to have an hour to just teach the people”.

In support of previous comment **PN1** said:

“No, we will not get extra staff. We gonna have to make do with what we’ve got. No, not at this stage I wouldn’t think so. Not with the finance... financial problems that we are having now. We do not know what is happening in future. I do not think we can get extra staff”.

- Autonomous nursing practice

The participants believed they could not make their own independent decisions about sick women mineworkers’ outcomes based on the clinical judgements. They did not appreciate having to always rely on coalmine policies which were at times contrary to or impacting negatively on the image of the occupational health nursing profession. The participants believed they have inadequate autonomy in controlling the vision and scope of their nursing practice. **PN3** alluded that they cannot change anything as far as nursing care is concerned. She said:

“We found everything here. I think when LIFE got the contract, this is what was rendered here at the clinic. So, the PHC part is just much more like what it was here before”.

- ***Culture of valuing clients***

Professional nurses normally take oaths during the completion of their training where they solemnly swear that their patients will be their first consideration. However, their actions were no longer in line with that oath for different reasons such as, insufficient resources, personal attitudes towards patience and others. **PN2** explained this by saying:

“We are available for rendering nursing care, but employees in this mine have medical aides and we are told to refer them to their doctors or local government clinics”.

Nursing, being a caring profession, ensures that nurses become responsible for their clinical function in taking care of clients or patients who deserve proper and safe health care. Shahriari et al. (2013:9) confirms that nurses’ actions are based on the values they have selected, based on their goals, plan of action and function. In this study, such a right is infringed upon without professional nurses who are no longer patients’ advocates and are seen to be passive participants in rendering health care to the women mineworkers.

Despite the constraining issues the professional nurses believed that they can make a difference in the miners’ health and wellbeing. This was confirmed by **PN3** who said:

“We are here to add value to the mine. We... ehh...one day is one too much for a woman to go away and say I am going for family planning, while we can render that service here”. She further said, *“We are in the farming area, it’s rather far. We are driving at most about 50-55 kilometres. The nearest I think they said it’s 30 something kilometres. So you can see that you can’t... we are here to curb **absenteeism**. So if a woman goes away it’s **absenteeism**”.*

4.5.2.3 Health competency

Health competency includes having qualified health workers with expertise, and experience in occupational health care.

- ***Clinically competent and qualified health workers***

For the professional nurses to render effective and efficient health care to the women mineworkers, they should be clinically competent in doing so. However, the PN at the OHS centre did not have adequate skills and training. Some of them had acquired the qualification at a Diploma and Degree level, while the others did not. The latter only had a short course qualification, which they had done

more than 10 years ago with no in-service training. **PN2** mentioned that there is no improvement as far as health care rendering is concerned:

“I’ve been to work with many people in different places. I have friends in many...who are nurses where there’s this wellness. Nurses are there specifically for that. Why here we do not have a particular nurse to do that?”

- **Healthy work environment**

Healthy work environment is referred to as a site or location where nurses accomplish their company objectives and attain personal fulfilment from their work (Burton 2010:1). **PN3** raised concerns about the work environment. She said:

“I don’t think the environment for underground... the underground environment is really 100% suitable for women. But even if you can draw in the men [to weigh in]..... I think there is no... how can I say...sanitation facilities ... there is no water for them”.

PN1’s concern was:

“Sometimes the refuse bays are too far, the toilets are too far to walk to. So, I really don’t know how they cope underground, these women”.

PN4 added that:

“I think running water is a big problem; sanitation; eh...the environment is dusty, it’s not... I am not sure... ja, I think...but for me, the worst thing will be no running water, you can’t wash your hands. And then if you need to go to the toilet, you need to walk 2 or 4 or 5 splits before you reach something and I don’t think it’s clean there, for a woman”.

A healthy work environment is a determining factor in nursing. When patients have a positive experience of the health care rendered in a health care centre, the nurses will also experience a positive and healthy work environment. In this study, the work environment was not healthy and the participants raised their dissatisfaction in their inability to render appropriate health care services. **PN3** raised this concern:

“Because there is no money for medication, mineworkers are referred to own doctors since they have medical aids and contractors to the government clinics or where they want to go”.

Such a response may create negative views of the mineworkers, especially the women, who also voiced their disappointment at visiting the OHS centre and ending up referred to outside doctors.

They viewed this act as a waste of their time; they should have just consulted their doctors instead of visiting the OHS centre.

4.5.3 ILLNESS AND INJURY MANAGEMENT

Priority setting, curbing absenteeism and production are key elements in illness and injury management.

4.5.3.1 Priority setting

Priority setting has two subcategories: assessment for appropriate care, and consideration of what is important or urgent.

- **Assessment for appropriate care**

During the interviews, all the participants agreed that they were overworked. However, they tried to assess clients and prioritise by stabilising the patients and later referring them to the external health services such as public clinics and private doctors. Such care would be at the mineworkers' costs because they all had medical aid membership that was subsidised by the selected coalmine. For the proper diagnosis, each nurse is supposed to do health assessment of the sick or injured person. This is done to avoid litigation and unnecessary legal action for the company; in this case, and for the individual health care worker (professional nurse), who has not acted as expected when attending to the patient's needs. **PN4** indicated that:

"You incorporate everything. You do occupational health, you do... you do that, injuries on duty. If you know, what I mean. Obviously, the time [can be tight and providing effective care can be compromised] if... for that particular day where you have 60 eh... clients. Where would you get time to do that wellness or primary health part"?

When the professional nurses were asked if they could manage to execute efficient and professional services and examine 60 clients per day, **PN2** said:

"Well the aim is to... for one... for one nurse to see 25 a day which makes 100 for all four of us. So I'm talking mostly surveillance cases (pause). It's too... it's... it's.. it's a hell of a job. Excuse my... language".

- **Consider what is important and urgent**

Some participants agreed that they did not have time to assess or attend to the sick women mine workers due to occupational health work, which was prioritised at the coalmine. When they had the

opportunity, they requested the mine management to hire a lower category of nurses to assist with basic healthcare, they voiced their frustrations. **PN3** said:

“I always say to them it does not necessarily mean that it should be a professional nurse. We are there to guide; we are there to facilitate. Even if it is an enrolled nurse, they are nurses these people who can... eh... (long pause) These are... these are nurses, they have a background of nursing. I mean, you talk TB for instance, you talk HIV. These... there are short courses to do that. And then where ever if they are stuck, we are available as resource eh... centres if I may call it, for re... for reference. For, you know, we can facilitate that”.

4.5.3.2 Professionalism

Professionalism consists of select caring behaviors among occupational health nurses. Professionalism in nursing is an important element of a healthy work environment and health practice and includes three subcategories: flexibility, adaptability and confidentiality.

- **Flexibility and adaptability**

In nursing, flexibility and adaptability entails full-time or part-time work in a healthcare setting. While the participants were willing to assist all mineworkers, particularly women, with healthcare services, they are understaffed. To alleviate this, they suggested that the mine employs part-time nurses or auxiliary workers to assist them. Most of them agreed that other coalmines were flexible and do take full responsibility for their mineworkers.

- **Confidentiality**

In this study, some participants raised concerns about revealing the diagnosis on the sicknotes, which they saw as unethical. Others believed for the mineworker to be considered fit, the diagnosis should be written in the medical certificate, so that she could be placed in the appropriate job. **PN3** related that:

“As I am saying, it’s not for going out and going to the clinic. You need to tell the supervisor which is 80% the men, that you must... you are having this problem and need to go to the clinic now. So when you come back from the clinic he wants the letter back... what did you do at the clinic... Although we keep the confidentiality, but I think some of them are just not... they just let it pass”.

When the researcher asked the other participant about what is written on the confirmation letter, **PN4** confirmed that there is no diagnosis written:

“The supervisors always want to know the confirmation letter, because they will think that this lady just wants to come out and don’t want to work. no, the reason why is confidential. This is only the notification that states that she did visit the clinic”.

4.5.3.3 Productivity

Cost effectiveness, absenteeism and management commitment all affect production. According to **PN3**, production was key to them as health workers;

“Eh... and once again I will mention that we are here for health and safety. A healthy employee would always be productive and will be safe at work”.

- **Cost effectiveness**

Cost effectiveness is essential for controlling resources, but should not be done at the expense of the sick person where life may be lost or disability may occur. In this study, the participants were not happy when women mineworkers were not assisted with medication, but there was nothing they could do because that is what the policy stated. One participant mentioned that due to budget constraints, they would remain with four professional nurses and no extra nurse would be appointed. When asked if they had requested the employer for an additional professional nurse, **PN4** said,

“An extra person will always be out. We will never have an extra person. But maybe to have a programme of a day, a day sometimes where we are going to have an hour to just teach the people”.

This was also mentioned by the mineworkers who said they used to receive treatment when the OHS centre was still under the mine management of the selected coalmine. **PN1** further explained the cost-effective control measures and said:

“Not with the finance... financial problems that we are having now. We do not know what is happening in future. I do not think we can get extra staff”.

In addition, **PN4** mentioned that:

“The contract agreement is the company doesn’t have a lot of medication anymore. We just buy the basic things. So we refer the contractors to the government clinic or their own

doctors and the full time employees go to their own doctors, because they've got medical aid".

- **Absenteeism**

One of the most challenges in the mining sector is absenteeism. Absenteeism is an issue that affects the other mineworkers, the work environment, and production. All mineworkers report to the OHS centre with the sick note from their doctors. At the selected coalmine, the professional nurses know that their mandate is to provide healthcare service with the aim of curbing absenteeism. **PN2** confirmed this when saying:

"Absenteeism affects the production in every working environment. One of the reasons we are working at the mine is to render health and safety and to curb absenteeism".

PN1 agreed with **PN2** while indicating the distance to the next health service point when saying:

"We are in the farming area, it's rather far. We are driving at most about 50-55kilometres. The nearest I think they said it's 30 something kilometres. So you can see that you can't... we are here to curb absenteeism. So if a woman goes away it's...it's absenteeism".

- **Management commitment**

Management must be committed to support employees in their workplace. This should include healthcare to ensure productivity. **PN2** summarised this by stating that:

"If you don't have a... a commitment from management on women issues. What I would really eh... love to see, I would love to see the commitment from management, the support so to say. Eh... also have a buy in from... from the unions. These are the people they believe in. And you will... you will win it all if you have something in mind to say this could benefit women. If you have the buy in from these... eh..."

PN3 noted that:

"Management should have a statement of intent to say we are committed"

The professional nurses' voices indicated their challenges while working at the coalmine. The main challenge stems from the organisational policies regarding the management of work-related

injuries and illnesses. In as much as they are registered as autonomous practitioners, the nurses were challenged by these policies and their loyalty to the employer.

4.6 DATA ANALYSIS: MINE MANAGEMENT

Table 7 depicts the framework for analysis of data obtained from mine management

TABLE 7: FRAMEWORK FOR CATEGORIES FOR MINE MANAGEMENT

Sub categories	Generic Categories	Main Category
Lack of gender sensitivity Gender stereotype	Structure of the mining industry	Gendered workplace
Femininity Gender segregation	Gender based barrier (s)	
Welding fumes Diesel particulate matter Coal dust	Exposure to hazards	
Diversity of lifestyles Gender role socialization	Support to women in mining	Health and Safety issues
Open hostility Thrive on the job	Subtle-sexism	
Fully belong to the workplace minority effects	Continuous trial in mining work	
Survival techniques Repression	Denial at work	
Provide resources for change, Build support system for change agent, Develop new skills for women	Manage the momentum	Effective change management
Assess change agent power, Key stakeholder involvement, Influence stakeholders	Development of workers support	
Efficient and effective workers, Policy that discourages gender difference	Productive mineworkers	Cost effectiveness
Discourage efficiency loss Absenteeism	Economic status	

4.6.1 GENDERED WORKPLACE

Gendered workplace has three generic categories; structure of the mining industry, gender based barrier and exposure to hazards.

4.6.1.1 Structure of the mining industry

During the interviews, the mine managers agreed that the structure and origin of mining industry disadvantaged women especially with regard to Personal Protective Equipment. **MM1** explained that:

“Especially with the smaller ladies, eh... if your PPE does not fit, then they... I’ve seen people put on 3 pairs of long johns underneath, just so that it fits better. So if you start working, your... your... you... you sweat, you get tired a lot quicker, it’s difficult to move”.

MM2 further related that there are many things which disadvantaged women in the mining industry:

“I don’t know if.. if you’ve heard about the she-wee?... it’s a tool that you can use, to urinate standing upright. So you don’t necessarily have to go into a portable in a sitting position, where you have to take off your PPE”.

Gender structure is the first generic category under this main category. It consists of two subcategories, which are lack of gender sensitivity and gender stereotype.

- **Lack of gender sensitivity**

Some participants clarify that underground, there was no male or female, but only underground mineworkers who performed their duties equally for an equal salary. **MM2** verified this when saying:

“There is no difference on the gender underground, as far as health is concerned, they are all employees”.

MM1 stated that there are gender challenges and stigma attached:

“But there has been a stigma in the.. in the.. in the industry and on the mine with.. with ladies. So, people would generalise and then ‘well, say well she is not at work and it’s every month exactly the same time for instance. The perception of men is still there so, we want to eliminate that perception totally”

- **Gender stereotype**

Gender stereotypes are over-generalisations about the characteristics of the entire group based on gender. In a masculine-identified workplace like the coalmine, men's sexualisation maintains the gendered relations between women and men mineworkers.

The mine managers confirmed that there were identified cases of gender stereotype, but the mine was managing to deal with such issues. **MM4** said:

“There is men’s perception of belittling women especially during that time of the month when the women menstruate. Such men can be charged if the women lodged a complaint, where a disciplinary process is followed”.

MM3 mentioned that the mine managers ensure the safety of women mineworkers from the gender stereotypes:

“Eh, there are designated change rooms for female only. There’s security in place with access cards, owned by females or women who open that facility. So, technically, men should not be able to enter those change rooms”.

4.6.1.2 Gender based barrier(s)

Women mineworkers in this study agreed that there was a gender based barrier between women and men mineworkers. However, the mine management did not agree with this issue. **MM3** said:

“If women employees have issues, such can be presented to the committee for discussion and later the chairperson of that committee can present those issues to management for further discussion and solutions”.

- **Femininity**

Women mineworkers perform men's jobs, which may challenge the routinisation of the hypothetically natural order of gendered relations. From the management position the women mineworkers' capability of performing men's work was acknowledged by most participants hence women were seen as the best and most effective mineworkers. **MM4** indicated this when saying:

“The track record on females is better than males, the only problem is the time when they are pregnant for 9 months”.

MM3 confirmed that women are better employees to work with and said:

“There are several individuals that we are busy managing in our wellness committee. Currently we have 5 different men, no females. It shows that women are strong”

MM1 alluded that women mineworkers performs better and efficiently; however, they prefer to leave working underground due to some men’s attitude:

“There has been a tendency of ladies coming into the environment and then once they are in the environment going into a different position that will take them out from underground. I hope these guidelines will help us to keep them in that environment because they will be comfortable”

- **Gender segregation**

Gender segregation separates women and men’s tasks by "compartmentalised" activities, which may lead to different awards, and different career opportunities even though workers may have comparable labour market attributes.

In this study, men and women were doing the same job, however, most work was heavier for women. One participant (**MM3**) confirmed that:

“Although the physique of the women mineworkers was not as strong as their male counterparts, women mineworkers may be working in the same labour market and still perform better and excellently in underground work...”

MM2 mentioned that men sometimes do not respect women:

“Women are ... I can’t get a word...([thinking] but women get selected and are broken down you know... men start picking on the person, saying... jah you only here for 28 days a month...and you know we all get the same bonus... why were you not here...these women feel self-conscious”.

4.6.1.3 Exposure to hazards

The subcategories of exposure to a hazardous environment include welding fumes, diesel particulate matter and coal dust.

- **Welding fumes**

Welding fumes are some of the occupational and environmental hazards, which can have different effects on women, especially when women are pregnant. Participants confirmed the non-

compliance and safety issues around physical and chemical exposures and re-assured the researcher that safety was their priority, including that of the pregnant mineworkers and their unborn babies. **MM3** said:

“We are here to look after the safety of all the employees, not only women, and our environment is free from dust and fumes”.

MM1 agreed that women are protected from exposures and said:

“When the ladies come back from maternity leave, they don’t go back to their positions immediately, because they are... are breastfeeding. They work on surface to re-climatise them for their situation for 9 months plus another 4 months plus another 2 months.”

MM4 alluded the importance of addressing health and safety for all mineworkers through different committees:

“We’ve got that engaging environment where people can talk, the moment that the problem comes up or raised, we can address it so much quicker in different committees like Health, Safety, Environment and Community Committee (HSEC). And then we build the confidence within the workforce to say that you’ve raised something, we’ve addressed it and this is the result of the problem”.

- **Diesel particulate matter**

Some participants said underground is like a house, it is clean and free from any particles. **MM2** eloquently explained that:

“Underground, is like a well-ventilated house. The only thing is that underground is dirty and dark and should not be leading to sicknesses. I am not aware of our conditions, because we manage our conditions. We have got ventilation which we bring in from surface. If you think of somebody who has got asthma, the air, the sufficiency should be there. The temperature is moderate because of the underground effect”.

MM1 related that as managers, they take full responsibility for the safety and the health of mineworkers:

“I need to put a control in place to manage that. If... if one employee gets sick because of something underground, or condition, an illness; its all of us that... that’s almost sick at the same time as the employer is responsible, but I see my appointment almost higher than the

employer, because I work with the people, I need to make sure that people are healthy, fit for work”

According to **MM3**, the conditions in the mines are taken care of and he said:

“I think, just for women in general, the toilets on the mine on surface do have facilities for hygiene products to be disposed of. Those facilities are serviced daily and they are disposed of properly, to prevent mineworkers from getting sicknesses.”

- **Coal dust**

Most participants agreed that underground was dirty and dusty, however according to the mine managers, the mine was well managed for the safety of its workers. **MM2** address this when stating that:

“We don’t inhale smoke. We wear eh... protective clothing to... to guard ourselves against eh... eh... you know what we will call the... the hazards of mining; which is noise, dust, hard work, with used equipment. So, the underground environment as such does not create any... any sick or eh... any risk or so”.

4.6.2 HEALTH AND SAFETY ISSUES

Health and safety framework for supporting women in mining include exploring the impact of subtle sexism, continuous trial in mining work and denial of work in a workplace. **MM1** confirmed that:

“We’ve changed some of our PPE, gumboots made it lighter... the best thing that you can do and you can only do once you know. So, for us it’s been about creating those environments where... where... females can talk about their issues. Because if they don’t talk then you... you will never know [the women’s health concerns] and you won’t sort it out. If something happens, it would be almost a surprise for you. So, we...we’ve created eh... the different committees like the wellness committee, the PPE committee so that females can come out and talk about what their issues are. Eh... people assume that ladies want pink things for instance and it’s not like that. Everyone is different and you need to cater for the different people. But for me is to create that environment where people feel enable they... they can engage”.

4.6.2.1 Support to women in mining

Two main aspects were recognized regarding women’s support: diversity of lifestyles/attitudes and gender role socialisation.

-Diversity of lifestyles/attitudes

Some participants indicated difficult diversity of attitudes where women work with men and experienced discomfort, especially when menstruating. **MM3** explained that:

“I haven’t experienced a lot of absenteeism because of menstruation, but there has been a stigma in the... in the... in the industry and on the mine with... with ladies. So, people would generalise and say, ‘well she is not at work and it’s every month, almost exactly the same time for instance’. I haven’t seen it in a very long time, but you... you see it. Eh... it’s the...the perception is still there, so, we want to eliminate that perception totally”.

- Gender role socialisation

Although the women mineworkers were willing to work and learn from their male colleagues, some of the men mineworkers were not receptive and open to women. They viewed them as outcasts in the mining environment and needed to be at home looking after their families and children. They believed it was not easy for them to be promoted into supervisory positions, and when they were lucky to get such promotions; their scope of work was limited compared to the men mineworkers (Marsden et al. 1993:371).

4.6.2.2 Subtle sexism

This is unrecognised, unequal and unfair treatment of women, which is visible but perceived to be normative and therefore does not appear different. From the interviews, mine managers were not acknowledging the existing sexism of the mining industry like men entering women’s bathrooms or toilet. **MM3** said:

“I think you don’t want men to accidentally or intentionally enter into the women’s showers, because they could be in various states of undress. If it’s late at night, and somebody is in there alone, there could be a risk. So we provide women mineworkers with designated showers to prevent access of male mineworkers to such facilities”.

MM1 brought another side of subtle sexism when stated that:

“We are working on PPE for WIM not all ladies were comfortable and also eh... going to the portable eh.... facilities that we had underground. Like sanitation facilities that we have underground is... is... eh... to a very good standard in the sense that it’s flushable, there’s a toilet paper available, the bins available is better than not having anything”.

MM1 stressed the importance of safety to all mineworkers, including efforts by mine management to ensure that. She said:

“I was part of the drafting committee for that... that... that mandatory guideline. So, we started with... we’ve got a PPE committee for eh... the females at work. Eh... where we we’ve we went through a process to understand what their concerns are for the PPE. And the... the basic issue that we had for underground is we don’t have options, so, you... underground we wore... wear a one piece overall”.

- **Open hostility**

Open hostility is the state of bad feeling or ill will where a woman feels embarrassed. During the interview **MM2** was very hostile and uttered words like,

“Those who say they were not being able to get a job when they come back from maternity leave...that is nonsense. If there’s still anybody in this company, who still believes this rubbish; then it’s the ladies fault, because when we... when we did the induction, we talk about that. When you visit the clinic on your annual check up, they talk to the ladies. The ladies amongst each other talk. So, there’s certainly no reason to be eh... fair for the fact. I think our company is one of the best companies in South Africa, offering eh... leave if you want to take leave before the time. They offer 4 months fully paid eh... salary afterwards. Eh., you... you can come back and then your job will be there”.

- **Thrive on the job**

Women mineworkers thrive on the job to provide for their families, despite the difficult working conditions of working for prolonged hours voices not heard as far as their health concerns are concerned. Different women association groups like ‘Women in Mining’ have assisted by being spokespersons for the women mineworkers and conditions have slightly improved in the last decade. As indicated by few women mineworkers there were good men colleagues who have accepted women mineworkers and were working harmoniously with them. **MM1** stressed the importance of safety to all mineworkers, including efforts by mine management to ensure that. She said, *“I was part of the drafting committee for that... that... that mandatory guideline. So, we started with... we’ve got a PPE committee for eh... the females at work. Eh... where we we’ve we went through a process to understand what their concerns are for the PPE. And the... the basic issue that we had for underground is we don’t have options, so, you... underground we wear a one piece overall”.*

4.6.2.3 Continuous trial in mining work

Continuous trial is category which includes: belonging concerns, and minority effects.

Given the workplace challenges and changing culture in mining, it is perhaps not surprising that women mineworkers continue to experience hardships in reaching expected productivity target.

These were the words of **MM4**:

“Women underground mineworkers are not underperforming, they are hard workers, very proud of their work and contribute positively compared to men”.

- ***Fully belong to the workplace***

It is the responsibility of the coalmine to ensure that the women mineworkers feel that they fully belong to the coalmine. Furthermore, reducing occupational injuries and occupational diseases is a strategic objective of all the stakeholders in the South African mining industry to create an enabling and optimal work environment for women mineworkers (van Aardt et al. 2008:21).

Mine management prefer to involve mineworkers especially women to accommodate different types of mineworkers. They, therefore, saw the necessity to create a safe work environment that could accommodate male as well as female mineworkers and ensure realistic selection criteria in terms of the capabilities and limitations of miners. **MM3** believed as follows:

“This is the forum we use. It’s the safe environment. Eh... and you... you can use other people to learn as well. So, for me the biggest thing is that in the past we’ve had a lot of the same things available, but it wasn’t used because people didn’t know about it. Eh... if you then talk to them and say but this is available, they almost don’t trust it because some... because they don’t have eh... a history of people that went there and use the facilities or use the programme. They need to be part of it and own it to have a sense of belonging I think”.

- ***Minority effects***

Women mineworkers are in the minority compared to the men mineworkers. That made them feel their voices were not heard because the mine management did not approve or take time to implement anything they asked to be implemented. Most of the women mineworkers were made to belong to the mineworkers’ union. At the selected coalmine, there were three different unions, but there was only one that was recognised by this coalmine. This union was the only one that bargained for mineworkers because it had most members at the selected coalmine. It’s women’s wing was raising women’ issues, which were not resolved immediately, according to the women mineworkers.

MM1 was of the opinion that through engagements with such women's wing, they have managed to improve the showers:

"In the change houses, we have eh... the showers. Eh... it has partitions, but it's not all the way up to the ground level. A lady having her period for instance for the month... Eh... there was a concern about having the shower water running underneath the partition to... to other ladies, and then either they will be exposed to that water or people will see what is happening to you during that month. So, it's to create that privacy. So, we... we've... we went into a process of having those partitions all the way down to the floor to create that level of privacy for the ladies".

4.6.2.4 Denial at work

Denial at workplace included two subcategories, survival techniques and repression.

- **Survival techniques to work in mining industry**

MM1 agreed that although there were challenges within the mining industry, there were improvements and survival methods in place to assist all mineworkers:

"Health, Safety, Environment, Community and Quality policy. Anything gets raised through there. Eh... with the different safety... health and safety forums that we've got, the HSEC committee. Every... if it is not addressed through the clinic, it can be addressed through that committee and then raised to the various levels to be sorted out".

- **Repression**

Repression impacted mental processes, individuals' thoughts and impulses that may give rise to anxiety. For women mineworkers, as per professional nurses' views were that there was no on-site treatment besides referral to private doctors or public health care centres. One of the participants, **MM2** mentioned that:

"Our clinic offers very good service. They recommend that once you are diagnosed with one of these sicknesses, any sicknesses that it's treated absolutely confidential for starters. And they encourage you to go every month".

Such a statement is contradictory to the other study populations and in the researchers' view, the participant is totally not aware of what is happening, but only knows what is expected as far as the contract between the selected coalmine and the service provider at the OHS centre.

4.6.3 EFFECTIVE CHANGE MANAGEMENT

Effective change management included managing the momentum and developing worker support.

4.6.3.1 Manage momentum for change

Managing momentum focused on providing resources for change, building support system for change agent and developing new skills for empowering women.

- **Provide resources for change**

Some female participants who worked underground (**MM2**) shifted the blame of responsibility and said:

“I am sorry that I could not assist much. I am in charge of both underground and surface; but I currently don’t have underground employees.”

While other mine managers accepted the responsibility, and mentioned that there was a problem regarding uneven and slippery roads underground. **MM4** accepted by stating that:

“Transport underground is bumpy, due to uneven areas and holes; this may aggravate woman’s health condition, if one is sick. But one cannot easily fall, because there are safety belts in the transport, to prevent underground mineworkers from falling. Transport is new and in good condition; but not luxury to drive in; however, bakkies are more comfortable”.

MM3 believed the selected coalmine is continuously building support through a lot of programmes and said:

“There is a Pregnancy Life Cycle where pregnant women are monitored and placed in alternative, suitable positions which are meaningful”.

- **Build support system for change agent**

Some participants confirmed that the mining situation was not conducive for women. However, they had improved from the worst conditions by building the support system for change.

- **Develop new skills for women**

According to some participants, women are developed at the selected coalmine. However, the number may not be high. Women mineworkers do not engage and if they do not talk about their concerns it is not easy for management to decide for them. **MM1** said:

“If you go and look at any management of change process. It’s... you get the best results if you have the people eh... engaged with the whole process from the beginning, so that they... they feel and they have contributed... contributed throughout the process. And you almost don’t... you don’t have to go and work on that ownership, because they have it, because they were part of it from the beginning”.

4.6.3.2 Development of workers support

Developing worker support included assessing change and agents of power, identifying key stakeholders and influencing stakeholders.

- Assess change agent power

Mine management confirmed that they were continuously assessing the mining conditions and were acting as change agents in attending to the women mineworkers’ concerns. **MM1** said:

“We are trialling the babygrow overall for women instead of a one piece overall; they have designed lighter safety shoes for women and they are looking forward to addressing others as well”. She further mentioned that “Eh... with the different safety... health and safety forums that we’ve got, the HSEC committee. Every... if it is not addressed through the clinic, it can be addressed through that committee and then raised to the various levels to be sorted out. I think we’ve got a great responsibility. Eh... we need to make sure that we not only provide a safe environment to our employees, eh and specifically women. But they need to be... they need to feel comfortable in that environment as well. And... any... any... any eh... health risk, environmental risk, safety risk to that employee; it’s... I am appointed legally”.

- Key stakeholder involvement

Diverse committees such as Health, Safety, Environment, Community and Quality (HSEC) committees, mommy’s club and others are fully operating to address all the health and safety concerns of not only women; in fact, the entire workforce. In addition, the OHSC is part of the outsourced team that addresses issues relating to health based on their own processes. **MM1** stipulated that:

“If you go and look at MOSH [Mine Occupational Safety and Health] Adoption, which is driven from the Chamber of Mines... It can’t be from the top down, we need to understand what the issues are, and have those people contribute and understand what our process is,

we understand what their concerns are. And from there you build the process or procedure that suits all of their needs”.

MM2 agreed that women mineworkers are the stakeholders and are expected to contribute positively towards the mine. He said:

“The ladies can report the unhygienic place including bathrooms and toilets. And then it’s up to management to make decision. But there’s also part on... on the lady employee if they feel the conditions underground, the toilets are not conducive; they can themselves undertake to do something”

- **Influence stakeholders**

In mining industry, there is continuous fear by management, mineworkers and unions regarding the high risks of occupational health and safety problems experienced by mineworkers. These three stakeholders are to work harmoniously and cooperatively to ensure that the health and safety of mineworkers is taken care of. Participants in this study re-assured the researcher that the tripartite stakeholders are working towards bringing solutions rather than bringing problems. **MM1** said:

“NUM always work with us to approach issues and bring solutions rather than creating problems”

4.6.4 COST EFFECTIVENESS

Cost effectiveness includes productive mineworkers and the impact on the mine’s economic status.

4.6.4.1 Productive mineworkers

Productive mineworkers are the first generic category under the cost effectiveness main category. It has two subcategories; efficient and effective worker and discourage gender difference.

For mineworkers to be productive, **MM4** said:

“Everybody has work to do, but if one is not at work, other mineworkers in the team can take a responsibility and assist to prevent loss of productivity”. However, the mine management indicated that they were doing something for the women and they need to appreciate it.

MM2 said:

“Pregnancy is just a state of life through which we all have to go and help our employees to feel that they are not being put aside or that they are not part of the environment, not part of the workforce. However, after maternity leave, women work efficiently without any problems”

- **Efficient and effective workers**

According to **MM3**, there is effective and efficient worker support because even if women are absent due to women sicknesses, there is enough manpower to perform the underground work. She further clarified that:

“Generally, if there were opportunities for women to work on the surface, they would grab those opportunities, however there are those who like working underground, earning bonuses and shift allowances.”

- **Policy that discourages gender difference**

Human resource procedure of disciplining those male colleagues who are ill-treating women mineworkers is in place. Women mineworkers are aware of such procedures and they are utilising them effectively to reduce the harassment behaviour by men mineworkers and supervisors. **MM4** affirmed that:

“Men’s perception of not accepting women as colleagues is dealt with harshly. It’s a matter of them understanding the mining laws that women are to work here”

4.6.4.2 Economic status

Economic status focus is to discourage efficiency loss.

- **Discourage efficiency loss**

MM3:

“Women underground mineworkers are not underperforming; they are hard workers, very proud of their work and contribute positively compared to men”.

- **Absenteeism**

Most participants believed absenteeism was not a problem when it came to women mineworkers. **MM4**said:

“Females’ track records are better than males, the only problem is the time when they are pregnant for 9 months”

MM1 said there were no loss of production during the 9 months pregnancy period of women mineworkers:

“We have budgeted additionally for that, especially for miners, artisans and general workers”. Furthermore, one participant mentioned that, “when mineworkers are sick for one day, the supervisor is informed with no disclosure, but if you are not at work for more than one day, a medical certificate is needed”.

The mine management indicated several examples of their efforts to ensure accessible health services at the coalmine. According to them, women’s health concerns as well as their safety were of high priority on their agenda, but the high cost of such services was a barrier.

4.7 SUMMARY

In this chapter, the researcher analysed the collected data and interpreted it in detail using main categories: gendered workplace, health and safety issues, effective change management and cost-effectiveness. In the next chapter, the researcher discusses the findings of the first phase of the case study, which were guided by the socio-ecological model embedded with constructivism as the lens of the entire study.

CHAPTER 5

DISCUSSION OF FINDINGS OF THE STUDY

5.1 INTRODUCTION

This chapter contains the discussion of the findings and literature control. The discussion is guided by the Socio-Ecological Model (SEM) embedded within the constructivist perspective as the lens for the entire study. The SEM espouse underground women mineworkers' health concerns from the different levels of the structures. These levels are microsystem as the individual, mesosystem implying relationships, exosystem as the organisational environment in the form of policies and macrosystem as external environmental influences (McLaren & Hawe 2005:9). However, it is important to know that all these four levels are interdependent and leverage on each other. The levels emphasised multiple dimensional perspectives of the women's health concerns of mineworkers. Put clearly, these women's health concerns span from physical, social and cultural factors while occurring at individuals, groups, and organisational levels. Notwithstanding, the fact that these concerns are objective and subjective with variant qualities of immediacy or cumulative impact of events over the period of time (Richards et al. 2008:181).

The findings of this study are informed by the four levels of the SEM. **Microsystem's** main categories included women reproductive health needs, health needs overall, safety needs, women's dignity, psychosocial working area and professional and career development. **Mesosystem's** findings are discussed under the main categories endeavor to accentuate how the mine is gendered, change management, ethical theory, privacy, or job satisfaction. Findings on the **exosystem** are discussed under external social influences such as policies and standard operating procedures used at the mine, e.g. Basic Conditions of Employment Act No 75 of 1997, FLD.HSESTA.031-Pregnancy in the workplace 2012 and International Labour Organisation of 1935. Discussion of **macrosystem's** main categories were health and safety milieu, mine as a hazardous working environment, gendering of mining industries and psychosocial working environment. These subsections included the findings based on the responses of the study populations that is the women underground mineworkers, professional nurses and mine management.

The SEM expound on taxonomies of the multiple levels of influence on health and wellbeing (Whitehead 2007; McLeroy, Bibeau, Steckler and Glanza 1988) based upon ecological systems theory (EST). Socio-ecology emerged from different developments such as psychology, sociology and public health where individuals communicate in different environmental systems (Bronfenbrenner1993:38). In addition, ecology established four environmental systems which provide the structure in which psychologists and sociologists study the correlation of people's surroundings within their particular environments and the population at large (Bronfenbrenner 2004:4).

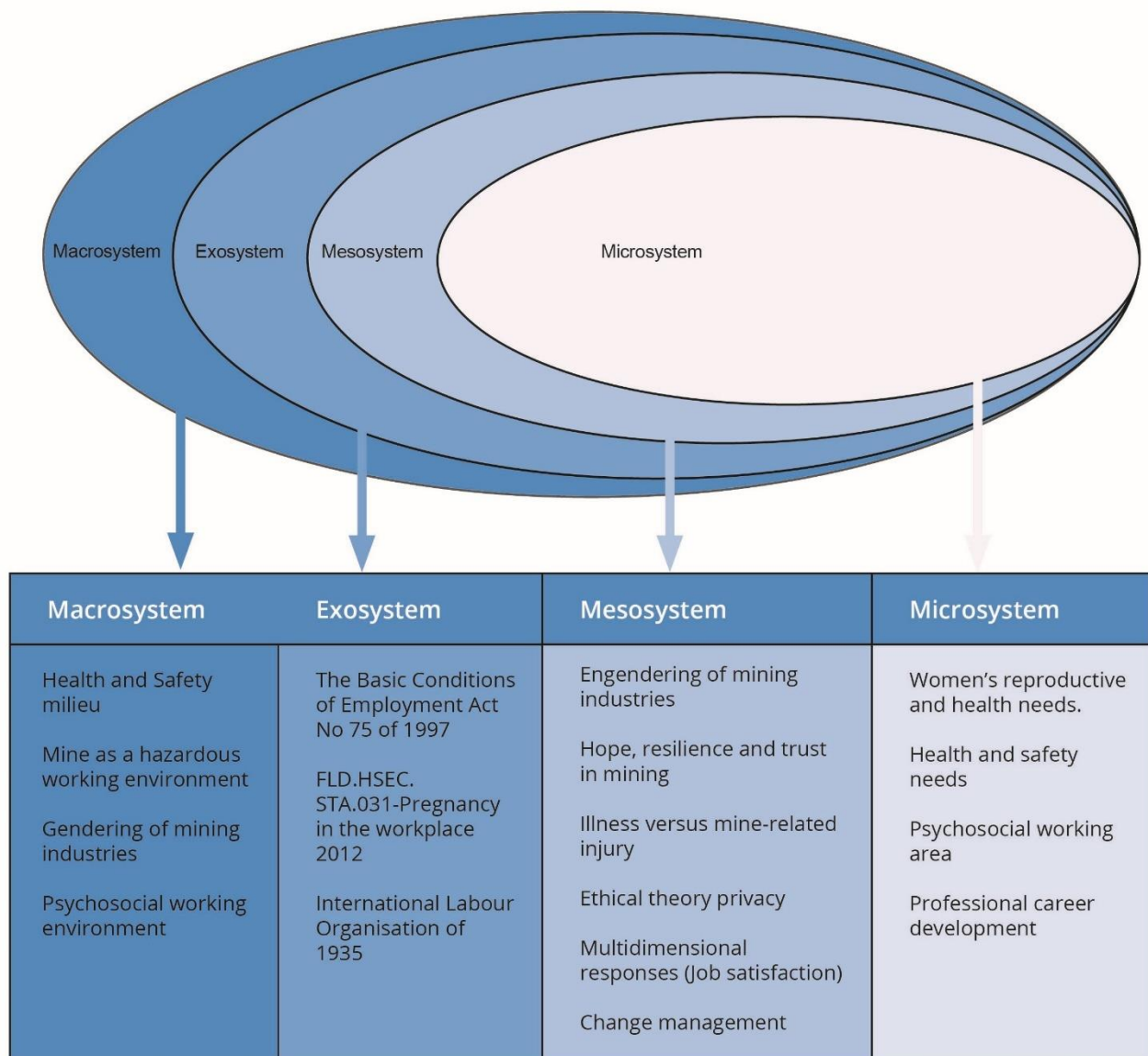


FIGURE 4: SOCIO-ECOLOGICAL MODEL

In this study, the SEM has four concentric circles. The innermost circle represents the individual and personal factors that influence the underground woman mineworker's health concerns at the selected coalmine. The second circle represents the working relationships experienced by the underground women mineworkers. The third circle represents the immediate environmental context in which the underground women mineworkers work. The fourth, which is the outermost circle, represents the external socio-political influences (Richard et al. 2010:312).

The socio-ecological perspective in this study assisted the researcher to understand how the health concerns of women underground mineworkers were influenced by the work they performed. Women mineworkers have individual and personal (e.g. illness, health, fertility, reproduction), interpersonal (e.g. work, emotions, safety, relations) and social (e.g. support, independence, finance, choices, participation) systems which are dynamic and interacting with each other. The interacting systems are influenced by determinants of socio-economic and reproductive health such as age, years in a coalmine employment, economy and employment, age at marriage, fertility and health status (D'Souza, Somayaji & Nairy 2011:1965).

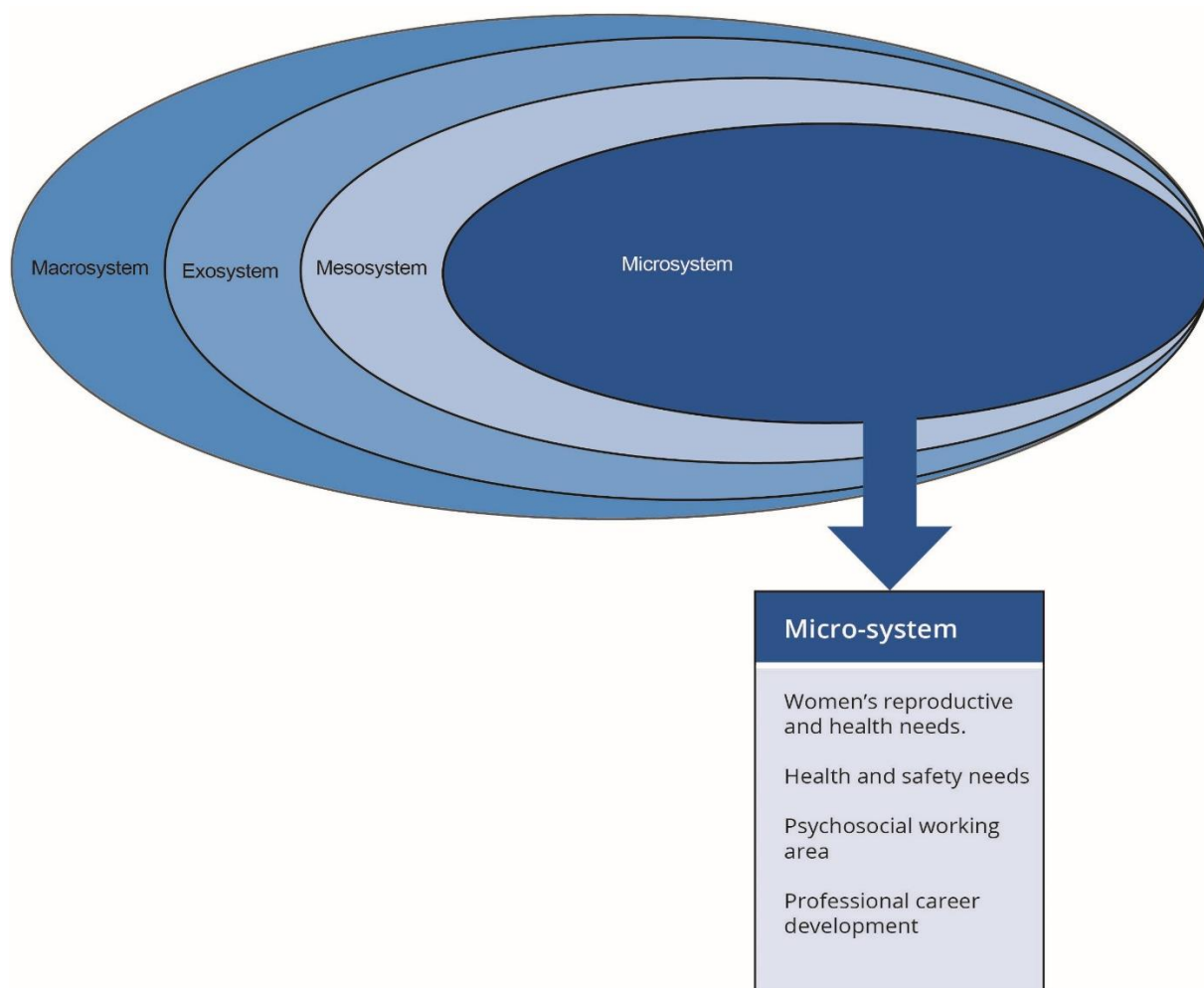


FIGURE 5: MICROSYSTEM

5.2 MICROSYSTEM

The microsystem level in SEM, according to (McLaren and Hawe 2005:11), focuses on factors at an individual base. Additionally, the authors explained the microsystem level as an ecological perspective that underscores individual and personal factors; in this regard, the factors that influence the women mineworkers in their daily activities at the mine are women's reproductive and health needs, health and safety needs, the psychosocial working area and the professional and career development. However, these factors are interrelated.

5.2.1 WOMEN'S REPRODUCTIVE AND HEALTH NEEDS

Women's reproductive and health needs is the first main category under the microsystem level. Women mineworkers' reproductive and health needs are embedded within the South African Legislations (Maternity Protection Convention, No. 003 of 1919), in that, when a mineworker is pregnant, the employer should ensure that the women's health is taken care of before and after childbirth with all the maternity benefits. In addition, the Basic Conditions of Employment Act, No 75 of 1997 (BCEA) Section 26, states that:

“No employer may require or permit a pregnant worker or a worker who is nursing her child to perform work that is hazardous to her health or the health of her child. Additionally, during the worker's pregnancy, and for a period of six months after the birth of her child, her employer must offer her suitable, alternative employment on terms and conditions that are no less favourable than her ordinary terms and conditions of employment, if the worker is required to perform night work, as defined in section 17 (1) or her work poses a danger to her health or safety or that of her child; and it is practicable for the employer to do so”.

The Code of Good Practice on the Protection of Employees during Pregnancy and after the Birth of a Child (Section 5), also emphasises that every employer should provide at least four months' maternity leave and ensure that the pregnant or nursing women are prohibited from performing work that is hazardous to her health and that of her baby. Botha et al. (2012:400) also agree with the two Acts mentioned above, that no pregnant nor breastfeeding WIM should perform hazardous work.

In addition, the Southern African Development Community (SADC) recognised women reproductive and health needs as a fundamental human right and an integral part of regional integration, economic growth and social development. Furthermore, the SADC is devoted to ensuring that all forms of gender inequalities, regionally and nationally through a set of values and behaviour adopted from legally binding international, continental and regional instruments are eliminated (SADC Gender Policy 2007).

The reproductive and health needs of the women mineworkers in this study were not taken care of. This was mentioned by women that they are issued with she-wee, a device used to urinate, without being trained on how to use it. However, they used the pamphlet inside the packet, which has directions on how to use it. What concerned them most was that it was a re-usable device, which was to be kept in their underground bags until they knocked off and could take it to the shower to wash it. Most of the women never used it due to its discomfort and fear of being injured by the device's sharp end. The fear of the infection from re-using the device without it being washed was worrisome, because it was only washed once a day during shower time.

According to the mine's standard operating procedure, if there is any uncertainty or concern about whether an employee's workstation or working conditions should be adjusted, it may be appropriate in certain circumstances to consult an occupational health practitioner. If appropriate adjustments cannot be made, the employee should be transferred to an alternative position in accordance with section 26 (2) of the BCEA. Furthermore, the employers must keep the risk assessment for pregnant or breastfeeding mothers under regular review, considering the possibility of damage to the health of the foetus, which may vary during the different stages of pregnancy. There are also different risks to consider for workers who are breastfeeding. Arrangements should be made for these employees to be able to attend antenatal and postnatal clinics as required during pregnancy and after birth. Additionally, arrangements are to be made for breastfeeding mothers to have breaks of 30 minutes twice per day for breast-feeding or expressing milk each working day for the first six months of the child's life. In this study, mine management improved the workplace to accommodate breastfeeding women by building facilities like express-rooms with refrigerators where breastfeeding female mineworkers express and refrigerate their breast milk. During knock off period, the woman takes her expressed milk home, to breastfeed her baby.

There are different health hazards within every workplace, including the mining industry. The following hazards are to be identified and assessed, according to the mine's standard operating procedure: The control of physical hazards in the workplace includes the recognition, evaluation and control of exposure to noise, vibration, radiation, electric and electromagnetic fields and radioactive substances; work in extreme environments; control of the thermal environment (heating and air conditioning). **Schedule 1** (also summarized in Table 8 below) describes the extent to which certain of these physical agents may constitute a hazard to the health and safety of pregnant and breastfeeding employees and suggests methods to prevent or control these hazards.

The application of **ergonomic hazards** involves ensuring that work systems are designed to meet the employee's needs for health, safety and comfort. A range of ergonomic risk factors may pose hazards to the health and safety of pregnant and breastfeeding employees and should be identified

and assessed as part of the risk assessment programme. These include heavy physical work; static work posture (e.g., standing for long periods; sitting for long periods); frequent bending and twisting; lifting heavy objects and movements requiring force; repetitive work; awkward postures with no rest. **Schedule 2** describes the extent to which some of these factors may constitute a hazard to the health and safety of pregnant and breastfeeding employees and suggests methods to prevent or control these hazards.

Contact with harmful chemical substances may cause infertility and foetal abnormalities. Some chemicals can be passed on to the baby during breastfeeding and could possibly impair the health and the development of the child. The HCSs Regulations, 1995, issued under OHS Act apply to all employers who carry out activities, which may expose people to HCSs. These employers must assess the potential exposure of employees to any HCS and take appropriate preventive steps. The Regulations set maximum exposure levels for some 700 HCSs.

The HCSs Regulations require employers to:

inform and train employees about, and in any substance to which they are or may be exposed. This must include information on any potential detrimental effect on the reproductive ability of male or female employees. Regulation 7 (1) of the General Administrative Regulations, 1996, under OHS Act requires manufacturers, importers, sellers and suppliers of hazardous chemical substances used at work to supply a Material Safety Data Sheet (MSDS) which must include information on any reproductive hazards. Every employer who uses a hazardous chemical substance must be in possession of the relevant MSDS and must make it available on request to affected persons.

Apart from the Lead Regulations, there are no regulations which set maximum exposure levels of specific applications for women of childbearing age or pregnant women. In the absence of this, exposure to chemicals, through inhalation, swallowing or absorption through the skin remain a risk. In cases where this may not be achieved, employees are to be transferred to other work in accordance with section 26(2) of the BCEA. European Council Directive 93/32/EEC classifies some 200 substances and preparations as falling into one of the following categories: *possible risks of irreversible effects (R40); may cause cancer (R45); may cause heritable genetic damage (R46); may cause harm to the unborn child (R61); possible risk of harm to the unborn child (R63); may cause harm to breast fed babies (R64)*. The actual risk to health of these substances can only be determined following a risk assessment of a substance at a place of work, i.e. although the substances listed may have the potential to endanger health or safety, there may be no risk in practice. For example, if exposure is below the Oval that might cause harm. Chemical substances

that are known or suspected to constitute a hazard to pregnant or breast-feeding women and to the foetus or child are listed in schedule three below.

Many biological hazards such as bacteria and viruses, may affect the unborn child if the mother is infected during pregnancy. Biological agents may also be transferred through breast-feeding or by direct physical contact between mother and baby. Health workers, including service workers in healthcare facilities and workers looking after animals or dealing with animal products are prone to be more exposed to infection than other workers. Employees who have close contact with young children, such as teachers and edu-care workers, are at an increased risk of exposure to rubella (German measles) and varicella (chicken pox). Universal hygiene precautions are required to prevent disease, that is the high standards of personal hygiene, surveillance of staff in high-risk areas, appropriate sterilisation and disinfecting procedures, designation of a person to be responsible for health and safety, the use of protective clothing and gloves and the avoidance of eating or smoking in laboratories or other risk areas.

Some of the biological agents that are known to constitute a hazard to the health of breastfeeding or pregnant women are listed in Schedule 4. In addition, both the worker and the employer should take precautionary measures on the following common aspects of pregnancy that may affect work. Examples could be:

- morning employees may be unable to perform early shift work;
- exposure to nauseating smells may also aggravate morning sickness;
- backache and varicose veins may result from work involving prolonged standing or sitting;
- backache due to manual work;
- more frequent visits to the toilet will require reasonable access to toilet facilities and consideration of the employee's position if leaving the work that she performs unattended poses difficulties;
- the employee's increasing size and discomfort may require changes of protective clothing, changes to work in confined spaces and changes to her work where manual handling is involved;
- her increasing size may also impair dexterity, agility, coordination, speed of movement and reach;
- the employee's balance may be affected making work on slippery or wet surfaces difficult; and
- tiredness associated with pregnancy may affect the employee's ability to work overtime and to perform evening work.

TABLE 8: SCHEDULE 1 - PHYSICAL HAZARDS

HAZARD	WHAT IS THE RISK	HOW TO AVOID THE RISK
<i>Vibration and mechanical shocks</i>	<i>Long-term exposure to vibrations may increase the risk of miscarriage and stillbirth. Exposure to shocks or whole-body vibrations in the later stages of pregnancy can result in premature labour.</i>	<i>It is advised that pregnant workers and those that have recently given birth avoid work that is likely to involve uncomfortable, whole body vibrations, especially at low frequencies, or where the abdomen is exposed to shocks or jolts.</i>
<i>Extreme heat</i>	<i>The exposure of pregnant and breast-feeding employees to extreme heat may lead to dizziness and faintness, particularly in the case of women performing standing work. Lactation may be impaired by heat dehydration.</i>	<i>Employers should limit the exposure of pregnant and breast-feeding workers to extreme heat. Arrangements for access to rest facilities and refreshments should be made in conditions of extreme heat.</i>
<i>Extreme cold</i>	<i>Work in extremely cold conditions such as cold storage rooms has been associated with problems in pregnancy.</i>	<i>Employees must be supplied with thermal protective clothing and their exposure to cold limited in terms of regulation 2 of the Environmental Regulations for Workplaces, made under the Occupational Health and Safety Act (OHSA).</i>
<i>Noise</i>	<i>Prolonged exposure to noise can elevate the blood pressure of pregnant women and lead to tiredness.</i>	<i>Employers should ensure compliance with regulation 7 of the Environmental Regulations for Workplaces, OHSA.</i>
<i>Ionising Radiation</i>	<i>Significant exposure to ionising radiation is known to be harmful to the foetus. Working with radioactive liquids or dusts can result in exposure of the foetus (through ingestion or via contamination of the mother's skin) or a breast-fed baby to ionising radiation.</i>	<p><i>Work procedures should be designed to keep exposure of pregnant women as low as reasonably practicable and below the statutory dose limit for a pregnant woman.</i></p> <p><i>Pregnant women or breast-feeding mothers should not work where there is a risk of radioactive contamination.</i></p> <p><i>Employers of registered radiation workers, including radiographers, must comply with the regulations controlling the use of electronic products issued under the Nuclear Energy Act 131 of 1993.</i></p>
<i>Non-ionising (electromagnetic) radiation</i>	<i>It has not been established that the levels of non-ionising electromagnetic radiation likely to be generated by Video Display Units (VDU's) or other office equipment constitutes a risk to</i>	<p><i>Women who are pregnant or who are planning children and are worried about working with VDU's should discuss their concerns with an occupational health practitioner.</i></p> <p><i>The following practical measures can be</i></p>

	<i>human reproductive health.</i>	<p><i>adopted to limit exposure to Electromagnetic Fields in offices (emfs):</i></p> <ul style="list-style-type: none"> • <i>Workers should sit at arm's length from the computer (70cm) and about 120cm from the backs and sides of co-workers' monitors</i> • <i>Workers should have regular breaks from VDU work, as this reduces exposure time</i> • <i>Radiation-reducing glare screens (or shields) can reduce the electrical component of the EMFs. However, shields that distort the image on the monitor should not be used.</i>
<i>Work in compressed air and diving</i>	<i>People who work in compressed air are at risk of developing the bends. It is not clear whether pregnant women are more at risk of getting the bends but potentially the foetus could be seriously harmed by gas bubbles.</i>	<i>Pregnant workers should not work in compressed air because of potential harm to the foetus from gas bubbles. For those who have recently given birth there is a small increase in the risk of the bends. The Diving Regulations, 1991, under OHS, must be complied with.</i>
<i>Physical and mental strain</i>	<i>Excessive physical or mental pressure may cause stress and give rise to anxiety and raised blood pressure during pregnancy.</i>	<i>Employers should ensure that hours of work and the volume and pacing of work are not excessive and that, where practical, employees have some measure of control over how their work is organised. Seating should be available where appropriate. Longer or more frequent rest breaks will help to avoid or reduce fatigue.</i>
<i>Physically strenuous work</i>	<i>Employees whose work is physically strenuous should be considered to be at increased risk of injury when pregnant or after the birth of a child.</i>	<i>Heavy physical exertion, including the lifting or handling of heavy loads, should be avoided from early pregnancy onwards.</i>
<i>Prolonged sitting and standing</i>	<i>Sitting or standing for long periods during pregnancy can have serious health consequences. Standing for long unbroken periods can result in complications during pregnancy such as deep vein thrombosis, varicose veins, premature labour and even miscarriage.</i>	<p><i>Workstations should be adjustable to allow for necessary changes in posture.</i></p> <p><i>Pregnant employees who sit for long periods should be provided with a proper chair with lumbar support rest to prevent lower back pain. A footrest could alleviate pain and discomfort in the case of both sitting and standing workers.</i></p> <p><i>Pregnant employees who work in a stationary position should be given frequent rest breaks. Mobility during breaks should be encouraged to help prevent swelling of the ankles and improve blood circulation.</i></p> <p><i>Where work organisation permits task</i></p>

		<i>rotation, this should be done to allow the worker to do tasks that involve standing, sitting and moving.</i>
<i>Anaesthetic gasses</i>	<i>Exposure to anaesthetic gases during pregnancy can lead to miscarriage.</i>	<i>Exposure to high concentrations of anaesthetic gases should be avoided during pregnancy.</i>
<i>Carbon monoxide</i>	<i>Risks arise when engines or appliances using petrol, diesel and liquefied petroleum gas are operated in enclosed areas. Carbon monoxide can result in the foetus being starved of oxygen.</i>	<i>Occupational exposure to carbon monoxide should be avoided during pregnancy and breast-feeding.</i>
<i>Antimitotic (Cytotoxic) drugs</i>	<i>Exposure to antimitotic drugs, which are used for treating cancer, damages genetic information in human sperm and egg cells. Some of these drugs for example antimitotic drug cytotoxicity to non-tumorigenic cells and multiple cancer resistance developed in response to drugs such as taxanes. Absorption is by inhalation or through the skin.</i>	<i>Workers involved in the preparation and administration of antimitotic drugs should be afforded maximum protection. Direct skin contact can be avoided by wearing suitable gloves and gowns. Pregnant employees potentially exposed to cancer drugs should be offered the option of transfer to other duties.</i>
<i>Ethylene oxide</i>	<i>Ethylene oxide is used mainly in sterilising procedures in hospital. Exposure may occur when sterilised goods are transferred to the aerator after the cycle is complete and when changing the gas tanks.</i>	<i>Health risks can be minimised by reducing worker exposure during transfer when the steriliser door is opened. Pregnant employees exposed to ethylene oxide above the acceptable level should be transferred to other duties.</i>
<i>Lead</i>	<i>Exposure of pregnant and breast-feeding employees to lead affects the nervous system of young children and is detrimental to child development.</i>	<i>Contact with lead should be avoided during pregnancy and breast feeding. The Lead Regulations issued under OHSA must be complied with. These Regulations specify levels at which employees must be withdrawn from exposure to lead.</i>
<i>Mercury and mercury derivatives</i>	<i>Organic and inorganic mercury compounds can have adverse effects on the mother and foetus.</i>	<i>Women of childbearing age should not be exposed to mercury compounds.</i>
<i>Polychlorinated Byphenyls (PCBs)</i>	<i>PCBs can cause deformities in the child. Maternal exposure before conception can also affect foetal development as PCBs can be passed on to the foetus through the mother's blood.</i>	<i>No pregnant women should be exposed to PCBs at work.</i>

<i>Organic solvents</i>	<i>Exposure to organic solvents including aliphatic hydrocarbons, toluene and tetrachloroethylene can lead to miscarriage and have a detrimental effect on the foetus.</i>	<i>Pregnant women should be protected to exposure against these organic solvents.</i>
<i>Pesticides and herbicides</i>	<i>Exposure to certain pesticides and herbicides is associated with an increased risk of miscarriage and can adversely affect the development of the child.</i>	<i>Exposure to pesticides and herbicides should be avoided or minimized.</i>
<i>Alcohol</i>	<i>Foetal alcohol syndrome can lead to physical and mental abnormalities in children. Workers in the beverage, catering and associated industries, including wine farming, are particularly at risk.</i>	<i>Where appropriate, employees should be informed of and counselled in the hazards associated with foetal alcohol syndrome.</i>
<i>Tobacco smoke</i>	<i>Tobacco smoke contains carbon monoxide and carcinogenic and other harmful substances. Smoking and the inhalation of environmental smoke affects foetal blood supply and can lead to retarded growth and development and more early childhood diseases. Smoking carries an increased risk of cancer and cardiovascular disease.</i>	<i>Care should be taken to ensure that women employees are able to work without being exposed to tobacco smoke.</i>

Where the risk assessment indicates a risk of the presence of the above-mentioned physical hazards, the employer should ensure that pregnant women mineworkers are not exposed to such hazards. In a case where the coalmine uses some gases, the employer should use gas measuring instruments and warning devices for the detection of such hazards and comply with the South African National Standard (SANS) specification.

TABLE 9: SCHEDULE FOUR - BIOLOGICAL HAZARDS

HAZARD	HOW TO AVOID THE RISK
<i>Cytomegalovirus</i>	<i>Employees should be required to maintain high standards of personal hygiene, wash their hands after each patient contact and use gloves when handling potentially contaminated wastes in order to minimise the risk of infection.</i>

<i>Hepatitis</i>	<i>General precautions must be taken for all forms of hepatitis. Vaccination is the most effective means available of preventing hepatitis B. Workers must take particular care to avoid mucous membranes and skin coming into contact with potentially contaminated blood or other secretions.</i>
<i>HIV</i>	<i>Universal precaution is important for workers potentially exposed to HIV. Health care workers should take precautions to prevent needless stick injuries and exercise care when handling the blood, tissues or mucosal areas of all patients.</i>
<i>Rubella (German measles)</i>	<i>Rubella vaccine is the most effective means of preventing the disease, and susceptible employees should be immunised. Pregnancy should be avoided for 3 months after vaccination.</i>
<i>Varicella (chicken pox)</i>	<i>It is advisable to identify employees who have not previously had chicken pox. Pregnant employees who are known not to be immune to chicken pox and who are exposed to an active case should report to a physician.</i>
<i>Toxoplasmosis gondii</i>	<i>Control measures against toxoplasmosis gondii for women of reproductive age include high standards of personal and environmental hygiene; the sanitary disposal of cat faeces and avoiding contamination by cat faeces of soil to be tilled for agriculture.</i>

The employer may consider improving pregnant women mineworkers' health by continuous awareness and understanding of the different hazards mentioned above. Such awareness may prevent costs in compensation claims, with greater impacts on mine productivity, profitability and mineworkers' quality of life when they are exposed to these biological hazards.

Like the other two legislations mentioned above, Section 9 (3) and (4) of the Constitution of South Africa No 108 of 1996 also prohibits any person from discrimination. This means every person has a constitutional right. Furthermore, Section 187 (e) of the Labour Relations Act [LRA] as well as the Employment Equity Act [EEA] in section 6 prohibits unfair discrimination. Direct and indirect discrimination may be differentiated, where direct discrimination is intentional and means that an adverse action is taken against a person because the he or she poses a specific characteristic as listed in section 9 (3) and (4).

In South Africa, mining work is an economic stepping stone for women (Labonne 1996:119), the employment of WIM started around 2004 (Response to Mining Charter 2007:2). Women have unique health and safety needs due to their anatomical and physiological features (Zungu 2012:6).

Unlike male underground mineworkers, female mineworkers' physique and anatomical structures are not designed to carry heavy equipment like the men underground mineworkers (Zungu 2012:6; Van Aardt et al. 2008:11). This was identified in the study where the participants were challenged with heavy lifting of machineries such as the heavy wheels called Toro (Ashworth et al. 2004:3). It is for this reason that ILO classified women as a vulnerable group of workers in Mining (International Labour Organisation 2008:4). There is a greater tendency for women to suffer from occupational related diseases such as muscular skeletal and reproductive ill health compared to men mineworkers (Zungu 2012:6; Benya 2009:4; Bradley 1989:109). In this study, it was pointed out that women walk long distances of more than 12km from the cage to the section, and it was very strenuous especially for the older women, for this reason, were perceived by some supervisors as incapable of functioning at an accepted level or standards.

Working for long hours without resting can be dangerous for the women. According to the participants, they can have prolonged shifts (or longer working hours) which sometimes, due to breakdown, can exceed 12 hours. The extended working hours are physically and mentally demanding and require repetitive high vigilance to ensure that no accidents happen. Women may also be fatigued which can lead to impaired concentration, poor judgement, reduced hand-eye coordination and slower reaction times, all of which may prompt injury. Physical fatigue has been identified as a causal factor in heat exhaustion and attributed to several physiological disturbances such as excessive cardiovascular strain and hyperthermia. Nayak and Mishra (2005:5) also elaborated that the mining job was meant for men because of their physical structure and ability to handle and cope with such work.

Although the mine had a fatigue management SOP, mine management can enforce the process by ensuring that underground supervisors allow mineworkers a resting period as stipulated in that fatigue SOP. The aim of the SOP is to identify, develop and implement appropriate control strategies to manage and reduce the risks associated with fatigue for both permanent and contractor employees (FLD.HSEC.STA.033 Fatigue Management 2014) [Functional Level Document. Health, Safety, Environment and Community Standard]. According to the Guidance Note for Fatigue Risk Management (2013:11), fatigue at work is caused by the type of work, the time of the day the work is done, the period of a task performed, the length of time spent at work and the environment in which work is performed. Such was alluded to by many WIM who were not coping with working for almost 16 hours due to a breakdown. Such a lengthy working period increases the risk of incidents especially to those who travel on their own from work back home. It is important to keep employees hydrated and allow some rest in between, by implementing a fatigue risk management plan, as recommended in the Guidance Note for Fatigue Risk Management (2013:12).

There is a body of literature on the effects of mining on the reproductive health of women. Previous studies confirmed the evidence of reproductive effects of occupational exposure to vibration. Furthermore, the body vibration may lead to menstrual problems, miscarriages and stillbirths; including hearing loss to the unborn baby (Batstone et al. 2001:31; McCallum & Wilson 2003:12; IFC-Lonmin 2009:22). In this study, a few participants mentioned heavy flow of menstruation experienced and their doctors told them that it might be due to underground mining work. Other women related the frustration they experience when menstruating where they end up using different types of sanitary napkins (i.e. 2 tampons and two sanitary towels) to ensure that menstruation does not show out on the brightly coloured overall and be belittled by their male colleagues. Sithole (2008:22) affirms that women experience menstruation differently and companies have not done much to address those menstrual challenges. When the women were menstruating, they could not even go and change their sanitary towels because the underground toilets were unhygienic. Moreover, when they were faced with such menstruation challenges and in pain, the women revealed that the OHSC at the selected coalmine cannot be of assistance with pain medication or sanitary towels.

Unavailability of sanitary facilities underground was identified in this study. This was noticeable when women mineworkers menstruate. During menstruation women sometimes have a challenge of not having sanitary towels and opt to use cloths which are usually used by artisans when servicing machines at the selected coalmine. The use of such cloths might lead to vaginal infections. Zungu (2012:7) acknowledges the need for underground sanitary facilities to promote women's hygiene, protection and privacy, which will in turn support their dignity. In the selected coalmine, the women's dignity was not respected and protected. The South African Constitution Act 108 of 1996 affirms that all employers should make certain that the work environment is assessed and maintained to ensure that it is risk free (Van Aardt 2008:18; Badenhorst 2009:57).

On realisation that the underground sanitary facilities were not up to standard, the female underground workers brought 5 litre buckets or the cloths to use to relieve themselves while working. Such use of these items comes with a price as most of the WIM confirmed that since they had started working at the mine's underground section, they suffered from recurrent urinary tract infections. For WIM's to be protected from these illnesses mentioned above, it was important that the selected coalmine attended to the unhygienic sanitation underground. This could be attained provided the mine management can abide with the international standards and specifications of having one shower for every six women (IFC-Lonmin 2009:22).

According to Gable (2011:564), access to reproductive health care services in health centres remains sporadic, globally. In this study, the participants were also experiencing challenges in

accessing the primary health care service, which includes HIV and AIDS treatment, antenatal care, postnatal care and family planning (Batstone et al. 2001:5). However, the OHSC does monitoring of chronic conditions, including HIV and AIDS that is outsourced to the external health care service based in Gauteng. Mineworkers in need of other primary healthcare services are referred to their own doctors because the coalmine has provided a subsidised medical aid scheme to all its mineworkers. Regarding family planning, the mine relies on the public health sector's mobile clinic that visits the OHSC on a quarterly basis.

The professional nurses at the OHSC would be, therefore, issued with different methods of family planning by the mobile clinic colleague to continue assisting the WIM who did not have time to come for family planning. The intention was to prevent them from defaulting their treatment to prevent unplanned pregnancies, because OHSC closes at 16:00. It is essential that the coalmine considers workplace policies and supportive workplace practices, which provide a reproductive health-promoting environment. Such an environment should not only address the work-related health needs, but also the primary health needs which include family planning, for the underground women mineworkers (Batstone et al. 2001:2).

Previous studies have stated that the workplace, with a strong primary health care system, always yields better health results and work performance at a lower cost (Starfield & Shi 2002:211). At the coalmine in this study, the pregnant woman mineworkers are not discriminated against. The selected coalmine had a Pregnancy in a workplace Policy known as the FLD.HSEC.STA.031:2012 [Functional Level Document. Health, Safety, Environment and Community Standard], which was to protect women mineworkers during pregnancy and after childbirth. This pregnancy procedure further provides mine management with guidelines, which enables them to accommodate women's needs during their pregnancy and those of their unborn children at the workplace.

The findings of this study indicate that the health care of a pregnant woman mineworker is not holistically taken care of, because there is no antenatal care service at the OHSC. When a pregnant WIM visits the OHSC, she is referred to her own doctor or government health facility for further care and treatment. In addition, the selected coalmine's pregnancy policy talked about the care after childbirth; which is contradictory because there is no childcare facility provided for the women mineworkers' children. There is a need for WIM to have the childcare facility or a crèche where their children can be taken care of (Maternity Benefit [Amendment] Act, section 11A). This Act emphasises *the need for every establishment with fifty or more employees to have the crèche facility within such distance as may be prescribed, either separately or along with common facilities*. Van Aardt et al. (2008:17) agrees that the mining industry has a challenge regarding the provision of childcare or pre-school facilities for the children of mineworkers. This is due to the

location of the mines that are furthest from the residential areas and because mining cannot provide such facilities due to dangers within the mines, making it an unsuitable place for children. It is for this reason that the Maternity Benefit (Amendment) Act further stipulates that the employer shall allow four visits per day to the crèche by the mother, which includes the resting intervals for the woman employee.

Additionally, there is a need to impart knowledge and understanding to the underground women mineworkers about the mine's pregnancy policy and benefits for them. Such awareness improves healthy pregnancies and decreases the possibility of low birth weight babies and miscarriages. It, therefore, improves the likelihood of the healthy pregnant worker who is productive throughout the pregnancy period until she returns to work after the parental leave (McCallum & Wilson 2003:2). When back at work, women mineworkers are advised to cautiously work without physically straining themselves to avoid other ill health, such as work-related musculoskeletal disorders (MSDs) (Kuyek 2004:18; IFC-Lonmin 2009:24).

Dahlberg (2004:521) refers to musculoskeletal disorders (MSDs), as the common work-related disorders, which normally affect all mineworkers both in physically strenuous work and in low-intensity static work. MSDs usually affect women more than men, and attack mostly the neck, shoulders, back, hands and feet. However, it is a challenge to compare the prevalence of MSDs between men and women because they perform different tasks and they are also not exposed to the same risks (Hussain et al. 2013:337).

In this study, the women mineworkers above 40 years of age suffered from MSDs due to bending and heavy lifting of equipment. Although it was difficult for these women mineworkers to cope with underground work, they continued to work in order to support their families. Those who were below 40 years of age suffered from MSDs, however, they were able to cope with underground work because they were young and seldom complained of ill health.

There are procedures informing all mineworkers on how to report pregnancy and ill health. It is deemed the responsibility of the WIM to declare it to the supervisor. However, mineworkers often do not correctly report their illnesses or pregnancies in a timely fashion due to the fear that they might be stopped from working. This is especially true for the newly appointed ones. IFC-Lonmin (2009:35) confirmed this notion as young women mineworkers of childbearing ages usually hide pregnancies, due to lack of information and fear that they might be disqualified from the maternity benefits. While some WIM at the mine only discovered very late that they were pregnant, others only knew that they were pregnant after being informed by their doctors or after the miscarriage. These women were not aware that they had a miscarriage and innocently continued with underground work until they bled profusely and consulted their doctors. They were aware of the

mine procedure, which stipulates that a pregnant woman does not work underground. What pained the participants most was that they had been planning to have children; and when they experienced miscarriages, feared it might inhibit their chances of future pregnancies.

It was noted that the coalmine's report mechanism that was followed when the women were coming back from maternity leave was not according to the National Health Act No 61 of 2003. This Act categorically stated that no health worker is authorised to disclose information about the person without a written consent given by that person.

When a female underground mineworker returns from maternal leave, the mine always asks the woman when reporting back from maternity leave to bring a letter from her gynaecologist, doctor or health centre. Such a letter should also indicate the method of delivery to the Occupational Medical Practitioner before being allowed to go back to work underground. If the woman mineworker delivered through caesarean section, she was denied going back to work underground. The participants and their doctors did not feel comfortable about such a letter. They believed there should be confidentiality about medical procedures and that should be between the patient and her doctor. This was also substantiated in the Occupational Health Service NHS Trust (2012:2) that the Occupational Health Service should be committed in maintaining the privacy, dignity and confidentiality of all its patients. Furthermore, every physician should inform the patient about the purpose and nature of the information disclosed and that relevant information cannot be withheld. In this study, if clarity can be given to women about the reason why the method of delivery is needed by the OMP, uncertainties and insecurities can be reduced and prevented. The WIM felt that they should be given privacy by being asked for information which could impact her health and safety underground. This will satisfy the women's needs and improve their health too (Baker et al. 2002:6).

5.2.2 HEALTH AND SAFETY NEEDS

Health and safety in the South African mining industries is endorsed by the Mine Health and Safety Act No. 29 of 1996, the intention of which is to provide for the protection of the health and safety of employees and other persons at mines. Also, these purposes are needed to promote a culture of health and safety. Similarly, the WIM experience health and safety challenges equally as do their men counterparts. The Health and Safety Mine Convention indicates prevention of fatalities of mineworkers, due to such diseases as cancers, respiratory conditions which includes silicosis, asbestosis and pneumoconiosis (Kuyek 2004:18-19; Hinton et al. 2003:10).

The mining industry had a high number of fatalities amongst women underground mineworkers between 1980 and 1989 and their age ranged from 25 to 29 years (Kuyek 2004:20). Usually these

fatalities that women experienced were not clearly listed and defined in previous studies. Eisner and Leger (1988:6) stipulate that the fatality rates in coalmining industries are more than those in gold mines in the last decade in South Africa. This was re-affirmed by Margolis (2010:417). In South Africa, health illness deaths were estimated at 8 229 in 2001. However, no clarity is found on how many of these deaths were related to mining work. The available data indicate that the number would be exceptional and unreasonable when comparing it to the employed mineworkers, due to a high number of Occupational Disease amongst the previous and current mineworkers (Hermanus 2007:533). These health illnesses need to be identified by the Department of Minerals and Resources (DMR) where non-compliant mining companies exist.

The Department of Minerals and Resources has the power to close a mine temporarily by issuing a section 54 instruction according to the Mine Health and Safety Act 29 of 1996 if the mineworkers health and safety are not adhered to, according to the health and safety mining requirements (Roos 2014:15). However, mineworkers continue to suffer from health and safety hazards. These may range from heat exhaustion due to high temperatures underground, fatigue due to prolonged working hours, dehydration, malnutrition and unavailability of sanitary facilities underground. Attested by Ashworth (2003:19) was the fact that the absence of drinking water or eating during a shift underground may lead to fatigue.

Underground women mineworkers suffered heat exhaustion, especially during hard labour. Donoghue and Bates (2000:336) concur that underground thermal conditions, the depth work rate and the hydration state of an individual may induce heat exhaustion. In this study, women underground mineworkers were more concerned about the heat than the cold underground. They mentioned that with cold, they can wear multiple clothes to be warm, but with heat, there are no air conditioners or fans to ventilate the underground environment, especially during breakdowns where they work for longer hours. Kauppinen and Kumpulainen (2003:79), confirm that fatigue and working for long hours, night work and shift work may affect the women. In this study, mineworkers were feeling dehydrated since there were no taps for drinking water underground. Some participants carried their bottles of water and some did not. Similarly, the participants preferred not to have a meal, but to eat a fruit during the shift to curb hunger. Bringing food was a challenge since there was no clean water to wash hands before eating it and there was no conducive place to sit while eating. Furthermore, the participants were in need of a dietician's recommendations and regular consult in order for them to stay healthy.

According to Response to the Mining Charter (2007:14), every workplace should appoint a dietician that monitors and evaluates the mineworkers' nutritional status by ensuring that a nutritious meal is catered to the mineworkers. According to mine management, improvements were

made where a nutritional pack was issued to each mineworker before going underground in all shifts, to ensure that mineworkers are hydrated and healthy while at work. However, the sanitary facility issue was being reviewed to see how it could be improved, because the management values every mineworker. Van Aardt et al. (2008:18) advice was that although there are multiple challenges faced by WIM, there are also strengths, which surpasses their weaknesses. The authors further cautioned that women should not be perceived as a problem, but rather be seen as an opportunity to build their skill- competency where additional ablution facilities are to be built and be maintained.

- ***Underground is dusty***

When the women underground mineworkers' concentration is poor, due to dusty underground section, they might be exposed to risky work. Hence it is important to work with such protective devices as goggles to protect themselves from a hazardous dusty environment. The findings in this study was that most women underground mineworkers were aware that underground is dusty, but they sometimes did not comply by wearing safety masks because they believed it distracted them when working.

As stipulated in the Mine Health and Safety Act No 29 of 1996, the employer is responsible for the health and safety of the mineworker, and there is a need for mineworkers to be supervised when working to ensure compliance with PPE and to avoid work-related illnesses unnecessary costs. The finding was that most mine management spent their working period in the offices rather than underground and believed that the underground section at the coalmine is like a house, which is well ventilated; the only problem is the dust, which is managed well. In addition, the researcher observed that for most women mineworkers, their overalls were also an obstacle, especially when working where the women were unable to move freely and would sweat and be distracted by wiping the perspiration while working. Such may lead to an injury on duty where the production might be affected when the injured mineworker is not at work due to the injuries sustained. Some injuries, depending on their severity, may lead to an injured worker suffering a comorbidity, which in this study is a psychosocial disorder (Margolis 2010:419)

- ***Women's human dignity***

It was further discovered in this study that mine management issued women mineworkers with a "She-wee" for urination. For the women to utilise the she-wee, she needs to insert it under the multiple PPE and urinate while standing like a man (Boerner 2007:1) Women at the mine raised concerns of being issued with the device and not trained on how to use it. Instead, they relied on the pamphlet with instructions.

Previous literature (Cornish 2008:15) narrates that women are often restricted from participating in Occupational Health and Safety (OHS) standard setting as well as OHS decision-making. Few participants related the difficulties they encountered in talking to the safety representatives about women's health concerns, because most of the safety representatives were males. They did not understand women's health issues such as the complexity of the "she-wee" use. It is of importance that WIM be involved in OHS decision making so that they can suggest best devices which are comfortable and convenient to use, such as the moon cup instead of the "she-wee". Furthermore, the device is cost saving because one uses it for at least six–twelve months if properly cared for; instead of using 22 sanitary protections for every period. In addition, the moon cup is convenient because there is no need of rushing to the shops at the last minute, no stockpiling of different sanitary towels and no carrying of bulky spares of sanitary protection (Borowski 2011:22). According to the underground women mineworkers, using the "she-wee" urinating device is time-consuming and uncomfortable than when urinating on a normal toilet in a seating position.

Tracey Croke in her "Pee like a man" article confirmed that the device takes longer periods compared to when urinating in a normal toilet. In this study, it was found that most women mineworkers could not use the "She-wee" device, due to the difficulties in urinating while in a standing position because they end up wetting themselves with urine. Previous research pointed out that the ill-fitting of PPE for WIM was a health and safety concern (Badenhorst 2009:62; Ashworth et al. 2004:22). It was also noted that many participants chose not to use the "she-wee", the unhygienic toilet to relieve themselves, and they also preferred not to drink water or eat while at work. It is essential for every worker to stay hydrated in order to perform work optimally. When dehydrated, the woman underground mineworker may pose a danger to herself and to other mineworkers working with her. By not hydrating themselves, the woman underground mineworkers may suffer from poor concentration, heat exhaustion and/or heat stroke (Zungu 2012:7).

5.2.3 PSYCHOSOCIAL WORKING AREA

A conducive psychosocial working area is needed for every mineworker to be productive. This is endorsed by the two pieces of legislations: Broad Based Socio-Economic Empowerment Charter for the South African Industry and the Compensation for Occupational Injuries and Diseases Act No 230 of 1993. According to the South African Industry 2010 Charter on Broad Based Socio-Economic Empowerment, every mining industry should report its level of compliance with the Mining Charter on an annual basis as provided for by Section 28(2) (c) of the Mineral and Petroleum Resources Development Act No 28 of 2002. In addition, the Act states that the DMR shall continue monitoring and evaluating the impact of material constraints, which may result in not achieving the set targets.

When the working area is not conducive, it may lead to multiple psychosocial working disorders, for example post-traumatic stress disorder (PTSD), regarded as one of the psychosocial disorders and is very common within the mining industry. Mines are viewed as high-risk places with high figures of traumatic accidents which are traumatic stressors leading to a high prevalence of psychosocial working disorders such as post-traumatic stress disorder (Zungu 2013:22). Initially post-traumatic stress disorder (PTSD) was not considered a work-related injury, until the amended Compensation for Occupational Injuries and Diseases Act No. 230 of 1993 as amended came to effect.

PTSD is referred to as a mental illness arising from exposures to a traumatic event, such as severe accident, interpersonal violence, sexual assault, disasters and military actions. Symptoms of PTSD differ among individuals and may include disturbing thoughts or feelings, or dreams related to the events, mental or physical distress to trauma-related cues and attempts to avoid trauma-related cues (Dollard et al. 2012:6). These features may last for more than 30 days after being exposed to a traumatic mine accident or may not occur until several months or years after the event. These occurrences are regarded as non-compliant and have serious implications for the company profile; they may lead to the closure of the mine by the DMR if such incidents occur frequently (DMR Annual Report 2010/2011).

The Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 (COIDA) as amended, ensures that employers report all symptoms of post-traumatic stress disorders (PTSD). In this study, the mine reported and submitted all the work-related injuries for compensation purposes through the insurance company; It has been found that the compensation process for mineworkers is time consuming for the injured and their families and those who died due to work-related injuries. There is a need for the coalmine to accept the liability of claims and follow up with the compensation body in order to build the trust relationship with the mineworkers. This will improve the working relationship and increase the confidence of mineworkers (Zungu 2013:26).

COIDA stipulates that the process of claiming the compensation fund starts with the employee notifying the employer about the work-related injury/incident as stated in section 38 of COIDA. This notification of a work-related injury/incident may be in a written or verbal form immediately after it has happened. The notice of the accident may also be given as soon as possible to the commissioner in the prescribed manner. Failure to give notice to an employer as required shall not bar the right to compensation if it is proven that the employer had knowledge of the accident from any other source at or about the time of the accident. However, if some of the WIM are not reporting these incidences, they will not be compensated where compensation is due. Kauppinen and Kumpulainen (2003:107), state that although compensation is meant for all mineworkers, it has been found to be more favourable to men than to women mineworkers.

For every workplace to be compliant with the South African Legislations (MHSA, BCEA, etc) it should have a positive psychosocial working environment (Baker et al. 2002:3). Such an environment should be well supported and have a health and safety committee that works hand in hand with management, unions and workers for the company to be able to reduce psychosocial working disorders (MHSA of 1996; Ashworth 2003:36). This is attested by Amponsah-Tawiah (2013:77): working environments that are stress free produce high productivity, employee satisfaction with positive workers within and outside the work environment. This study also pointed out that women mineworkers suffered a lot from anxiety and mental stress, due to the heavy work and shift work they performed at the mine. However, they never felt discouraged about working hard, because they knew that the mining job was better than their previous jobs; and that the mine was paying them well to sustain their families. Despite the psychosocial effects Ashworth et al. (2004:19) asserted that women are considered by management to be very diligent, committed, reliable, manageable, organised, neat and punctual. Additionally, women are attentive and in all aspects, better at following work protocols than their male colleagues hence there is a need to afford them with career development.

5.2.4 PROFESSIONAL CAREER DEVELOPMENT

Professional career development is advocated by the three pieces of legislations: Mine Health and Safety Act No. 29 of 1996, the Skills Development Act No. 97 of 1998 and the Occupational Health and Safety Act No. 85 of 1993. Section 10 of the Mine Health and Safety Act No. 29 of 1996 affirms that as far as reasonably practicable, every manager must provide employees with information, instruction, training or supervision that is necessary to enable them to perform their work safely, without risk. Zungu (2016:33) affirms that in any workplace, worker's training and capabilities should be considered before assigning any task to that worker. In this study, the mine should have a Standard Operating Procedure (SOP) confirming that all the employees are professionally developed. This is also emphasised in the Skills Development Act No 97 of 1998 that it is obligatory for every employer to develop workers. Employers are to submit a Workplace Skills Plan to the relevant Sector Education and Training Authority, where development and identification of the worker's personal development plan is described and developed, to guide the employer in drafting a career path plan so that the employees can develop and progress within their career.

The Skills Development Act No 37 of 2008 came to effect on 2 February 1999. The main purpose of this Act was to improve the quality of life of workers, their prospects of work and labour mobility; to improve productivity in the workplace and the competitiveness of employers; to promote self-employment; and to improve the delivery of social services. In this study, the findings were that the

women were not participating in learnerships and other training programmes. It is important that the coalmine improves SOPs to ensure high quality of education and training in the workplace.

In addition, the Occupational Health and Safety Act No. 85 of 1993, stresses that the employer shall ensure that the employee is adequately and comprehensively informed and trained, on both practical aspects and theoretical knowledge, with regard to the content and scope of these regulations. Such training shall include the refresher training on a yearly basis or at more frequent intervals that may be recommended by the health and safety committee. Companies should continue mentoring women in workplaces in order for women to be promoted to senior positions, which will in turn improve their living conditions and those of their families and the society at large (Adu-Oppong & Arthur 2015:12).

Career Development for women usually brings up career progression matters, because women in mining occupy low level positions (Dieffender 2014:18). It was observed in this study that some women mineworkers were dissatisfied because they were appointed as general workers for more than 10 years in the same positions. A traditional and misguided belief that women cannot do other mining jobs, coupled with the absence of career development support, makes it very difficult for women to be promoted; they may be stuck in their initial jobs for years. However, if mine management is serious about integrating and retaining women in the workforce, they should look into this challenge and develop underground women mineworkers in order to progress to the next career level (Van Aardt 2008:4).

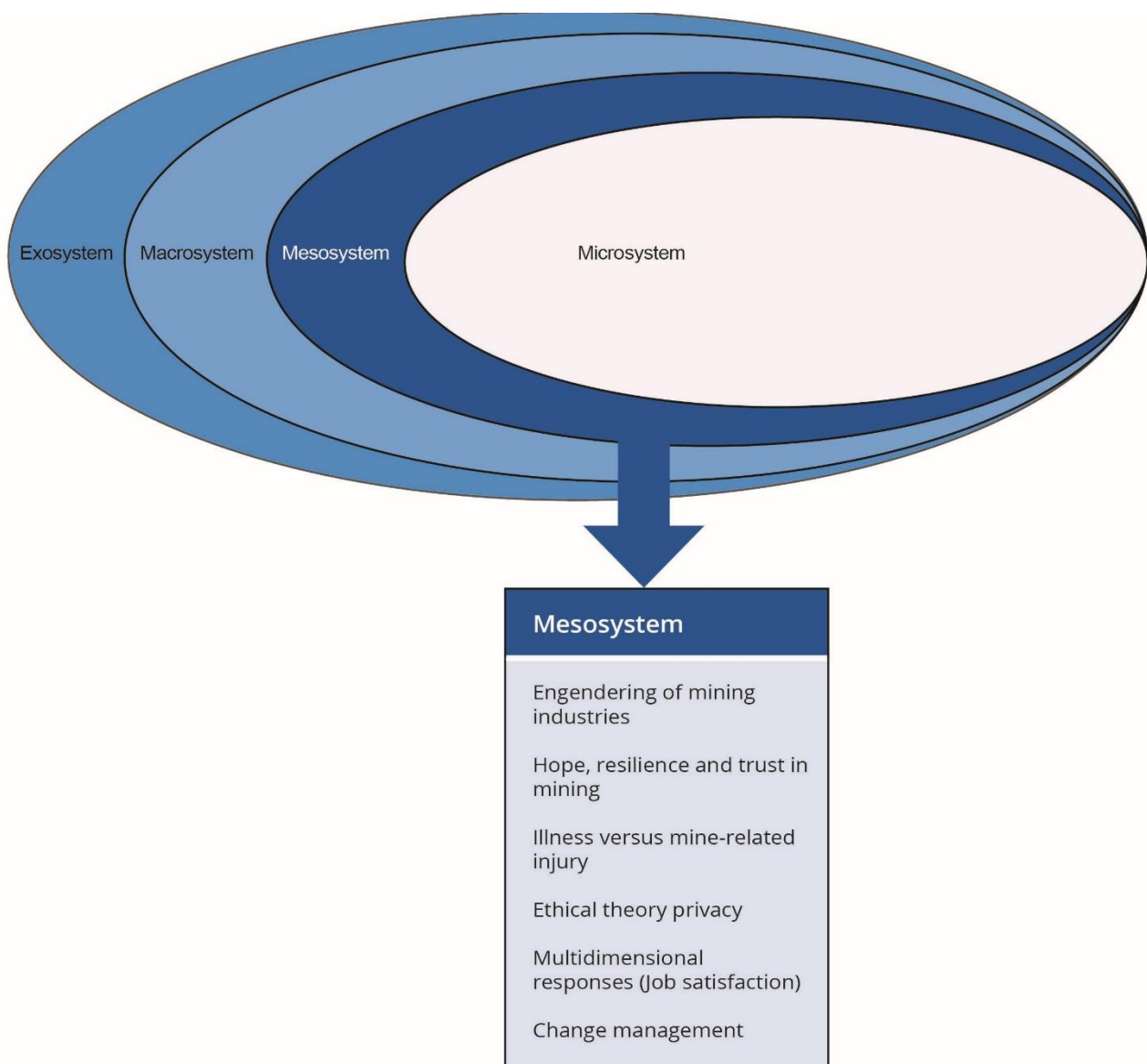
Owusu (2014:47) agrees that when the worker progresses from one occupation to another one with high ranking, better remuneration and more influence; that worker will produce positive results. The same thing was pointed out in this study where some participants were grateful that the coalmine initially appointed them as general workers and four years later, they are artisans and earning a better salary to support their families. Dieffender (2014:16) affirms that organisations that perform very well excellently economically and productively are those which inspire and motivate workers to learn and develop themselves. In this study, most of the women underground mineworkers did not know about available study opportunities for mineworker and dependents. Since they relied on notice boards for safety related information sharing, they also thought that opportunities on career development would be posted on the notice boards. The few women who knew office mineworkers with computer access were at an advantage because that person would always share those job opportunities in the mine.

In this study, it was pointed out that some participants were unhappy about not being promoted after working for a long period. It was discovered that the few women who were promoted had to fight for their rights to get those promotions. In addition, it was also discovered that few of those

who managed to move vertically from general worker to learnership, also fought to be considered for those learnerships at the mine. This is not in line with the Beijing Declaration (1996:10) which advocates for equal training for all especially women, so that they can be empowered and participate in decision-making bodies.

5.3 MESOSYSTEM

The mesosystem level interconnects with micro-system, exosystem and macrosystem within an environment (McLaren & Hawe 2005:11). The mesosystem level in this study includes the relationship and interaction among co-workers and between the participants and the researcher. The discussion around the mesosystem will be under the main categories as pointed out in the findings. These main categories are engendering of mining industries, isolation of women mineworkers, illness versus work-related injury, responsible ethical practices, multi-dimensional responses or job satisfaction and change management. These subsections encompass the



findings of the professional nurses and mine management of the coalmine.

FIGURE 6: MESOSYSTEM

5.3.1 ENGENDERING OF MINING INDUSTRIES

There are four pieces of legislation that speak to engendering the mining industry in South Africa: these are the Employment Equity Act No 55 of 1998 as amended by the Employment Equity Act No 47 of 2013, the Basic Conditions of Employment Act No 75 of 1997, the Labour Relations Act No. 66 of 1995 and South African Constitution Act No 108 of 1996. In South Africa, the equity legislations expedite the women labour force, including even in the mining industry (Martin & Barnard 2013:1).

According to Chapter 2 Section 5 (of the Employment Equity Act No 55 of 1998 as amended by) Employment Equity Act No 47, of 2013, every employer must take steps to promote equal opportunities in the workplace by eliminating unfair discrimination in any employment policy or practice. Furthermore, in Section 6 of the Act, it is stipulated that no person may unfairly discriminate directly or indirectly, against an employee in any employment policy or practice, on one or more grounds.

The Basic Conditions of Employment Act No. 75 of 1997 states that the denial to employment of a worker because her pregnancy, intended pregnancy, or any reason related to her pregnancy is automatically unfair. The definition of dismissal or denial to employment in section 186 of the Labour Relations Act, 1995, includes the refusal to allow an employee to resume work after she has taken maternity leave in terms of any law, collective agreement or her contract.

Section 9 (3) and (4) of the South African Constitution No. 108 of 1996 prohibits any person from discriminating against any other person. This means that every person has a constitutional right not to be discriminated against. Section 187 (e) of the Labour Relations Act [LRA] as well as the Employment Equity Act [EEA] in section 6, prohibits discrimination. One can distinguish between direct and indirect discrimination. Direct discrimination is intentional and means that an adverse action is taken against a person because they possess a specific characteristic as listed in section 9 (3) and (4).

Gender bias in mining relate to diverse access to resources that are driven by cultural attitudes towards gender, societal group, social policy and labour market systems (Marsden et al. 1993:372; Botha 2016:252). In this study, gender structure at the mine disadvantage women underground

mineworkers. This was noted, amongst other things, with the PPE which was designed to fit men; and women underground mineworkers end up wearing multiple pairs of long johns underneath in order to fit in that big overall. There is a need for the mine to consider gender mainstreaming, which includes the overall being designed to suit the women's anatomical structure (Ashworth et al. 2004:22).

Gender mainstreaming is defined as “an organisational strategy to be applied internally and externally as means of bringing a gender perspective to all aspects of an organisation's policies and activities, thus building gender capacity and accountability” (Walby 2004:2; Lahiri-Dutt 2011:7). Sharma (2010:202) and Ward et al. (2011:2) affirm that mining sector conditions are more favourable to men than to women. As far as employment opportunities, power and decision-making processes are concerned, women are negatively affected by the structural settings in the mines, such as tools designed to be utilised by men including the inappropriate PPE and the geographical environment. This signifies women suffer from insufficient protection and an inability to perform their duties in a safe and competent manner (Van Aardt et al. 2008:20). Zungu (2012:10) agrees that the equipment and other PPE in the mining industry are designed to suit men mineworkers. This disadvantages women and causes some discomfort and inability to perform their work correctly. Hinton (2011:6) concurs that the underground equipment is indelicate and insensible to be used by women, especially when they are not suitably trained and taught on the use of the equipment.

As stipulated in the above-mentioned South African legislations which were adopted by all employers, there is a need for a speedy integration of women within the mining industries. This will improve the economic status of not only the coalmine, but the entire country. Ranchod (2009:26) echoes the sentiment that companies incorporating WIM have a huge advantage of sustainable development, job creation, empowerment and poverty alleviation. Zokwana (2007:1) articulated this clearly when saying:

“We were made to believe that men are more intelligent, highly competent, physically strong and fearless and that the mining industry was pre-ordained for them as an area of speciality. This naked sexism and racist male chauvinism only served to conspire in the marginalisation, abuse, and hatred of women generally and black women in particular”. Almost a decade later, the mining industry has not changed much; this indicates that more studies are needed to fast track the mining industry image and patriarchy”.

Anderson and Anderson (2008:607) refer to animosity against women in the workplace as 'hostile masculinity' where a male person's personality is adverse and uncertain towards a female. This

behaviour makes a man feel negative and inferior towards a woman, especially if the latter is more senior than him to avoid instructions from her (Malamuth & Thornhill 1994:186).

The UN Millennium Declaration stated that "Men and women have the right to live their lives and raise their children in dignity, free from hunger and from the fear of violence, oppression or injustice". However, in the mining industry such oppression still prevails to a certain extent, because men still outnumber women as far as the employment figures are concerned. In addition, the Sustainable Development Goal number 5 focuses on the advancement of gender equality and empowerment of women and girls by 2030. This was emphasised in the Summary of the Beijing Declaration and Platform for Action (1996:20), that the women's economic rights and independence, the access to employment and appropriate working conditions, including economic status should be promoted.

It was pointed out during the interaction with mine management that the target of 10% female employment has been exceeded. However, mine management acknowledged that there is still more to be done to engender the mining industry where outstanding matters related to women's health are to be addressed.

In his study, Mustovo (2001:2) agreed that gender related matters in the mining industry are still insensitive and immediate attention and action is needed to transform and make it gender responsive. Additionally, the author states that gender relations regulate how families, society and organisations are classified, including how agreements are reached and how resources are utilised. This is further emphasised by Laplonge (2014:22) who argues that the mining industry should realise that there are various methods of work, which could be morally beneficial to the organisation's cost effectiveness and growth. Such methods are displayed by women who perform the mining job well and with efficiency. These methods were witnessed at the coalmine where professional nurses stated that despite hardships with underground work, women still work responsibly underground and enjoy their work because of the better salary they earn. Furthermore, the integration of women has been observed by participants (professional nurses and mine management) that many women are supporting families and are managing to put food on the table for their families.

In this study, it was further noted that the women experience gender stereotypes from their male colleagues, especially when they (women) did not feel well, for example during menstruation. These male colleagues did not show respect to women and they could not assist with heavier work and always referred to 50/50 where they both earn the same salary and they are also expected to perform similar duties. Such behaviour may also lead to some psychosocial factors like inefficient

safety climate, job dissatisfaction with poor collegial support may lead to low self-esteem and poor career development (Bronkhorst et al. 2014:25).

Women and men have different gender roles and responsibilities in their own lives, families, households, and communities (Ward et al. 2011:16). To understand how gender shapes activities that affect the environment, it is necessary to examine women's and men's roles and responsibilities, access to and control over resources. That is why Mahy (2011:5) confirms that the mining industry should not be viewed as a natural and genuine place to employ men, but a place for workers, both women and men, who are capable and fit to perform mining duties. In this study, the women were outnumbered by men: in most shifts, one woman worked in a team with eleven male mineworkers during the day and in night shifts. This made the women mineworkers feel isolated.

5.3.2 HOPE, RESILIENCE AND TRUST IN MINING

The Minerals and Petroleum Resources Development Act No. 28 of 2002 (MPRDA), was established to address the transformation of the minerals and mining industry; promotion of equitable access to South Africa's mineral resources; promotion of investment in exploration, mining and mineral beneficiation; socio-economic development of South Africa; and environmental sustainability of the mining industry. Currently the socio-economic status of South Africa remains the same with few improvements, especially in the coalmines (Botha et al. 2012:395). Despite this, women underground mineworkers in this study do not feel perturbed; they appreciate the salary they earn which according to them does not differ from that of their male counterparts. Botha et al. (2012:399) cite that when both women and men perform similar jobs, the same monetary value should be earned.

When an individual's needs are met, trust develops and leads to hope. Similarly, when the employee earns a better salary, it gives them confidence which in turn brings hope about life in general (Yohani & Larsen 2009:248). Hope scholars such as Snyder et al. (1991:571) and Dieffenderfer (2014:40) define hope as "a positive motivational state that is based on an interactively derived sense of successful (a) agency (goal-oriented energy) and (b) pathways (planning to meet goals)". In this study, it was identified that women underground mineworkers at the selected coalmine had hope that the working conditions, which they were not grateful about, like shift work, prolonged working hours, unsuitable PPE, would one day be corrected by mine management. Although most WIM complained about these conditions, it was never an obstacle in their work performance. It is true that people with high hopes are capable of reaching their goals, irrespective of those barriers (Dieffenderfer 2014:4). Nevertheless, it is true that when workplaces

have hope, there is a need to advance research on the hope so that all the workplaces should be able to work harmoniously and successfully (Dieffenderfer 2014:3)

Furthermore, in this study hope was witnessed in this way: women's safety shoes were re-designed and made lighter than those worn by their male counterparts. According to mine management, other improvements recognised in the study included some of the shower rooms, which were being renovated. Such renovations were done to ensure that women would feel comfortable because there would be no water from the other showers running through to the next shower. This showed that mine management had listened to some of the complaints raised by women and made the renovations accordingly. In addition, mine management saw the need because the women who were on a period always were feeling embarrassed when using the shower, while those not on a period were health conscious; thinking that the red water running through to their shower was going to infect them. This is confirmed by Veninga (2000:23), that employees prefer to work in companies with caring supervisors who respond positively to their needs.

In the study, it was also pointed out that mine management also had hope and responded to the women underground mineworkers' requests and they managed to establish a mommy's support team. This team included the pregnant women and those coming from maternity leave. These women meet on regular basis to share their experiences of pregnancies and those of being mothers. The selected coalmine also renovated one of the offices into an express room. In this facility, there were comfortable chairs and a refrigerator, so that WIM would come and express the breastmilk and store it in the refrigerator. When knocking off, the WIM took their breast milk home to feed their babies. This was a relief because when the breasts were full of milk, the underground women mineworkers felt uncomfortable during working hours. Previous studies reveal that a conducive environment like the one mentioned above, motivates workers to be resilient, adapt easily, enjoy their work and be more goal-oriented and productive (Youssef & Luthans, 2007:782; Dieffenderfer 2014:47). Resilience is described as the ability to bounce back and cope in a system successfully despite adverse circumstances of that particular situation (Adger 2000:349; Youssef & Luthans 2007:778).

In this study, besides the circumstances of mining being perceived as a hostile and unfriendly environment which is meant for men, most WIM were able to adjust and cope with underground and shift work. Such resilience was attested to by low rate of absenteeism for women compared to men. The respect between women and men mineworkers, irrespective of colour, was mutual and they always supported each other. Their means of communication was Fanakalo in order to understand each other and ensure safety all the time. Such an understanding working relationship

was both effective and beneficial because the male colleague mentored the young WIM, irrespective of their cultural differences. This is affirmed by Gibson and Klinck (2005:120) as the element of resilience.

If employers are positive in building and entrusting hope and resilience into their organisations, family-friendly employment policies should be developed where flexibility on the number of hours that employees should work is taken into consideration (Veninga 2000:23). For the women mineworkers to be productive, they were inspired by the presence and visibility of different health and safety committees, such as wellness committee, women union-wing committee, health, safety, environment and community committee where WIM share not only their frustrations, but also work ethics for productivity and improvement purposes. The availability and sustainability of these committees lead to reduced incidences of work-related injuries. Mine management echoed that their mandate was to ensure that mineworkers came to work healthy and they should also exit in that healthy state, when it was time to knock off. Such an attitude is not only empowering, but also promotes the supportive environment and builds trust (Hart et al. 2014:21).

The findings in this study regarding trust was that the WIM no longer have a trust relationship with the professional nurses. One cited that she did a papsmear test two years ago and never received her results. She was told that the results were not back. She went for the same test the following year and the same reason that the results were not back from the laboratory was given. The WIM praised her private doctor who does a pap smear test and after 2 weeks, the results are received. The woman was not happy because she paid the private doctor for the pap smear tests, which the selected coalmine had claimed to be providing. It is of vital importance that the mine communicates with the woman and clarifies the problem of the service that is not effective. Kowalski-Trakofler et al. (2010:15) agrees that to avoid communication breakdown and uncertainty, there should be information sharing or briefing sessions.

Some of the women raised the concerns of not receiving briefings on health-related matters. The findings of the study indicated that participants were not happy about the briefings they receive from the selected coalmine, because they were only safety oriented. They further mentioned that they would like to hear more health-related briefings so that their health needs could be addressed and illnesses prevented.

- ***Isolation of women mineworkers***

The isolation of women underground mineworkers where they work with male colleagues created a feeling of loneliness. Previous studies uncovered that it is risky to work in isolation because when in need of assistance, such as when attacked by the cable thieves, the response might not be

immediate (Guide to Working Alone Regulation 2011:3). Furthermore, the New York Committee for Occupational Safety and Health (2013:1) states that more women are suffering from stressful conditions due to working alone with less training and coaching when comparing them to their male counterparts. In this study, it was revealed that men underground mineworkers at the selected coalmine in Mpumalanga did not support or assist their women colleagues when faced with difficult tasks. Such behavioural problems created stressful situations for the women underground mineworkers to perform the work. Bashwira et al. (2013:5), argue that in the Democratic Republic of Congo, WIM are working hard without recognition, and they are discouraged and criticised for working in the mining industry. The authors' opinions were that due to this exclusion, some of these women felt aggrieved and demoralised. Furthermore, the demoralisation was not only due to the distribution of work, but also include both shift and standby allowance discrepancies.

The male colleagues were earning both the shift allowance and the standby allowance and on top of that acquiring a privilege of working only during the day. It was further pointed out that the intervention by the unions assisted the WIM because all mineworkers, irrespective of colour are now working the three shifts. In addition, all mineworkers are also benefitting by earning the shift allowance and the standby allowance. This is a recent development. Such relief from strenuous work and monetary benefits motivated the WIM to concentrate more on their work to ensure that they do not injure themselves. Furthermore, the Mine Health and Safety Act No. 29 of 1996 confirms that every employer must ensure that workers are safe by identifying appropriate controls, to prevent the re-occurrence of incidents and to report all incidents as required by the Act and corporate governance. This applies to investigations of suspected or confirmed occupational illnesses.

5.3.3 ILLNESS VERSUS MINE-RELATED INJURY

There are two pieces of South African legislation that speak to illness and mine-related injuries. These are the Compensation for Occupational Injuries & Disease Act (COIDA) No. 130 of 1993 and the Occupational Diseases in Mines & Works Act (ODMWA) No. 78 of 1973. IOD are reported to the RMA within 24 hours of the injury date under COIDA. Occupational Diseases are reported according to ODMWA. These compensable illnesses include silicosis, tuberculosis, asbestosis, obstruction of the airways, pneumoconiosis, permanent diseases of cardio-respiratory organs due to work hazards, progressive systemic sclerosis attributed due to work hazards and any other disease which the Minister of Health (MoH) declared it a compensable disease. These diseases are reported to the MBOD, within the first 14 days of diagnosis. At the selected coalmine, there is an Occupational Illness investigation procedure to establish the process as contemplated in section 5/11 of the Mine Health and Safety Act to identify appropriate controls to prevent re-

occurrence of such incidents and to report all incidents as required by the Act and corporate governance. Providing a safe and healthy working environment that is free of injuries and diseases is essential in preventing illnesses and promoting the physical wellbeing of all workers (Kauppinen & Kumpulainen 2003:19).

Non-work-related illnesses are treated differently from work-related illnesses. Such was confirmed in Chapter iv of the Compensation for Occupational Injuries and Diseases Act, 1993. This was also observed at the selected coalmine, where every sick mineworker reports at the OHSC for assessment and is then referred to their private doctor, public hospital or clinic. This is done because the mineworkers have a subsidised medical aid scheme or programme, which allows them to consult their own doctors. In this study, it was noted that the OHS centre personnel did not prioritise the women mineworkers' illnesses and render health care and treatment due to mine management instruction and saving costs. This was not according to what they were trained to do as far as rendering appropriate care was concerned, but they had to comply with the mine's policies.

TABLE 10: HOW DESIGNATED ROLES AND RESPONSIBILITIES FOR HEALTH PROMOTION WAS USED TO DRAFT GUIDELINES

ROLE	RESPONSIBILITY	EVIDENCE / VOICES	NOTES FOR GUIDELINE FORMULATION
Manager	Ensures a supportive environment in which employees can attend various clinic functions to assist in health promotion.	<p>Amachange house wethu agcwele kakhulu. Sibanengi. Maniqgoka niyashayisana lapha. There's no enough space. Ene kuyaqashwa, siya edeka, instead bona aba edi ama change house, but ba eda abantu" <i>[The change houses are congested, we are many. When you dress up you bump at each other because there is no enough space. They are appointing and we are multiplying, but change houses are not added, only people are added].</i></p> <p>"The change house is not hygienic, cause ngapha ama toilet, ngapha amashower. While you are showering someone wenza unumber two ngapha abanye bahleli ngale ema bhentshini, kulangahlangene nje". <i>[The change house is not hygienic because this side you find toilets, and on the other side it's showers. While you are showering, the other one is defecating, while on the other side others are seated on the benches, it is a confusing situation].</i></p> <p>"There are no doors, they are open. You can see umuntu oshawayo lapho, niyabhekana. So, I can say maybe there is no privacy that much, cause some of us are afraid to expose our bodies. And if uyogeza in front of abanye abantu baloku bakubhekile, even nawe uba uncomfortable. La singena khona they can include umnyango, uslide. Ube wedwa ngale, than ukuthi ubukane nomunye umuntu nigeza". <i>[There are no doors, the bathrooms are open. You can see a person showering while facing one another. There is no privacy and some of us cannot expose our bodies in front of people. Showering while people are watching you makes you feel uncomfortable. At the entrance they can include a sliding door and you can be alone that side, instead of facing another person while showering].</i></p>	<p>Change management (Organisational climate influences safety behaviours)</p> <ul style="list-style-type: none"> -Management values -Management and organisational practices -Communication and employee involvement in workplace and safety -Cost effectiveness <p>Psychosocial</p>

ROLE	RESPONSIBILITY	EVIDENCE / VOICES	STATEMENT FOR GUIDELINE FORMULATION
		<p>“Angisho omunye uthole ukuthi uya mensa. Omunye uba nama pains. Azange ngike ngibone ukuthi nangu umama omunye bamkhiphile because unama pains, ushona khona emgodini until ize ishift yakhe ishayise ntambama. Kanti bekungaba kuhle ukuthi uma umama eku menstruation, mhlambe beze la eclinic bazomchecka ngoba mhlambe asithi ngizovika ngithi ngiyamensa kanti angimensi. At least bekungabakuhle ukuthi abesesimeni esi right kulama pains aze aqede ngoba asifani thina abantu. Omunye nakamensa kubabuhlungu vele the whole iviki lonke. Manje mabangamhlonipha ngaleyondlela ukuthi bamunakekele nje until aze aqede leyomenstruation”. <i>[You find someone menstruating and having pains. I have never seen a woman in that state being released from work, she goes on with underground work until her shift finishes. It would be better if that person can be taken to the clinic to confirm that she is menstruating to avoid every woman claiming to have menstrual pains. Because women are unique, some suffer from these pains longer while others don't, it would be human to respect this woman until she finishes her menstruation]</i></p>	
	Expresses a concern for employee health issues.	<p>"Thina we are the last people abaphumayo emgodini. Ebusika siya affecteka kakhulu cause mawufika e surface labanye sebagezile. Uthole ukuthi amanzi sewayabanda, wena you have to shower ngamanzi abandayo". <i>[We are the last shift to come out of underground. In winter, we are mostly affected because when you arrive at the surface, everyone has had a warm shower. We shower with cold water].</i></p> <p>“Kusho ukuthi bona ba. basicashela ukuthi net kube nomfazi cause of i gender equality? Bayakutraina bese bayaku appointa bese mabaqeda lapho bazokukhipha emgodini uye e ofisini or ubeyi foreman or i planner. But mina I would like to work at least i 5 years underground”. <i>[that it means</i></p>	<p>Hazardous environment</p> <p>Safety Compliance (knowledge, skills and motivation)</p> <p>(Adherence to safety measures and ensure that the environment is hazard free)</p>

ROLE	RESPONSIBILITY	EVIDENCE / VOICES	NOTES FOR GUIDELINE FORMULATION
Occupational Medical Practitioner	Responsible for individual health education, prevention of Occupational diseases, procedures, environmental hygiene and certain lifestyle factors.	<p><i>that they appoint us only for the gender equality? They train you, appoint you and later remove you from underground to go and work in the office, or as a foreman or a planner. But I personally would like to work for at least 5 years underground]</i></p> <p><i>“Aba pregnant baya attenda nase Cosmo for ama sonar nani nani, cause la angisho awakho ama sonar. Mina I would like ukuthi la eclinic if I have a problem, angisho ngise shaft I have a problem ngiza la. Ngifuna kube na something abanganginika yona, cause la you come here and then mawufika la ayikho into abazokunika yona. They are just going to send you to your doctor”. [Those who are pregnant attend at Cosmos for sonars and other tests, because here there are no sonars. I personally would like that if I have a problem; I come from the shaft to the clinic and get something. When you arrive here there is nothing. When you arrive here, there is nothing to give you. They are just going to send you to your doctor].</i></p> <p><i>“There is one briefing once a month. I think it’s the 2nd week of the month. But the focus most of the time is not about health, their focus is about i safety yase mgodini”. [There is one briefing session a month, I think it is on the 2nd week of each month. But the focus most of the time is not about health, their focus is about underground safety].</i></p> <p><i>“Thina abomama vele nje ikakhulukazi, vele ngoba i mining industry kahle kahle from kudala angisho bekuyabobaba, so thina vele for kithi kusesenzimanyana. Mara ngoba phela umsebenzi umsebenzi, siyasebenza. Especially underground. Ikakhulukazi vele abomama bakhala ngezibeletho ngobunengi. Ngobunengi nje vele uma ngikhumbula last year, baninigi abafazi la abenziwa ama operation njengami so. Manje asazi or mhlambe yilokuthi sisebenza emgodini, asikhoni ukuthola, but nje ngobuningi thina abomama senze ama operation. Most yile operation mina engiyenzile. So asikwazi noma yiwo lomsebenzi wa underground or, mara nje yiwo lo”. [Since the mine was meant for men, we women are still suffering. But because we want to work, we can work especially underground; but the majority suffer from abdominal conditions.</i></p>	<p>Psychosocial Working environment</p> <ul style="list-style-type: none"> -Pregnancy -Menstruation -Nursery or child care -Union representation

		<p><i>If I can recall last year, many women here underwent the same operation I did. But we don't know whether it is because of working underground, but most of us had this operation I had. We really don't know if it is this work, but it is].</i></p> <p><i>“And then enye into esi affecta kakhulu when it's coming to thina abafazi; when we are having our periods i hygiene futhi nakhona ayikho emgodini cause lama toilet lawa angcolile angeke ukwazi ukuyo change your pads khona”. [Another thing which affects us women is that when menstruating the underground toilets are unhygienic. You cannot even go and change your sanitary towel].</i></p> <p><i>“But wonke umuntu uyafuna ukuhlala nomntwana wakhe. Ene kaningi si end up vele ungahlali nabo ungabi nesikhathi sabantwana. Cause nalama shift esiwangenayo, ungena i day shift and then ungena i night. Umntwana kumele umshiye no nanny. Lana around maybe kube ne crèche or school? La u bashiya khona abantwana”. [But everyone would like to stay with their children and in most cases, we end up not staying with and not having time for them, because of the shifts we are working. You do day shifts and then night shift. You need to leave the child with the nanny. If there can be a crèche or school around where we leave our children].</i></p>	
		<p><i>“We did complain to the union about our concerns, but ahh.. still the same. There is nothing being done. That is why ngithi some of the suggestions we are writing there, they don't take them seriously. Cause there is a lady omela abantu besimame, wuye umuntu esimtshelayo. Uyaya a adresse issue abuye athi bazasiphendula. Abuyele futhi bathi ya basasebusy basa researcher bazosiphendula”. [We did complain to the union about our concerns, but ahh.. still the same. That is why I say some of our suggestions written there are not taken seriously, because there is a lady representing WIM. We tell her all our every concern. She normally addresses our issues and comes back to tell us that management will respond to us. She will return back and be told that management is busy researching and they will report back to us].</i></p>	

	Ensures a supportive clinical environment in which employees are able to express concerns on health issues.	<p>“Iya nalesifo se.. I don’t know whether its bladder infection or something? Or kukoswa yiko ukuthi sichama khona la e dustini? Cause sometimes unokuthi uyachama bese uba.. uyabona i bladder infection ukuthi injani? Bese uphuza ama citrous soda nani nani kukose uthole ama antibiotics? Bese uchama ka ncane (changing facial expression like one in pain) ubeka ibhakede or indwangu bese uchamela phezu kwayo bese kuba ngcono Sometimes citrous soda alone does n’t help, vele kudinga ngiye ku Dr wami anginike ama antibiotics”. <i>[It’s like this illness....I don’t know whether it is bladder infection or something? But it is caused by this urinating on the coal dust. Sometimes when you urinate you experience this.. you know how is bladder infection? You then drink citrus soda, then you also get some antibiotics and then urinate slowly. I normally use a bucket or put a cloth on the ground and urinate on it, then it becomes better. Sometimes citrus soda alone does not assist, then I need to see my Doctor for some antibiotics]</i></p>	<p>Health care services</p> <p>-Attending to health related illnesses</p>
	Education of Management on Health related problems, identifications of problems that could have medical implications.	<p>“Mina I am not happy, especially le ye pap smear. You do that pap smear, you come la e clinic uthi uzofuna ama results wakho back soloku bakutshela ukuthi amareresults awakabuyi. Mina it has been 2 years ngiyenza le pap smear but I never get my results from the clinic”. <i>[I am not happy, especially with the pap smear. You do that pap smear, you come to the clinic for your results and you are told that the results are not back. I have done this pap smear every year in the past 2 years, but I never received both results from the clinic].</i></p> <p>“Angikaze ngawathola ama results we pap smear, bangitshela same story. Even na last year vele ngaboreka nokuyenza ngoba I don’t get my results. The best thing ngiziyela ku Dr wami and ama results ngiwathola within 2 weeks, which mawuya ku Dr wakho you gonna use your medical, imali” <i>[I have never received my pap smear results. The clinic tells me the same story. Even last year, I was bored and never did it because I don’t get the results. The best thing I do I just got to my doctor and I get the results within 2 weeks, but the problem is that I use my medical aid and it’s money]</i></p>	<p>Health care services</p> <p>-Attending to health related illnesses</p>

ROLE	RESPONSIBILITY	EVIDENCE / VOICES	NOTES FOR GUIDELINE FORMULATION
Occupational Health Practitioner	Ensures a supportive clinical environment in which employees are able to express concerns on health issues.	<p>“And then enye into engasikahle, masithi uyagula le emgodini, kuthatha isikhathi iambulance ingezi. And then futhi lapho okunye uze uphume wena soloku iambulance ingakafikanga. Ngoba nami seyike yangenza lento. Nomunye engisebenza naye umuntu ongumama, saze samletha laphezulu soloku i ambulance ingakafikanga”. <i>[The other thing that is not correct, if you are sick underground, it takes longer for the ambulance to arrive. Sometimes you come out of underground and wait for it. This has happened to me and also to another colleague that we went from underground to surface and the ambulance was not there].</i></p> <p>“Angisho mhlawumbe awutholi isikhathi sokuya ku Dr wakho. So kumele mawuza la usemsebenzini, then ujike lana. Bakhona ukukusiza masinyane, then uhambe uye emsebenzini”. <i>[Sometimes you do not get time to see your Doctor. It is expected that you come to the clinic, and go back to work. If they can assist us quicker so that we can go back to work].</i></p> <p>“Ngicabanga ukuthi maybe makungaba ne medication eduze, makwenzekile ukuthi maybe sowuyacala nje uzwa ama pain lawo. Sekumele obviously uhambe bathi uthatha amalanga uyahamba uya eclinic or uya ka doctor yakho”. <i>[I think maybe if the medication can be accessible and nearer, in case it happens that you start having those pains. You obviously need to take some days and go to the clinic or to your doctor]</i></p>	<p>Psychosocial Working environment</p> <p>-Transport</p> <p>Health care services</p> <p>-Attending to health-related illnesses</p>

	<p>Education of Management on Health-related problems, identifications of problems that could have medical implications.</p>	<p>“Mhlambe basitshela ukuthi sigqoke i PPE. Ne safety. Nothing about i health” [<i>They normally tell us how to wear PPE and also about safety. Nothing about health</i>].</p> <p>“Hayi awasi right lama service, because kudala angisho bebakunikeza usizo. Manje noma uphethwe inhloko uthi uza eclinic bakutshela ukuthi hamba ku Dr wakho akunamapilisi. Noma uphethwe wumkhuhlane ukuqale ngaleso sikhathi, akunamapilisi noma umuthi womkhuhlane”. [<i>No, these services are not right, because in the olden days they used to assist us. Now even if you suffer from headache and come to the clinic, they tell you that go to your own Doctor, there are no tablets here. Even when you suffer from flu which started at work, there are no flu tablets or cough mixture</i>].</p> <p>“Idietician angicabangi ukuthi ikhona lana. Mmhh ngathi, ayikho. Khona sizokwazi ukuthi yikuphi ukudla oku right for thina. And then, ja sazi ukudla oku right for thina”. [<i>I don't think there is a dietician available. Yes, I don't think we have. So that we know the type of food which is appropriate for us. And then.. yes, to know the correct type of food</i>]</p>	<p>Safety participation</p> <ul style="list-style-type: none"> -Assisting fellow co-workers -Promoting safety programme and efforts to improve safety in a work place
	<p>Responsible for individual health education, prevention of Occupational diseases, procedures, environmental hygiene and certain lifestyle factors.</p>	<p>“Vele wangavelelwa yilenkinga ule emgodini, mangabe kuwukuthi i supervisor yakho vele mawuyicela ukuthi ufuna uphuma uzoze ushayise uvele unjabo. Kukosele phela mhlambe uzame ukuboleka something or i slumber ngoba khona abanye abehla bafake izilumber cause kuyabanda. So, uzofasa i slumber ke. Njengami nje khona ngelinye ilanga ngike ngavelelwa yinkinga leyo bengifasa i slumber the whole day”. [<i>If you start menstruating at work and your supervisor cannot release you to go out and change, you will work in that condition until you knock off. Sometimes we borrow something like a jacket because there are mineworkers going down wearing jackets due to cold weather. You will fasten that jacket on your waist to hide the marks. I was once in that situation and was having that jacket on my waist throughout the day</i>].</p> <p>“Abafazi sinezinto eziningi, we would like ukuthi kesibe endaweni eyi one sonke and then get someone professionally, who can discuss izinto na</p>	<p>Engendering of the mine</p> <ul style="list-style-type: none"> -Considerations of feminity in mining -Policy and ideologies that enforce feminity -Women-friendly health and safety

RESPONSIBLE PERSON	RESPONSIBILITY	EVIDENCE / VOICES	NOTES FOR GUIDELINE FORMULATION
		<p><i>the way thina abafazi kumele siziphathe ngakhona about our health. Cause sinezinto eziningi ezisiphathayo thina. Cause okunye I can have a cervical cancer maybe bazongifundisa about signs ukuthi uyibona njani leyonto if ingenzeka kuwe namabreast cancer". [as women, we have a lot of things we would like to see ourselves in one place where we will get a professional person to discuss women health related issues on how to look after ourselves. Women suffer from multiple conditions like cervical cancer where we can be taught about its signs and how to pick it up if you suffer from it including breast cancer]</i></p>	
Occupational Health Nurse	<p>Responsible for:</p> <ul style="list-style-type: none"> -individual health education, -prevention of Occupational diseases, -procedures, -environmental hygiene and -certain lifestyle factors. 	<p><i>"Siyasokola vele uma siya esikhathini. Phela kwesinye isikhathi umzimba womuntu wesifazane uyashintshashitsha angithi, uthole ukuthi uya esikhathini ungalindelanga, kwangenzeka wavelelwe yilengozi ule, hawu usenkingeni kakhulu. Hayi, bekukosele ukuthi bayasinikeza, abasinikezi, uyaziphathela. Bake bakukhulumisa loko bathi bazokwenza, angazi kwaphelela kuphi". [We are really struggling when we menstruate. Sometimes the woman's body changes and you find yourself menstruating unexpectedly. If it happens to you at work, you are in a serious problem. The mine needs to issue us with sanitary towels, but they don't; you need to bring yours. They once promised, but I don't know where it ended up].</i></p> <p><i>"Unyaka ophelile vele hai, indlela abebenza ngayo beyinga sikahle cause noma utesta utestela khona lana bekungana privacy. Just beavalile nyana nje kancane, but bebangenzi ngalendlela abenza ngayo. Angithi lokuya bekuba ne room la utestela khona so manje just bavalenyana Abanye vele bebacomplaina ukuthi iprivacy beyingekho" [Last year it was not well, when testing there was no privacy. They were slightly closing, but they were doing it differently. There were no rooms for privacy and most people complained about privacy].</i></p> <p><i>"Ababuyele ngalendlela ebebenza ngayo. Angisho lokuya kudala bekunama classes amaningi, nina beni rotate kahle, yabona. Manje vele eya last year yona, angazi or bebangakayi pleni kahle angikhoni ukuthola.</i></p>	<p>Engendering of the mine</p> <ul style="list-style-type: none"> -Considerations of Feminity in mining -Policy and ideologies that support feminity needs -Women-friendly -Bullying of women mineworkers

		<p>But kungasi iclinic yodwa, i management nje as a whole, angisho yiyo e planayo ukuthi kuzokuba ne safety week. Yenze ama arrangement. E clinic bona just bayatshelwa nje ukuthi nize ngelanga eliso kuzobe safety week. Yibo okukosa ba prepare angisho". <i>[They should go back to the old way of testing, where there were rooms and we will go for a test in each room rotating.</i></p>	
		<p><i>The one of last year was not properly planned and I do not know why. However, we cannot blame the clinic alone, the management as a whole should be blamed because they are the ones planning the safety week and do all the arrangements. The clinic personnel is notified by management that on such a day there will be a safety week].</i></p> <p>"Khona omunye bengisebenza naye. Bekane problem le yokuthi makaku maperiods vele uyagula Besizithola sesishoda ngoba kumele maybe angezi. Athathe i sick note or something". <i>[There was one I worked with. She had a problem where she felt sick when menstruating. We ended up with a shortage of staff because she maybe could n't make it. She had to get a sick note or something].</i></p> <p>"I try ngithi at least that thing ngizenzele. But, even though sometimes kunzima yabo. Ngiya.. ngiyazama ukuthi langihluleka khona ngibona ukuthi no, I can't and then ngiyababiza. Kuba nabanye angisho bathi angisho sisebenza sonke, sithola imali elinganayo sonke. Baze bangitshela njalo ukuthi ukhethe ukuthi uzoba u mechanic So, thina masisonke la asinamuntu o special, sinabo mechanic bonke". <i>[I try to at least do something for myself. But, even though it is difficult sometimes, you see. I..I try and where I can't, then I call them. There are those who say we are working together and we are earning the same money. They even tell me that I chose to be a mechanic, so, when we are all here, we do not have special person, we only have mechanics]</i></p>	

ROLE	RESPONSIBILITY	EVIDENCE / VOICES	NOTES FOR GUIDELINE FORMULATION
Technician Assistant (Medical)	Responsible for: -individual health education, -prevention of Occupational diseases, -procedures, -environmental hygiene and -certain lifestyle factors.	<p>“Siyafisa ukuthi loko esikhala ngako like ama overall so nama.. loku kwabomama mawule phezulu, ukuthi bangasilungisele kona ukuthi kube khona le emgodini kungathi mawuvelelwa i nkinga sekukosa ungazi ukuthi wenze njani. Mangabe bangasilungisela kona”. [<i>We so wish that the overall and the sanitary towel issues can be sorted out for us underground. So that if we are faced with the challenges mentioned, we don't find ourselves embarrassed and running around not knowing what to do.</i>]</p> <p>“Sisebenza ku dust kakhulu bayasinikeza like dust masks but then it's not 100%. Especially when you are working, angeke uze uyifake 24/7 cause you can't breathe properly”. [<i>We work in a severe dusty environment they give us dust masks but then it's not 100%. Especially when you are working, you will not put it 24/7 because you can't breathe properly</i>]</p>	<p>-Health services</p> <p>-Rehabilitation-no time for healing</p> <p>-No follow up of the illness</p>

The above-mentioned table represented the different roles by different participants at the mine, which was used to draft the statements for the guideline formulation. Such included the responsible person/participant, the comment, the participant's voice and the statement for guideline formulation.

A study by Margolis (2010:417) cites underground coal mining as the most dangerous form of mining in South Africa. This study confirms that coalmine industries experience a high rate of IOD which have amounted to 3021 lost time injuries, which occurred at a 3.3 rate of injury per 100 full time equivalent employees in 2006. Due to these incidences, the DMR puts strict rules that govern all the coalmines in South Africa through its Minimum Standard of Fitness document. According to this DMR document, the mine owners should ensure that all mineworkers are medically declared fit to work in the specified category of work at the mine. Furthermore, the document protects mineworkers from being exposed to unacceptable health and safety risks, as indicated in Section 7 of the Mine Health and Safety Act. When work-related injuries are reported, they are attended to with proper healthcare and treatment, including follow ups and rehabilitation until the injured mineworker is properly healed and able to resume the normal duties. If such injuries are not reported, the injured mineworker is deprived of treatment as well as compensation.

According to Gender, Health and Work (2004:2), although both women and men are well paid by their employers, their health tends to be compromised by risk exposures, which later affect them physically and psychologically. The International Labour Organization (ILO) re-affirmed that approximately 2.2 million women and men die from work-related injuries and illnesses annually; with 160 million of new work-related illnesses. However, the ILO further emphasised that in developing countries, the information submitted by organisations is not the true reflection of what exists. Work-related injuries and illnesses are inappropriately recorded and submitted for compensation, because women are perceived to be always working in safer environments. In addition, when women's work-related claims are submitted for compensation, some are misdiagnosed and the compensator does not accept the claim as occupationally related (Gender, Health and Work 2004:2),

In this study, it was also found that some women underground mineworkers were denied by their supervisors to report work-related injuries. They were told that they will not be paid the safety bonuses due to reported injuries. Cornish (2008:15) agrees that women are often bullied to appear as if they lack decision-making skills in OHS. Reporting mechanisms of work-related injuries exist, but there is a threat from the supervisors if they use them. Barker et al. (2002:6) agrees that young workers are prone to work-related injuries due to a lack of work experience and skills. However, previous studies have proven that women were less exposed to the incidence of injuries than men

due to women being used to their domestic work and caring attitude (Cornish 2008:14). To prevent work-related injuries, the coalmine should encourage mineworkers to report all work-related injuries as stipulated in the Occupational Health and Safety Act (85 of 1993).

Injuries are reported according to the mines rules and regulations, which are developed from the South African legislations. The reporting process according to the COIDA is as follows:

According to Chapter 5 Section 38 of the COIDA, the notice of accident by employee to employer in written or verbal reporting shall, as soon as possible after such accident happened, be given by or on behalf of the employee concerned to the employer, and notice of the accident may also be given as soon as possible to the commissioner in the prescribed manner. Failure to give notice to an employer as required in subsection (1) shall not bar a right to compensation if it is proven that the employer had knowledge of the accident from any other source at or about the time of the accident. Subject to section 43, failure to give notice to an employer as required in subsection (1), or any error or inaccuracy in such notice, shall not bar a right to compensation if in the opinion of the Director-General the compensation fund or the employer or mutual association concerned, as the case may be, is not or would not be seriously prejudiced by such failure, error or inaccuracy if notice is then given or the error or inaccuracy is corrected; such failure, error or inaccuracy was caused by an oversight, absence from the Republic or other reasonable cause.

According to the mine's Standard Operating Procedure-:

After the employee has been involved in a work-related injury, the supervisor is notified. The supervisor then calls the Control Room Operator informing him/her about the incident. The following information is obtained: the type of incident e.g. Medical/Trauma; the exact location of the incident; how many persons involved; name and contact number of the person reporting the incident. After obtaining the necessary information, the Control Room Operator notifies the Paramedic on duty, surface or underground and the Emergency Services (ES) Specialist onsite. The on-duty Paramedic will respond to the scene of the incident and take command on arrival. Upon arrival on the accident scene, the on-duty Paramedic will take charge of the scene. The on-duty Paramedic will ensure that the scene is safe for rescuers, patients and bystanders. The on-duty Paramedic then secures the scene and ensures safety of patient and the vehicle. The ES Coordinator is notified of the severity of the incident and then notify the Emergency Service Specialist".

When the above information has been received, the on-site ES Coordinator can then:

Notify the Ambulance services and external resources if needed. He will then make the decisions based on information received on what resources are required for that scene. The ES Specialist should already have been notified at this stage. Based on the information received, he will make the decision whether or not to implement further resources or to implement the Incident Management System and also to respond to the Incident. The ES Specialist activates additional emergency services and resources as required by state of severity. If not serious, the Site ES Coordinator will co-ordinate the incident, notify the relevant medical facility of the number of patients, notify the Health, Safety, Environment and Community (HSEC) and Mine Head of Department (HOD). Site specific ES Coordinator must accompany the patient to hospital submit proper feedback with regards to patient's injuries to Management. Notify the Group Health Manager. Submit feedback on number of patients, type of injuries etc. Request for additional assistance from the Group Health Manager. Group Health Manager will liaise with hospitals in a multi patient incident. Feedback will be given to the Mine HOD and Incident Management Team (IMT). Submit regular feedback with regards to state of incident.

The **work instruction 076** is the process followed when reporting Occupational illnesses and injury at the mine:

Accidental injury or death arising out of and in the course of employment; and certain occupational diseases arising out of and contracted in the course of employment. In accordance with Section 39 (1): "an employer shall within seven (7) days after having received notice of the accident or having learned in some way that an employee has met with an accident, report the accident to the commissioner in the prescribed manner". Section 68 (2) reads as follows "an employer shall within fourteen (14) days after having received notice or having learned in some way that an employee has contracted a disease report such disease to the commissioner or mutual association concerned".

Scott and Grayson (2008:7) refer to NIHL as a condition characterised by the inability to communicate and a poor response to environmental and occupational noise. This condition starts slowly and advances to be worse and it can be deadly in specific work situations. Previous studies revealed that noise exposure is a huge challenge in the mining industry because of heavy machines, drilling and rock breaking; transferring, sorting and milling of rock; and working in confined environments. In South Africa, the mineworkers' available data for noise exposure propose that approximately 50% of the mineworkers are exposed to NIHL, of which more than 90% of them work in areas with noise levels that are above 85 Db and 11% of them work in areas with the noise levels that are even higher (Hermanus 2007:534). At the selected coalmine, the OHSC

personnel identify mineworkers with NIHL when they report at the OHSC for medical surveillance. These mineworkers are then referred to the Ear, Nose and Throat (ENT) specialist who then confirms the illness (NIHL). Such mineworkers are captured in Occupational Disease register for easy references and audit purposes.

When reporting NIHL to the MBOD, the ENT report is accompanied by noise exposure record that is received from the selected coalmine's Occupational Hygienist (OH) who monitors all mineworkers' exposure levels. Occupational Diseases are not easily hidden, because they are picked up at the OHSC during the periodic medical examination. Employees who were diagnosed with an Occupational Disease should have a benefit examination report, which should be sent to MBOD, who decides on certification. Certified diseases should be reported to Compensation for Occupational Injuries and Diseases Act 130 of 1993 (COIDA) for compensation.

Quality Control System

In this study, it was found that the quality control system of illness and injuries was in place and followed according to RMA processes. The OHSC personnel with the assistance of the Human Resources department ensured that the monthly report form on claim days is evaluated and comments are appearing on all the claims reported later than 7 days. The illness and injuries registers are kept updated as incidents occur for audit and reference purposes as indicated in the flow charts (COIDA and ODMWA) below.

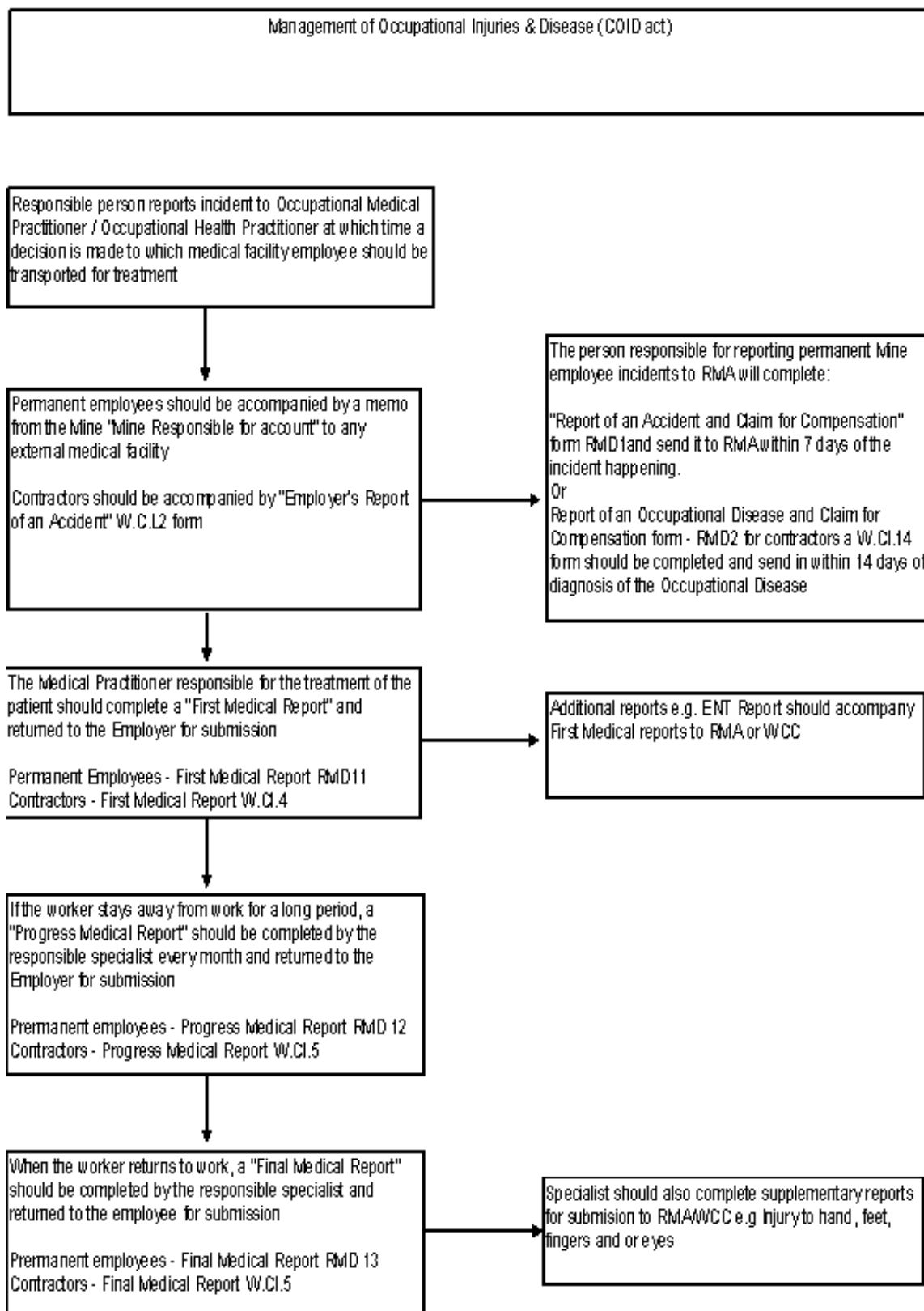


FIGURE 7: PROCESS FOR MANAGING WORK-RELATED INJURIES AND DISEASES

The OHSC of the selected coalmine adheres to the following procedure when attending to the employee with a work-related injured:

Procedure for Reporting of Incidents:

- Notify Control Room / Security of incident.
- Occupational Medical Practitioner [OMP] / Occupational Health Practitioner [OHP] notified of incident.
- Risk Manager to notify clinic / OMP in writing, indicating whether incident has been accepted as a monitored or controlled incident. (The responsibility for classifying an incident as controlled, monitored or uncontrolled rests with the Site Management).
- Preliminary report supplied to the clinic to verify acceptance as controlled incident for recording purposes.
- Clinic to obtain history from injured on his or her NORMAL duties.
- OMP / OHP to verify NORMAL duties.
- OMP to refer injured to appropriate primary facility.
- Clinic to supply hospital with authorisation for payment of accounts.
- OMP to liaise with treating doctor on extent of injury.
- When necessary OMP to facilitate referral to appropriate centre / specialist for definitive care.
- OMP to classify severity of injury on "Individual Incident Report".
- Completed and signed "Individual Incident Report" to be forwarded to Risk Manager.
- "Individual Incident Report" form to be signed by Risk Manager.
- Forward "Collated Report of Controlled Incidents" form to Risk Manager on a weekly basis by Thursday 12:00. Monitored incidents will not be reported on this form.
- Risk Manager to return collated form by Friday 12:00. If any inaccuracies are noted they must be reported to the clinic before 12:00. The final report will be sent out by close of business on Friday.
- A hard copy of the "Collated Report of Controlled Incidents" form to be sent to Risk Manager on the last calendar day of each month.
- This copy will be signed off by the OMP and must be signed off by the Risk Manager as well as the General Manager.
- A copy of the collated, signed form to be kept by both parties.

INDIVIDUAL INCIDENT REPORT

Individual Incident report is a form completed by the Occupational Medical Practitioner for the injured mineworker in order to ensure that all injuries are reported, recorded and monitored. In this

report, the name of the injured mineworker, the date and time of the injury, the section where the mineworker was injured is recorded. The injury is then classified either as a near miss, first aid (FA), medical treatment case (MTC), Restricted Work Case (RWC) or the loss time injury (LTI).

Monitored Incident		Controlled Incident		
Mine / Site		Date & Time of Accident		Date & Time Reported
Section where person was injured		Prelim report received		YES NO
Name of injured person		Co. No. / Contractor		
Description of injuries				
Nature of normal duties				
Information verified with				
Medical Practitioner's Diagnosis				
Special Instructions				
Initial / Telephonic Classification of incident				
LTI	RWC	MTC	FA	Near miss

Reported To:		Date & Time		
Final Classification of Incident				
LTI	RWC	MTC	FA	Near miss
Signatures				
Signature Medical Practitioner		Signature Risk Manager		

According to the women underground mineworkers, after being injured, the employee reports the injury to the immediate supervisor. The supervisor arranges transport for the injured employee to be transported to the surface area, where the ambulance will transport the injured employee to the OHSC. At the OHSC the injured employee is assessed and treated if the injury is minor. If the injury is serious, the injured employee is transferred to the private hospital within the area or to the one in the Gauteng Province. Despite the MHSA and the selected coalmine reporting system, the mineworkers were not following the process. The finding was that the supervisors instruct the injured woman mineworker not to report the accident because the whole team might lose their bonuses due to working unsafely.

Work-related injuries and illnesses should be reported according to the legislations mentioned above. Employers should educate employees on the importance of reporting accidents and illnesses and discourage them from hiding these incidents. Furthermore, a system that ensures privacy and confidentiality can be put in place for improving reporting by employees, they can be given work related incentives for reporting, and requested to report those hiding the incidents. Employers to ensure that such is treated with privacy and confidentiality. Furthermore, when reporting both illnesses and injuries, it is of importance to always ensure that the process is followed ethically with privacy (Allen 2013:849). At the mine, the health promotion SOP that is followed in promoting health. Such SOP is referred to below:

TABLE 11: HOW HEALTH PROMOTION OPERATING PROCEDURES WERE USED TO DRAFT GUIDELINES

STANDARD OPERATING PROCEDURES	COMMENT	EVIDENCE/VOICES	STATEMENT FOR GUIDELINES
<ul style="list-style-type: none"> Notify Control Room/Security of incident 	<p>Injuries are not reported because the team in the whole section would not get the safety bonus</p>	<p>“Besiguga imotto besi installer igear box. Masisa aligner njalo, yena bekame ngale mina ngime ngapha. So, yena wadonsa lento yangihlaba la esbhonweni, le roofbolter”. [We were lifting a motto, installing a gear box. My colleague partner was standing that side and I was this side. He pulled harder and the roof bolter injured me]</p>	<p>Change management (Organisational climate influences safety behaviours)</p> <ul style="list-style-type: none"> -Management values -Management and organisational practices -Communication and employee involvement in workplace and safety -Cost effectiveness
<ul style="list-style-type: none"> Occupational Medical Practitioner/ Occupational Health Practitioner notified of incident 	<p>Because the injuries are not reported as prescribed in the Standard Operating Procedure, employees seek medical assistance from the public sector or their private doctors</p>	<p>“I came to the clinic but eh...bebangafuni siyi reporte” [I came to the clinic, but eh... they did not want me to report it].</p>	<p>Hazardous environment</p> <p>Safety Compliance (knowledge, skills and motivation)</p> <p>(Adherence to safety measures and reporting of injuries)</p>
<ul style="list-style-type: none"> Risk Manager to notify clinic/OMP in writing, indicating whether the incident has been accepted as a monitored or controlled incident 	<p>When the injury is hidden by the employee, the Risk Manager will not know about such injury and there is no need for classification of the injury</p>	<p>No ayina niks shame i sharp. Azange kwenzakale niks. [No its fine. Nothing much happened].</p>	<p>Psychosocial Working environment</p> <ul style="list-style-type: none"> -Pregnancy -Menstruation -Nursery or child care -Union representation Transport

STANDARD OPERATING PROCEDURES	COMMENT	EVIDENCE/VOICES	STATEMENT FOR GUIDELINES
<ul style="list-style-type: none"> Preliminary report supplied to clinic to verify acceptance as controlled incident for recording purposes 	<p>If the injury was not reported, there would not be a preliminary report</p>	<p>“Just ngeva ubuhlungu phakathi so, then ngaya ka doctor ke” [I felt a pain inside, so I went to the doctor]</p>	<p>Health care services -Attending to work-related injuries and illnesses</p>
<ul style="list-style-type: none"> Clinic to obtain history from injured regarding their normal duties 	<p>The injured employee did not report the injury. The only time one will know about injury is if the employee visits the OHSC for medical surveillance. When completing the questionnaire, some questions are asked about last injury and the employee will unwittingly mention it</p>	<p>“So, masesishayisa ngeva ukuthi hayi lobuhlungu sebukhulu mina ngazizela la eclinic ngizofuna amapilisi”. [so, when we knocked off I felt severe pain, I then decided to go to the clinic and ask for tablets]</p>	<p>Health services</p>
<ul style="list-style-type: none"> OMP/OHP to verify normal duties 	<p>No verification will be done due to not reporting the injury</p>	<p>“Then there was a case vele ukuthi I should have reported immediately mayenzeka” (Then there was a case that I should have reported, the injury immediately after it happened)</p>	<p>Health services</p>
<ul style="list-style-type: none"> OMP to refer injured to appropriate primary facility 	<p>No referral by OMP because the injury was not reported</p>	<p>“Then la eclinic bathi we have to tell the safety department and all that (The clinic personnel said I should inform the Safety department)”</p>	<p>Safety participation -Assisting fellow co-workers - Promoting safety programme and efforts to improve safety in a work place</p>

STANDARD OPERATING PROCEDURES	COMMENT	EVIDENCE/VOICES	STATEMENT FOR GUIDELINES
<ul style="list-style-type: none"> Clinic to supply hospital with authorisation for payment of accounts 	Employee never reported the injury	“So I ended up vele kusale ngayireporta vele (I ended up reporting the injury)”	Health and safety
<ul style="list-style-type: none"> OMP to liaise with treating doctor on extent of injury 	Employee never reported the injury	“Iya isafety department bayivuma, bathi ngihlale ke ekhaya kancane (yes, the safety department accepted the injury. They said I must go home and rest for a certain period)”	Engendering of the mine -Considerations of Femininity in mining -Policy and ideologies that support feminine needs -Women-friendly -Bullying of women mineworkers
<ul style="list-style-type: none"> When necessary OMP to facilitate referral to appropriate centre/specialist for definitive care 	Employee never reported the injury	“Reporting injury depends on eh..I know the mine law says that you must report all the injuries”	-Health services -Rehabilitation-no time for healing -No follow up of the injury
<ul style="list-style-type: none"> OMP to classify severity of injury on “Individual Incident Report” 	No classification of injury, since the injury was not reported	“But if you are working for a bonus, it affects your bonus”	Engendering the mining industry
<ul style="list-style-type: none"> Completed and signed “Individual Incident Report” to be forwarded to Risk Manager 	No individual incident report completed, because the injury was not reported	“The section guys laba engisebenza nabo, ukuthi inga affecti our safety bonus” (the section guys I work with said it will affect our safety bonus)	Engendering of the mining industry

STANDARD OPERATING PROCEDURES	COMMENT	EVIDENCE/VOICES	STATEMENT FOR GUIDELINES
<ul style="list-style-type: none"> “Individual Incident Report” form to be signed by Risk Manager 	No individual incident report signed, due to the injury not being reported	“The pipe broke seven ribs, fractured the few. I went to my doctor because there were some safety procedures we did not follow”	Inspiring hope and resilience -Career progression -Salary inequities -Job security
<ul style="list-style-type: none"> Forward “Collated Report of Controlled Incidents” form to Risk Manager on a weekly basis by Thursday 12:00. Monitored incidents will not be reported on this form 	No collated report forwarded to Risk Manager, due to non-reporting of the injury	“So we did not report, were scared of the mine, you know (smiling)”	Bullying
<ul style="list-style-type: none"> Risk Manager to return collated form by Friday 12:00. If any inaccuracies are noted they must be reported to the clinic before 12:00. The final report will be sent out by close of business on Friday 	No collated report to be returned by the Risk Manager, due to non-reporting of the injury	“So if it’s a minor thing, let’s say you fell, you feel your body is aching, you leave it”	Resilience
<ul style="list-style-type: none"> A hard copy of the “Collated Report of Controlled Incidents” form to be sent to Risk Manager on the last calendar day of each month 	Since the injury was never reported, there would not be a hard copy of an injury	“Because you know it’s just a body ache, so you are not going to report it, because there is no investigation or anything”	Resilience

STANDARD OPERATING	COMMENT	EVIDENCE/VOICES	STATEMENT FOR GUIDELINES
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PROCEDURES			
<ul style="list-style-type: none"> This copy will be signed off by the OMP and must be signed off by the Risk Manager as well as the General Manager 	<p>Since the injury was never reported, there would not be a hard copy of an injury</p>	<p>But if it is a serious fall like the other day we had a serious fall. The guy passed out and had a concussion to his head"</p>	<p>Protection on privacy on women mineworker's information</p> <ul style="list-style-type: none"> -Health information -Employee information
<ul style="list-style-type: none"> A copy of the collated, signed form to be kept by both parties 	<p>Since the injury was never reported, there would not be a hard copy of an injury</p>	<p>A serious injury is reported and investigated by the mine. They send you maybe to the hospital, taken by the ambulance. So, it differs from person to person</p>	<p>Protection on privacy on women mineworker's information</p> <ul style="list-style-type: none"> -Health information -Employee information

The above-mentioned table represented the different participants' understandings of Health Promotion Operating Procedure at the selected coalmine. The table included the Standard Operating Procedure, the comment, the participant's voice and the statements for guideline formulation.

5.3.4 ETHICAL THEORY PRIVACY

Responsible ethical practices are embedded within the two pieces of South African Legislation: Mine Health and Safety Act No. 29 of 1996 and the Occupational Health and Safety Act No. At the selected coalmine, a standard operating procedure ensures that data is managed correctly and professionally.

Section 15 of the Mine Health and Safety Act No. 29 of 1996 (MHSA) states that:

No employee's record of medical surveillance kept in terms of section 13 (3)(c) record must be kept confidential and may be made available only in accordance with the ethics of medical practice; if required by law or court order; or if the employee has consented, in writing, to the release of that information, improper disclosure of confidential information is an offence (See Section 87) and breach of confidence may result in an administrative sanction (See Section 39). In addition, this section of the Act proclaims that any person required to maintain an employee's record of medical surveillance must store it safely; and not destroy it or dispose of it, or allow it to be destroyed or disposed of, for 40 years from the last date of the medical surveillance of that employee.

Responsible ethical practices are referred to as the ability to recognise, interpret and act upon multiple principles and values as per the standards given within a given context. In this study, responsible ethical practices are related to handling information with privacy, which is similar to confidentiality. Heikkinen et al. (2006:515) define privacy as the way in which medical information is collected and disseminated, ensuring that the physical, social and psychological aspects of privacy are not disregarded. While Moor (1991:74) describes privacy as the control of the information about people and groups deciding on when, how, and to what level such information is to be transmitted to other people about them. The author further discloses that it is every person's right not to communicate one's information to other individuals. That is why in this study, the women participants felt uncomfortable when they were requested by the professional nurses at the OHSC to bring a letter from the doctor stating the method of delivery before being allowed back to work. This is re-affirmed by Allen (2013:841) and Moor (1991:75) it is reasonable for one to disclose information about herself to the next person; however, it is intolerable for someone to reveal information about someone without the written consent from that person.

To release confidential medical information to outsiders is a violation of informational privacy. In this study, it was identified that there is no privacy between the woman as a client and the professional nurse as the therapist, because the information about the woman's method of delivery was requested at the OHSC. It was further pointed out that when the woman asked the reason for such letter, the professional nurses explained that the OMP needed the letter so that the WIM can be declared fit to go and work underground.

Additionally, Section 16 of the MHSA expresses that:

Every OMP at a mine must compile an annual report - covering employees at that mine, giving an analysis of the employees' health based on the employees' records of medical surveillance, without disclosing the names of the employees. The annual report compiled in terms of subsection (1) must be given to the manager, who delivers one copy of the report to each of the owner; the health and safety committees, or if there is no health and safety committee, the health and safety representatives; and the Medical Inspector.

The findings in this study were that the professional nurses at the selected coalmine comply with the MHSA when preparing the annual report to the DMR. Privacy is adhered to by ensuring that there is no mention of mineworkers' names in the DMR annual report. Only the figures are documented; for instance, 10 mineworkers suffered from tuberculosis, two work-related injuries, etc.

At the selected mine, the standard operating procedure specifies as follows:

medical personal data of mineworkers should only be collected in conformity with national legislation, medical confidentiality and the general principles of occupational health. Information is collected and recorded manually in the personal medical file of employees and other relevant health data. Employees must give consent for medical tests and verify information given by signature.

The findings in this study were that the occupational health related information is captured on various electronic databases and manual registers at the OHSC, in order to be accessed by the hygiene department, human resources department and risk department. Such data is used for statistical purposes. Professional nurses capturing the information ensure that the medical confidentiality and privacy are maintained. Furthermore, the information is captured in a way that it is easily retrievable, protected against damage, protected against loss, stored for forty years after last medical examination, stored in a fire-resistant archive in privacy, as stipulated by section 15 of the MHSA.

Nurses have ethical and legal responsibilities to maintain the confidentiality and privacy of every patient's health information obtained while providing health care services. In today's world, nurses are often faced with a dilemma where the patient's information is controlled and kept safe in the medical file without any external person accessing it. However, when such information is captured on the computer database, the control of such information is no longer safe and others can access such information (Heikkinen et al. 2006:516; A Nurse's Guide to Professional Boundaries 2011:12).

Although professional nurses are obliged not to disclose sensitive medical information about the patient without written consent, they have a responsibility to inform mine management about detrimental health exposures. Such information is shared in order to prevent those adverse health exposures and to improve occupational health care (Heikkinen 2006:528). In this study, this was witnessed when mineworkers suffered from work-related illnesses and injuries where assessment of the environment and investigation of the illnesses was done by the multidisciplinary team consisting of a professional nurse, Occupational Medical Practitioner, safety representative, union representative, exposed mineworker, supervisor of the mineworker and the hygienist or environmental officer. From the meetings of the team, a diagnosis is made confirming the work-related illness or injury in order to report it to the insuring company and the Medical Bureau for Occupational Diseases for illness for the purposes of compensation.

In this study, what came out clearly during the interactions with the women, was that they were not satisfied with handling of their medical information. This is affirmed in Privacy and Health Information (2003:11) that ethical competency on privacy should always be adhered to in order to gain the employees' trust and in return, employees will have multidimensional responses and job satisfaction with regard to health workers and the work itself.

5.3.5 MULTIDIMENSIONAL RESPONSES/JOB SATISFACTION

Job satisfaction is embedded into two pieces of legislations which are Mine Health and Safety Act No. 29 of 1996 and the Occupational Health and Safety Act No. 85 of 1993. According to the Mine Health and Safety Act No. 29 of 1996, section 6, the employee will experience job satisfaction when she knows that her safety needs are taken care of by the health and safety representatives appointed by the employer. In addition, the appointment of health inspector for the purposes of monitoring or enforcing compliance also increases the worker's job satisfaction.

Similarly, section 8 of the Occupational Health and Safety Act No. 85 of 1993 states that employers provide the suitable work environment to ensure safety of workers and this improves the worker's job satisfaction. Additionally, section 17 also emphasises the importance of the health and safety representatives for every shift to ensure that workers are working safely. Furthermore, section 24

stresses the employer's responsibility for seeing that inspectors are appointed to ensure that proper processes are followed in reporting injuries on duty. The employee's job satisfaction is enhanced by such an environment.

There has been less focus on the affective aspects of the job, any reviews required on how to analyse job satisfaction. However, Masvaure et al. (2014:490) mention that the emotional or affective approach is multifaceted with environmental and physical approaches. With all three aspects combined, employees' set goals will be met, ensuring that the employees will be more connected and committed to the company.

Job satisfaction is defined by Locke (1976:1298) as an enjoyable, pleasant and favourable emotional state emerging from the valuation of an individual's job or job knowledge. Such a state relates to the nature of activities that are integrated to different functions e.g. acknowledgement and psychological motivation. This feeling suggests that the happy worker will be optimistic and perform to the best of his or her ability, unlike a disgruntled worker who is discouraged with negativism towards excellent performance and is always unproductive. Previous studies have affirmed that when employees are involved and committed to their work and to the organisation itself, increased job satisfaction, low absenteeism rate, high performance rates and better health and wellbeing prevail (Schaufeli & Bakker 2004:298; Masvaure et al. 2014:488).

In this study, the findings were that although the participants were not happy about the health care service rendered at the selected coalmine, positive factors identified something, especially from the younger participants. These participants were grateful about the transition of being incorporated into the mining industry and being provided with employment. However, few of them, especially the learners were concerned about not knowing whether they would be appointed permanently by the selected coalmine after finishing their training in 6 months' time. Additionally, the older participants raised their dissatisfaction about their supervisors' attitude towards them. These supervisors always complained about their disappearance and when they were back from the toilets, they were asked about where they have been in front of everyone, and sometimes it embarrassed them to respond about their whereabouts. According to the older participants, their supervisors complained publicly in front of other workers of the slow working progress and the desire to know their whereabouts. Some older WIM mentioned that when the younger WIM came back from the toilet, supervisors never complained, they seemed to favour the latter group. Such differences never created animosity between the women underground mineworkers because the younger women sympathised with the older women and assisted them wherever they could, if they happened to be working in the same shift. That feeling was noted when the younger participants negotiated with

the researcher requesting the possibilities of the hours of older women to be reduced to at least 6 hours with the salary remaining the same.

Working for prolonged hours at the coalmine may physically and emotionally affect the job performance of any employee. Younger women were more satisfied with their salary and work compared to older women. Carrillo-García et al. (2013:1317) highlight that younger mineworkers are usually happier at work than older ones. It was noted during the study that the low level of education among the older women could be an obstacle for the older women to perform their work efficiently. Most of the young women had matric, others had college qualifications, post matric and their pace of working was better than the understanding of the older women. However, all of them reported job satisfaction and they ensured that they were always at work to qualify for better pay in a form of a bonus. Judge et al. (2009:18) and Reio and Kidd 2006:359) agree that job satisfaction is associated with the company's high return on assets and high earnings per share and that this is accompanied by satisfaction with pay, satisfaction with security, and overall Job satisfaction with a low absenteeism rate.

Absenteeism has been identified as the highest challenge which every manager handles and such may hinder the delivery of the appropriate service and could lead to loss of production and cost effectiveness (Munro 2007:21). The study's finding was that women underground mineworkers were the best workers compared to their male counterparts. According to mine management, if a woman mineworker was absent at work it was due to women's cycle and they normally took a day off which was acceptable according to the mine policy and procedure. However, if the woman was going to be away from work for more than two days, a medical certificate from the medical practitioner was required, but this seldom occurred to these women. Furthermore, it was pointed out that the only time where the woman underground mineworker was not at work was during the maternity leave, which the coalmine had a budget for. The reliever normally replaced the women on maternity leave to ensure that there was no shortage of staff underground and those mineworkers left behind were not overworked. This is a positive and supportive work environment where both supervisors and employees develop a trust relationship and, job satisfaction also prevails (Kelly et al. 2015:57).

Women are considered committed and disciplined individuals both at work and at home. This is expressed by Ashworth (2004:19) that managers regard women as committed, persevering, cooperative and faithful individuals that one can rely on. In addition, women are perceived by the researcher as organised, orderly, accurate and always working attentively according to the employer's work policy and procedures. In this study, most mine management articulated this

finding. They recognised that WIM are easy to work with; they comply with company policies and are always systematic when working, compared to their male colleagues.

Women underground mineworkers appreciated recognition by mine management, which was in the form of a bonus. Such appreciation made the WIM work harder. According to previous studies on the effect of financial recognition on worker performance, many companies increased their productivity (Veninga 2000:24). In addition, the above author states that when such productivity is increased, the employee's self-esteem improves and a safe climate culture is created. According to Kelly et al. (2015:64), when there is a positive working relationship between management and workers in an organisation, improved job satisfaction and a safety climate culture follows.

- **Safety Climate culture**

A safety climate culture is a generic category, embedded to the four legislations in South Africa; the Mine Health and Safety Act No. 29 of 1996, the Basic Conditions of Employment Act No. 75 of 1997, the Constitution of Republic of South Africa, Act No 108 of 1996 and the Occupational Health and Safety Act No. 85 of 1993.

Section 1 of Chapter 1 of the MHSA's main intention is to:

Promote a culture of health and safety in the mining industry; training in health and safety in the mining industry; and co-operation and consultation on health and safety between the State, employers, employees and their representatives.

The other three Acts (BCEA, the Constitution of South Africa and the OHSA) stipulate that employers should:

- ensure that the working hours of employees are in accordance with the provisions of any Act governing occupational health and safety considering the health and safety of employees, their family responsibilities, and
- seek permission to work more than 45 hours per week; nine hours per day if the employee works for five days or fewer per week; or eight hours per day if the employee works for more than five days per week.

Furthermore, the employee's normal working hours in terms of subsection (l) may, by permission, be extended by up to 15 minutes per day but not more than 60 minutes per week to ensure that the employee who serves community members perform those duties after the completion of ordinary

hours of work. Schedule 1 establishes procedures for the progressive reduction of the maximum ordinary hours of work to a maximum of 40 ordinary hours of work per week and eight ordinary hours of work per day. Subject to this Chapter, the employer may not require or permit an employee to work overtime except in accordance with an agreement: to work, more than three hours' overtime a day; or ten hours' overtime a week. The employer must pay an employee at least one and one-half times the employee's wage for overtime worked. At the selected coalmine, it was discovered that overtime is worked during the breakdowns and WIM were satisfied with the overtime payment. They also stated that three shifts were scheduled from Monday to Friday. However, those women who were willing to work overtime, which they called 'zama zama' worked over the weekends and during the December holidays and they were paid very well. Previous studies have revealed that women have lower expectations for their jobs and they seem to be more accommodating and happier, than men who have job-related expectations, which are heavier and more difficult to achieve (Carrillo-García et al. 2013:1315).

It was further pointed out that at the mine, women felt that the climate culture as far as hours worked, was within their capabilities, because of money being paid to them. However, they were of the opinion that the safety climate culture as far as work was concerned still needed improvement. The WIM's concern on climate culture is the negativism they receive from some of their male counterparts and the challenges from the mining environment itself. Ranchod (2001:10); Nayak and Mishra (2005:2) confirm that the mining industry laws are still discriminatory and not favourable towards WIM. These women are discriminated against while working, for instance their unsuitable PPE, unhygienic sanitation facilities and prolonged working hours, which keep them away from their families.

- ***Gender discrimination***

Gender discrimination is a generic category, supported by the multiple legislations including the Beijing Declaration and Platform for Action and the Convention on the Elimination of Discrimination against Women, as mentioned below. Women are still faced with challenges and obstacles in workplaces where they are unable to have pleasure and enjoy their human rights. Women are not enlightened about their human rights, hence the inability to exercise them. As agreed during the Beijing Declaration and Platform for Action (BDPA) all governments should pledge to stop infringing the human rights of women. Unfortunately, this is not happening (Advocates for Human Rights 1996:27). Workplaces should engage in accommodating and protecting the human rights of women and the feminist groups within different workplaces, including the mining industry. Despite the UN Convention on the Elimination of Discrimination against Women (CEDAW), the BDPA and

other ILO Follow up Documents, the women underground mineworkers still suffer widespread discrimination and gender inequality in the workplace when comparing it to work-related ill-health.

Convention on the Elimination of Discrimination against Women (CEDAW) of 1981 Chapter 11 of the CEDAW notes that:

The States Parties shall take all appropriate measures to eliminate discrimination against women in the field of employment in order to ensure, on a basis of equality of men and women, the same rights, in particular. Protective legislation relating to matters covered in this article shall be reviewed periodically in the light of scientific and technological knowledge and shall be revised, repealed or extended as necessary.

The Beijing Declaration and Platform for Action (BDPA) of 1995 declares that:

The Governments who participated in the Fourth World Conference on Women, which gathered in Beijing in September 1995, seek to advance the goals of equality, development, and peace for all women. The Governments acknowledge the diverse voices of women. The Governments recognize that despite progress, women still suffer obstacles to achieving equality with men, and that further progress is hindered especially by the poverty suffered by so many women and children.

During the Beijing Conference, the Governments including South Africa recommitted to:

the equal rights and inherent human dignity of women and men as embodied in the UN Charter, the Universal Declaration of Human Rights, the Convention on the Elimination of All Forms of Discrimination Against Women (the Women's Treaty), and other international human rights instruments. The progress made at previous UN conferences, including the conference on women in Nairobi in 1985, on children in New York in 1990, on the environment and development in Rio de Janeiro in 1992, on human rights in Vienna in 1993, on population in Cairo in 1994, and on social development in Copenhagen in 1995. The full implementation of the human rights of women and the girl child as an inalienable, integral, and indivisible part of all human rights and fundamental freedoms.

Few of the following ILO documents such as C103 - Maternity Protection Convention (Revised), 1952; C111-Discrimination (Employment and Occupation) Convention, 1958; C 100 - Equal Remuneration Convention, 1951; C102-Social Security (Minimum Standards) Convention, 1952; C118-Equality of treatment (Social security) Convention, 1962 were endorsed so that workplace should be gender discrimination free:

C 103 - Maternity Protection Convention (Revised), 1952:

The Convention's aim was to adopt certain proposals with regard to maternity protection, which is the 7th item on the agenda of the session and having determined that these proposals shall take the form of an international Convention.

C 111 - Discrimination (Employment and Occupation) Convention, 1958:

The Convention's intention was to assign to each State which ratified it the fundamental aim of promoting equality of opportunity and treatment by declaring and pursuing a national policy aimed at eliminating all forms of discrimination in respect of employment and occupation

C 100 - Equal Remuneration Convention, 1951:

The Convention's intention was to adopt certain proposals with regard to the principle of equal remuneration for men and women workers for work of equal value.

C 102 - Social Security (Minimum Standards) Convention, 1952:

This Convention was based on basic social security principles, which established worldwide-agreed minimum standards for 9 branches for social security which are medical care, sickness benefit, unemployment benefit, old-age benefit, employment injury benefit, family benefit, maternity benefit, invalidity benefit and survivors' benefit

C 118 - Equality of treatment (Social security) Convention, 1962:

This Convention addresses the issue of the social security of migrant workers in a global manner. It also covered 9 branches for social security which are medical care, sickness benefit, maternity benefit, invalidity benefit, old-age benefit, survivors' benefit, employment injury benefit, unemployment benefit and family benefit.

Discrimination has not been clearly defined in terms of the workplace, except to be given a definition of being disadvantaged or being unfairly treated (Adu-Oppong 2015:3; Channer et al. 2011:179). According to Article 1 of CEDAW, "discrimination against women" shall mean any distinction, exclusion or restriction made on the basis of sex which has the effect or purpose of impairing or nullifying the recognition, enjoyment or exercise by women. This happens irrespective of their marital status, on a basis of equality of men and women, of human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field". In this study, findings are that gender discrimination still exists. This was identified where a white male supervisor told a

WIM that she was not suitable to be a mechanic, and advised her to look for a better job because in mechanics only men can succeed. This WIM was passionate about mechanic work and had only few months left to qualify. Her positive attitude was picked out when she said she never felt bad about such utterances and was looking forward to spending more years in the mechanic career within the mining industry. Adu-Oppong and Arthur (2015:5) agree that in any organisation, men are usually entrusted and recognised when performing generous conducts and behaviours; while women are corrected for not performing those behaviours.

Previous research has confirmed that women in a workplace normally have lower social power than men. Such social power exposes women to be at risk of being abused by their male counterparts. Additionally, these women feel belittled and are frequently regarded as less entitled individuals who are always neglected, treated with arrogance and deprived of interpersonal relationships (Miner-Rubino & Cortina 2004:109). Heilman et al. (2004:416) further allude that gender discrimination is also noticed at the higher level of management positions where very few capable, skilful and intelligent women are promoted compared to men. Such was not noted in the study, because the ratios of both men and women participants were not equal. This inequality leads to increased rates of harassment at the workplace. Part of this harassment could even lead to death, for example, a woman mineworker was reported to have been raped and murdered at Anglo Platinum's Khomanani mine in Rustenburg, South Africa in February 2012 (Masondo, Sowetan LIVE 07 February 2012). Although there has never been a deceased WIM, in this study, it was pointed out that WIM still experience severe gender discrimination by their male co-workers. As indicated above, some male co-workers still believe that, mining is not a place for women and that women belong in the home. The male co-workers are often outspoken and the female workers often feel degraded and humiliated by remarks and comments made by them, especially when referring to women's ability and capability to perform mining work (Cornish 2008:2).

Women underground mineworkers will have to constantly work harder to remove the perception, which still exists that they cannot perform what men are capable of in the mining environment. During their off days WIM need to visit the gymnasiums, jog or do some exercises to strengthen their body muscles in order to perform optimally in their jobs. Most of the WIM participants were in their childbearing age. Multi-tasking was not a problem except when the child was sick and WIM had to ask for family responsibility leave and provide proof that the child was sick. Irrespective of that, WIM continue to experience negative utterances from the men mineworkers when they have to fulfil those family responsibilities. Botha (2016:258) concurs that men often think that women use their family as an excuse to avoid work responsibilities. Such perceptions made the women underground mineworkers feel distrusted and withdrawn, leading to them feeling isolated.

- **Isolation**

There is no regulation in South Africa that prohibits an employee to work alone. However, employers still have normal legal duties as stipulated in section 21 of the Occupational Health and Safety Act No. 85 of 1993, in that the employer shall provide and maintain as far as is reasonably practicable for an employee, a working environment that is safe and free of risks to health. Isolation for WIM in this study refers to women finding themselves working alone amongst men underground mineworkers who use derogatory utterances about women. Such hostility may disturb the WIM where she might overlook the safety precautionary measure and cause an injury. Malamuth and Thornhill (1994:192) refer to this hostile behaviour as dominant trivial talk that is often used to prove the point of the superior gender role of men and to boost their self-esteem.

Anderson and Anderson (2008: 605) associate this disturbing behaviour as foolish talk which a male person believes makes him civil or humorous. The finding in the study was that the women underground mineworkers were of the opinion that they were belittled and isolated, around the male colleagues, however, they pretended to be fine with the men's negative remarks towards them. In her study, Bailey-Kruger (2012:15) cites that some women were of the opinion that they were incapable of holding higher positions where men would instead be reporting to them. They rather preferred to be productive by supervising women, rather than men.

Mining is production-driven and depends highly on reaching production targets; therefore, mining teams are organised to ensure the highest productivity and consist mainly of men. In this study, it was found that only one or two women underground mineworkers worked together with 10 to 12 men underground mineworkers in a team. Women often felt isolated in such a male-dominated mining environment; and they felt uncomfortable and unsafe in the presence of so many men (Botha 2016:259). The mine should be compared to other mining houses using mining SOPs to benchmark using a comparison against other similar mine as a reference; and consider and/or adopt effective management strategies that are needed to implement changes such as gender ratio in relation to placing mineworkers in different sections. Companies undertaking the well planned and properly designed and implemented change management system may produce better results and improve production (Sithole 2008:16; Henritze 2015:7).

5.3.6 CHANGE MANAGEMENT

The coal mining industry is faced with extensive health challenges, which need to be addressed in order to accomplish and attain the available targets or goals. Such may be achieved if mining companies follow the modern way of doing things. Benchmarking with other mining houses, introducing new technology and evaluating their own approaches may assist in bringing change,

which will increase productivity, decrease costs and make the company sustainable (D'Ortenzio 2012:4; Pakalnis 2015:6). Change is becoming a long-standing feature within organisational life. However, while many organisations welcome the need for change (Knowles 1998:373), many of them accepted that their change management programmes did not always achieve their intended consequences.

Change management is defined as a manner in which people, teams and companies change, using different methods to re-direct utilisation of resources, allocation of budget, business process, or any other plan of work which will transform the organisation incompatibly (Rijal 2009:132). This study discovered that mine management at the selected coalmine was aware of the women's health concerns and was engaging robustly with the National Union of Mineworkers (NUM) as far as addressing the women's health concerns. According to mine management, NUM is the union with the largest membership at this coalmine and they bargain with mine management on matters affecting all the mineworkers, and WIM in particular. In addition, mine management confirmed that they work towards goal attainment with the NUM, because it does not bring problems. Rather, it comes with solutions in solving problems encountered and ensures that enough coal is produced. Previous research confirmed that women were likely not to benefit from protective legislation of the country, due to prevention priorities determined by the compensation costs. Furthermore, the work-related claims for women were treated with disbelief, which needed the intervention of the trade union (Gender, Health & Work 2004:3). The trade unions are further perceived to be advocates of workers' health and safety, including the compensation process approach. It is crucial for the trade union's approach to be controlled under the country's legislations, to ensure that women participate at all levels of the health and safety activities for productivity purposes (Gender, Health & Work 2004:4).

Mclaggan et al. (2013:1), acknowledge that there is an increased burden of producing coal in order to meet the country's rapid demand for electricity in the South African coal mining industry. Such a demand needs committed and proactive mine management with the ability to lead and interconnect with supervisors, mineworkers and unions and attend to the long outstanding issues such as the unsuitable PPE, unhygienic toilets and bathrooms. Such mine management should ensure that workers are inspired and made aware of how to be productive in order to reach the intended goals. The study noted that from both the mine management and professional nurses, there was a need for robust engagement and commitment where the selected coalmine would abide by its statement that women underground mineworkers' health needs to be addressed. Such a statement and commitment had to be made. Some of the participants from both professional nurses and mine management alluded to that commitment and statement of intent.

Kontos and Poland (2009:5), confirm that in any organisation, if all stakeholders like the union, management and women mineworker representatives agree on the organisation's working plan, resources may be easily mobilised in order to promote the mineworkers' interest of transformation. In this study, the finding was that transformation was very slow because the participants were of the opinion that out of all their submitted suggestions to promote change, the selected coalmine had ignored such suggestions and that affected the working plan. Many regulations are speaking about transformation, but instead of promoting it, power is exercised over WIM, thus delaying transformation. It is the responsibility of the mine to ensure that transformation is fast tracked by consulting the WIM regarding their health concerns, addressing those concerns by introducing change, analysing the effect of the change process to ensure that change is managed effectively (D'Ortenzio 2012:13).

In this study, it was pointed out that most WIM wanted their male colleagues to stop their negative attitudes towards them, but did not have the courage to confront them. However, few WIM mentioned that they were experiencing some gender differences when working underground. Some pleaded with the researcher to assist in correcting some of the challenges they were faced with. During the interaction with mine management, it was revealed that the mine was aware of the challenges faced by women and they were working on a change management system to ensure that WIM performed their work promptly and productively without any inequality or prejudice.

The normative-reeducative change strategy is followed when individuals are seen as human beings who socially adhere to cultural norms and values. It is of vital importance to re-define and re-interpret the current norms and values of the organisation in order to influence change successfully and efficiently. This has been implied by Nickols (2016:2), who stated that in a normal work environment, individuals would prefer to be part of that particular organisation, have a sense of belonging and abide by the culture of that company. Similarly, at the mine there was an organisational culture into which every mineworker fitted. That was noticed with the behaviour of most men mineworkers who were not willing and able to work with WIM. For the mine to ensure that the mineworkers worked together harmoniously, it had to adopt the normative-reeducative strategy. This strategy is effective in long-term challenges, like in the mining industry, because of the anticipated life span of the coalmine. Mine management will have to focus on culture and setting aside perceptions and negative behaviours of men mineworkers towards WIM. This will increase the profit margin growth; decrease slow market in coal production and most importantly will lead to adjustment and accepting that there is a gender difference between women and men mineworkers.

Men consider gender differences between women and men as a shortcoming of women. Merchant (2012:2), alludes that gender differences have come a long way from the feminist movement which has been in existence from the 18th century. In addition, the author agreed that women have been through a lot of oppression and maltreatment due to gender differences, ranging from salary inequalities, to reproductive rights until the 19th century, when women were granted the right to vote. Gender differences and discrimination were defeated in multiple divisions from legal equality, social equality and to workplace equality.

Gender bias remains a challenge. Despite the liberation women earned through the feminist movement, WIM are still marginalised by their male counterparts in a workplace. Mine management need to develop some plans to put strategies in place such as a model called MOSH (Mining Industry Occupational Safety and Health) where safety and health concerns and ideas from mineworkers are brought to mine management and vice versa. This MOSH strategy established by the Mine Health and Safety Council (MHSC) was set up in 1996 to advise on safety challenges within the mining industry. The MHSC is formed by the tripartite board, which represents the state, the employers and organised labour. This board is chaired by the Chief Inspector of Mines and its main aim is to advise the Minister of Minerals and Resources on OHS legislations and research outcomes which focus on improving and promoting women's OHS within the South African mines (Hermanus et al. 2015:718).

According to Nickols, (2016:4) change can be managed through an environmental-adaptive strategy, the focus of which is to slowly introduce employees from one level to the next higher level for easy adaptation. This Environmental-adaptive strategy encourages change from the bottom, upwards; from mineworkers to mine management. The advantage of this strategy is that change is not only the mine management's initiative and responsibility, but the employees' too. Another benefit of this strategy is that employees usually adapt to it and to new environment faster. In this study, this strategy can be implemented hand in hand with the MOSH model discussed above. Alternatively, talent management which is a prolonged timeframe strategy can be followed (Henritze 2015:18); since most of the participants such as WIM, PN and mine management worked at the mine for between 3-29 years.

Since the mining industry is competitive, it is essential that mineworkers have sufficient talent and skills development. Talent management is a mission critical process, which ensures that organisations have the quantity and quality of people in place to meet their current and future business priorities. The talent management process incorporates the important factors of an employee's life cycle from selection, development, succession and performance management within a particular organisation (Wellins et al. 2011:4). This method is relevant for this coalmine in

Mpumalanga, since the findings were that WIM needed to be developed in order to be promoted; instead of working as general workers for prolonged periods. The majority of the WIM had matric certificates and that could allow them to be developed and trained to be artisans.

Mine management need to have a different set of management skills in order to train these women underground mineworkers. Talent management processes which mine management needs to follow should include comprehending current and future management strategies. Furthermore, during the talent management process, mine management should know the WIM, the team members and the organisational goals, in order to present intention and feedback to WIM, including the employee's performance management. The mineworker's talent is developed by being there, supervising the WIM, strengthening her performance in the current job; preparing her for the next job level. Sithole (2008:27) agrees that productivity in the workplace may be impeded by political factors, which may be addressed through change management. If change is implemented effectively, the management of change may lead to an improved work environment. It is true that when change is introduced, all stakeholders in this study including mineworkers and union representatives as well as mine management should be part of the process. Such an act improves teamwork and increases trust amongst the stakeholders. There is a need for the collaboration of mine management and mineworkers in creating a conducive work environment especially for women, to improve their work relationships by being supportive of one another. This kind of work environment will in turn yield positive results in that the mineworkers will perform optimally and improve production (Campbell 2012:1). In addition, such environment gives WIM hope and resilience to continue working hard. Veninga (2000:24) advises that if employers want to build and sustain hope in a working environment, they should always be honest, objective and give feedback to their employees.

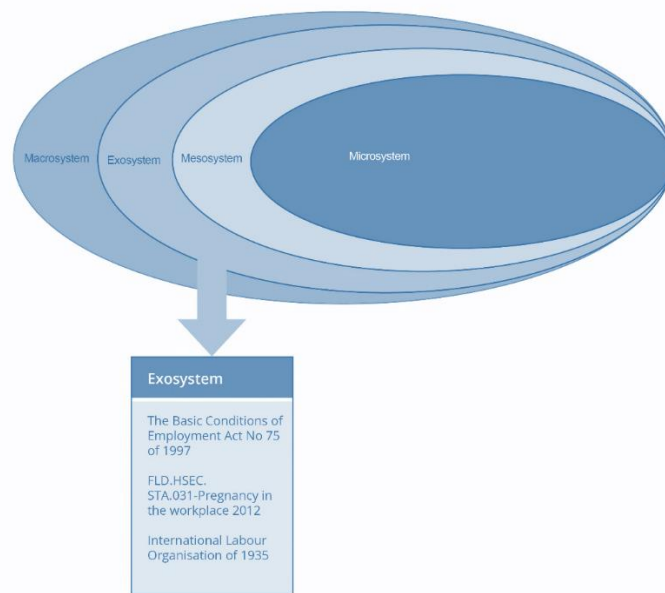


FIGURE 8: EXOSYSTEM

5.4 EXOSYSTEM

The exosystem is the extension of the mesosystem and focuses on the connections and activities between two or more situations where there is individual's development, for example the correlation between home and workplace of the mineworker (Bronfenbrenner 1994:40; Bronfenbrenner 1997:515). The exosystem is an environmental element with a profound influence of the Ecological Systems Theory (EST). In this study, the exosystem included the external social influences such as policies and standard operating procedures used at the mine. Such policies are discussed under the table below, which is the evolution of key policies governing the South African mining industry tapped from the findings of the professional nurses and mine management.

TABLE 12: EVOLUTION OF KEY LEGISLATIONS GOVERNING THE MINING SECTOR

POLICY	PERIOD	REASON	SIGNIFICANCE
C003-Maternity Protection Convention, 1919	1919	To adopt certain proposals in relation to women's employment before and after child birth whereby maternity benefits were included	Women's rights were considered and implemented as per this Convention
International Labour Organisation (ILO) of 1935	1935	The ILO is a specialised agency of the UN dedicated to improving labour conditions and living standards throughout the world	The ILO has assisted in ensuring that countries including South Africa comply with its standards in order to improve the labour conditions and living standards, globally. However, there are still workers still experiencing workplace discrimination many years later after its promulgation
C89-Night Work (Women) Convention, 1948 (Revised)	1948	To adopt certain proposals with regard to partial revision of the Night Work (Women) Convention 1919, adopted by the Conference at its First Session, and the Night Work (Women) Convention (Revised) in 1934, adopted by the Conference at its 18 th Session. Its aim was to ensure that at least 11 hours shifts would include an interval prescribed by the competent authority of at least 7 hours between 22:00 and 07:00	At the selected coalmine women underground mineworkers are working awkward two shifts while their male colleagues were working the straight day shift. Through the trade union's assistance, that has stopped. The question is how many of WIM are in the similar position and not aware of their rights to work the day shift
C100-Equal Remuneration Convention, 1951	1951	To adopt certain proposals with regard to the principle of equal remuneration for men and women workers for work of equal value	Men mineworker's remuneration of both shift and standby allowances benefited them, while women were doing two shifts at night and in the afternoon and only benefited from shift allowance.
C102-Social Security (Minimum Standards) Convention, 1952	1952	Aim was based on basic social security principles, which established world-wide agreed minimum standards for nine branches for social security which are medical care, sickness benefit, unemployment benefit, old-age benefit, employment injury benefit, family benefit, maternity benefit, invalidity benefit and survivors' benefit	The selected coalmine adhered to some of standards mentioned in this convention, e.g. family, maternity, sickness, unemployment and medical benefits. However, the WIM were not satisfied with the latter benefit because the OHSC did not render such care
C103-Maternity Protection	1952	Revision of the Convention (003) to adopt certain proposals with regard to maternity protection, which is the 7 th item on the	Women's rights were considered and

Convention (Revised), 1952		agenda of the session and having determined that these proposals shall take the form of an international Convention	implemented as per this Convention.
C111-Discrimination (Employment and Occupation) Convention, 1958	1958	The intention was to assign to each state the power to enable legislation which prohibits all discrimination and exclusion on any basis including of race, colour, sex, religion, political opinion, national or social origin in employment and repeal legislation that is not based on equal opportunities	This is still a challenge at the selected coalmine. More men mineworkers are getting better remuneration and they are promoted more quickly than their women counterparts
C118-Equality of treatment (Social security) Convention, 1962	1962	Aim was to address the issue of the social security of migrant workers in a global manner. It also covered 9 branches for social security which are medical care, sickness benefit, maternity benefit, invalidity benefit, old-age benefit, survivors' benefit, employment injury benefit, unemployment benefit and family benefit	The WIM interviewed were all from South Africa and there might be some migrant mineworkers, but they were not part of the three groups of participants in this study
Unemployment Insurance Act No. 30 of 1966 as amended with Unemployment Insurance Act No.63 of 2001	1966 2001	The aim is to provide protection to workers who become unemployed. It prescribed claiming the unemployment benefits for unemployment, maternity benefits, adoption benefits and dependence benefits	The relevant benefits are claimed for the mineworkers at the selected coalmine
Occupational Diseases in Mines & Works Act (ODMWA) No. 78 of 1973	1973	The intention of the act is to report all work-related illnesses as soon as they are identified. The certification process, the determination of impairment and the processing and payment of compensation are undertaken by the state	Illnesses related to the occupation can be compensated as prescribed in the Act.
C156-Workers with Family Responsibilities Convention, 1981	1981	The aim was to create equal opportunities and treatment in employment and occupation between men and women workers with family responsibilities, and those without such responsibilities	Women mineworkers' career development opportunity is still a challenge because very few of them are developed. The majority are still at entry level and are still working as general workers for some years.
Convention on the Elimination of Discrimination	1981	CEDAW's chapter 11 noted and agreed that the States Parties shall take all appropriate measures to eliminate discrimination against women in any employment to ensure equality and same	The 10% target for women mineworkers has been reached. However, WIM are still in a low number compared to men mineworkers but has

Against Women (CEDAW) of 1981		rights to men and women	not gone beyond that
C161-Occupational Health Services Convention, 1985	1985	The intention is to protect a worker against sickness, disease and injury arising out of his employment is one of the tasks assigned to the International Labour Organisation under its Constitution	Illness investigation and management is well taken care of as far as reporting is concerned, however the injuries are not reported as indicated by the convention. WIM do not report injuries because the team's bonus will be affected
Minerals Act No 50 of 1991	1991	Its intention is to regulate the prospecting for and the optimal exploitation, processing and utilisation of minerals; to regulate the orderly utilisation and the rehabilitation of the surface of land during and after prospecting and mining operations; and to provide for matters connected herewith	Not relevant to the WIM
Compensation for Occupational Injuries & Disease Act (COIDA) No. 130 of 1993	1993	The aim of this act is to report all work-related injuries. Such accident notice is by the employee to employer in written or verbal format, as soon as possible after such an accident happens. It may be given by or on behalf of the employee concerned to the employer, and notice of the accident may also be given as soon as possible to the commissioner in the prescribed manner. Failure to give notice to an employer as required in subsection (1) shall not bar a right to compensation if it is proved that the employer had knowledge of the accident from any other source at or about the time of the accident. Subject to section 43, failure to give notice to an employer as required in subsection (l), or any error or inaccuracy in such notice, shall not bar a right to compensation if in the opinion of the Director-General the compensation fund or the employer or mutual association concerned, as the case may be, is not or would not be seriously prejudiced by such failure, error or inaccuracy if notice is then given or the error or inaccuracy is corrected; such failure, error or inaccuracy was caused by an oversight, absence from the Republic or other reasonable cause	Some of the work-related injuries are not reported by the WIM, fearing that the team in her section will not qualify for their bonuses
Occupational Health and Safety Act No. 85	1993	The OHSA stressed that the employer shall ensure that the employee is adequately and comprehensively informed and trained, on both practical aspects and theoretical knowledge,	According to the women mineworkers, they were not offered in service training except the annual induction where they do their medical

of 1993		with regard the contents and scope of these regulations. The act further highlighted that the refresher training shall be given on matters contemplated in sub-regulation (1) at least every year or at more frequent intervals that may be recommended by the health and safety committee. Training shall be given more frequently than once a year if: work methods change; the type of work carried out, changes significantly; or the type of equipment used to control exposure, changes	surveillance at the OHSC and attend the safety induction at the training centre
Labour Relations Act No. 66 of 1995	1995	It aims to promote economic development, social justice and democracy in the workplace	The selected coalmine has done a lot to promote economic development, social justice and democracy; however, a lot still needs to be done. The mind set of men mineworkers for instance, needs to change
The Beijing Declaration and Platform for Action (BDPA) of 1995	1995	The Governments recommitted to: the equal rights and inherent human dignity of women and men as embodied in the UN Charter, the Universal Declaration of Human Rights, the Convention on the Elimination of All Forms of Discrimination Against Women (the Women's Treaty), and other international human rights instruments. The progress made at previous UN conferences, including the Conference on women in Nairobi in 1985, on children in New York in 1990, on the environment and development in Rio de Janeiro in 1992, on human rights in Vienna in 1993, on population in Cairo in 1994, and on social development in Copenhagen in 1995. The full implementation of the human rights of women and the girl child as an inalienable, integral, and indivisible part of all human rights and fundamental freedoms	Some goals which South Africa recommitted to are not yet implemented especially the inequality and discrimination of WIM
Constitution of the Republic of South Africa, Act No 108 of 1996	1996	The act protects the right to bodily and psychological integrity, which includes the right to make decisions concerning reproduction [section 12 (2)] and gives every person the right to health services, including reproductive health care [section 27 (1) (a)]. No person may be discriminated against or dismissed on account of pregnancy. The relevant provisions establishing this right are section 9 (3) and (4) of the Constitution; section 187 (1) of the Labour Relations Act 66 of 1995 and section 6 of the Employment Equity Act of 1998. Employers are required to	The selected coalmine adheres to the Act, however, improvement still needs to be done as far as WIM's health needs are concerned

		provide and maintain a work environment that is safe and without risk to the health of employees	
Mine Health and Safety Act No 29 of 1996	1996	<p>Its aim is to ensure that every manager provides employees proper training to deal with every risk to the employee's health or safety that is associated with work performed by the employee; in the measures necessary to eliminate, control and minimise those risks to health or safety; in the procedures to be followed to perform that employee's work; and in relevant emergency procedures.</p> <p>The act further stipulates that no employee should pay for health and safety training; employer to provide employees with any information, instruction, training or supervision that is necessary to enable them to perform their work safely and without risk to their health; and ensure that every employee becomes familiar with work-related hazards and risks and the measures that must be taken to eliminate, control and minimise those hazards and risks</p>	WIM are seldomly trained on tasks to be performed, instead they learn from the colleagues while working. This provides an opportunity for mentoring, monitoring and the correction of errors done on the job immediately
Basic Conditions of Employment Act No 75 of 1997	1997	The act requires that employers should provide for at least four months' maternity leave and explicitly forbids employers to make, or allow, a pregnant (or nursing) employee to do work that is hazardous to her health or the health of her child	The selected coalmine has ensured that this act is adhered to without failure, although some WIM experienced miscarriages due to their delay in reporting of pregnancy to their supervisors who assigned them work in a hazardous work environment.
Code of Good Practice on the Arrangement of Working time	1997	Its intention is to provide information and guidelines to employers and employees concerning the arrangement of working time and the impact of working time on the health, safety and family responsibilities of employees	The selected coalmine is in adherence with the code of practice
Employment Equity Act No 55 of 1998, as amended by Employment Equity Act No 47 of 2013	1998	According to Chapter 2 Section 5 of the Employment Equity Act No 55 of 1998 as amended by Employment Equity Act No 47 of 2013, every employer must take steps to promote equal opportunities in the workplace by eliminating unfair discrimination in any employment policy or practice. Furthermore, in Section 6 of the Act, it is stipulated that no person may unfairly discriminate directly or indirectly, against an employee, in any employment policy or practice, on one or more grounds, including race,	Mining industry is still a men's place because WIM are still discriminated against, e.g. nothing is happening as far as the one piece overall and the bright coloured overall worn by WIM

		gender, sex, pregnancy, marital status, family responsibility, ethnic or social origin, colour, sexual orientation, age, disability, religion, HIV status, conscience, belief, political opinion, culture, language and birth	
The Code of Good Practice on the Protection of Employees during Pregnancy and after the birth of a child	1998	This code is intended to guide all employers and employees concerning the application of section 26(1) of the BCEA which prohibits employers from requiring or permitting pregnant or breast-feeding employees to perform work that is hazardous to the health of the employee or that of her child. Workplaces may be affected differently depending upon the type of business and sector they are engaged in and the physical, chemical and biological hazards to which employees may be exposed in the workplace. The norms established by this code are general and may not be appropriate for all workplaces. A departure from the code may be justified in the proper circumstances	According to this code, many women work during pregnancy and many return to work while they are still breast-feeding. The objective of this code is to provide guidelines for employers and employees concerning the protection of the health of women against potential hazards in their work environment during pregnancy, after the birth of a child and while breast-feeding
C183-Maternity Protection Convention No 183 of 2000	2000	This convention provided women with 14 weeks of maternity benefits to ensure that they maintain themselves and their children with proper health care and standard of living. Such benefits should not be less than two-thirds of the woman's previous earnings or a comparable amount	WIM is protected as far as maternity benefits are concerned
Mineral and Petroleum Resources Development Act (MPRDA) No. 28 of 2000	2000	The intention was to recognise the internationally accepted right of the state to exercise sovereignty over all the mineral and petroleum resources within the Republic; give effect to the principle of the state's custodianship of the nation's mineral and petroleum resources; promote equitable access to the nation's mineral and petroleum resources to all the people of South Africa; substantially and meaningfully expand opportunities for historically disadvantaged persons, including women, to enter the mineral and petroleum industries and to benefit from the exploitation of the nation's mineral and petroleum resources; promote economic growth and mineral and petroleum resources development in the Republic; promote employment and advance the social and economic welfare of all South Africans; provide for security of tenure in respect of prospecting, exploration, mining and production operations; give effect to section 24 of the Constitution by ensuring that the nation's mineral and petroleum	The economic growth and employment opportunities are still rare for WIM. The majority of women are still faced with poverty

		resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development; and ensure that holders of mining and production rights contribute towards the socio-economic development of the areas in which they are operating	
The Broad Based Socio-Economic Empowerment Charter for the South African Mining Industry as amended	1996 2015	Provides a framework for progressing the empowerment of historically disadvantaged South Africans in the mining and minerals industry. Furthermore, training and skills development for transformation and sustainable purposes is needed.	It is of importance that the mining industry is transformed, so that WIM can sustain themselves and their families to reduce poverty and curb hunger
Minimum Standard of fitness to perform work at a mine	2001	This guideline has been drafted by the DMR to assist Occupational Medical Practitioners in determining fitness to perform specified work at a mine or to continue to perform such work	The selected coalmine is adhering to this minimum standard of fitness. Appointing the correct person for the correct job
National Health Act No 61 of 2003	2003	Provides a framework for a structured uniform health system, considering the obligations imposed by the Constitution and other regulations at national, provincial and local governments with regards to health services; and to provide for matters connected therewith.	The selected coalmine does not provide primary health care to its mineworkers, instead mineworkers are referred to their own Doctors.
Skills Development Act No. 37 of 2008	2008	Came to effect on the 2 nd of February 1999. The main purpose of this Act was to improve the quality of life of workers, their prospects of work and labour mobility; to improve productivity in the workplace and the competitiveness of employers; to promote self-employment; and to improve the delivery of social services. Furthermore, the Act's intention was to increase the levels of investment in education and training in the labour market and to improve the return on that investment; to encourage employers to use the workplace as an active learning environment; to provide employees with the opportunities to acquire new skills; to provide opportunities for new entrants to the labour market to gain work experience; and to employ persons who find it difficult to be employed	The selected coalmine's skills development through its standard operating procedure that mineworkers are developed at the training centre on safety related matters, while the health-related matters are not discussed. Furthermore, WIM are dissatisfied with the career development process, because they have been working for the coalmine and are never considered for skills development.
Protection of Information Act No. 4	2013	The aim is of the act is to promote personal information processed by public and private bodies; to introduce certain	The selected coalmine has a data management system where information is captured and can

of 2013		conditions so as to establish minimum requirements for the processing of personal information	be accessed by some departments within the selected coalmine.
Protection from Harassment Act No. 17 of 2011	2011	Provided to eliminate violence in the workplace	WIM at the selected coalmine experience violence from their male counterparts; mine management put stringent policies to prevent such but few of the perpetrators have been disciplined. Ensuring implementation of the policy does not appear to be in place.

The above-mentioned policies govern South African mining industry to promote social justice for mineworkers including women mineworkers. These policies put an emphasis on women mineworkers with more focus on general protections, conditions of employment and the ability to access information specifically on women working in mining industries. Pre-democracy (before 1994), mining policies were not favourable to the mining industry employees' well-being. Some of these Acts, for example the Unemployment Insurance Act No. 30 of 1966 were amended in order to speak to inequities and mine health issues facing the current mining sector. The Unemployment Insurance Act was amended as No.63 in 2001. Post democracy, the mining industry was included and most policies were introduced for example the Labour Relations Act No. 66 of 1995, the Beijing Declaration and Platform for Action (BDPA) of 1995. On the other hand, other Acts were amended, for example the Employment Equity Act No 55 of 1998 was amended as Employment Equity Act No 47 of 2013 in order to accommodate the mining industry. The mining sector post democracy continued to introduce and implement progressive legislation like the Protection from Harassment Act No 17 of 2011, to improve the lives of the mineworkers, especially women. However, the pace has slowed down compared to 10 years after democracy. Due to such limitations, women in mining continue to suffer as far as their health and safety needs are concerned.

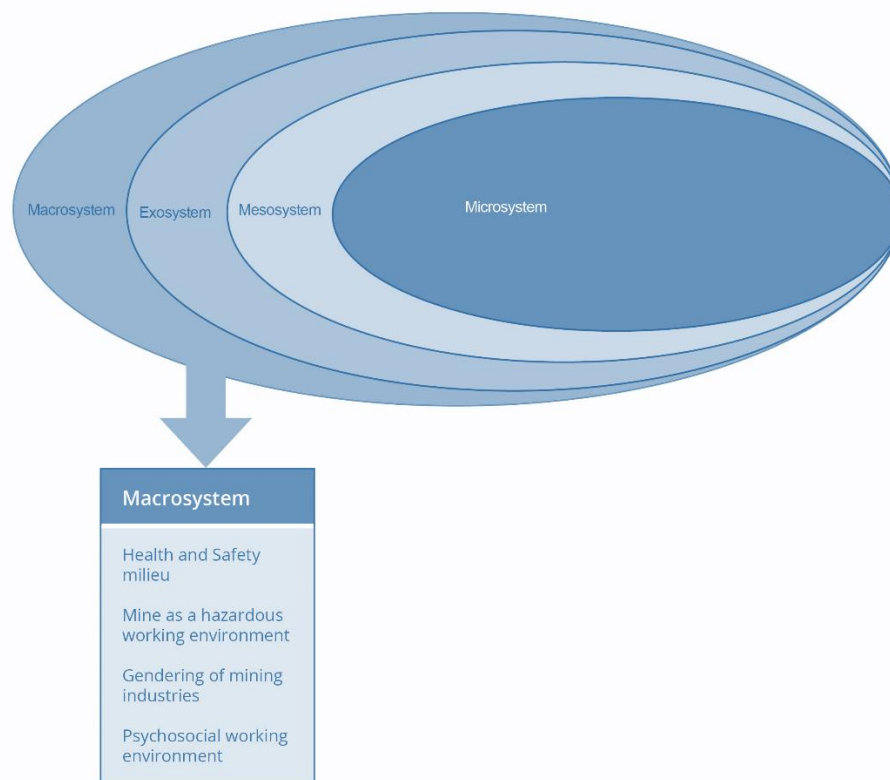


FIGURE 9: MACROSYSTEM

5.5 MACROSYSTEM

The macrosystem according to McLaren and Hawe (2005:11) focuses on a highly interconnected approach amongst the ecological frameworks within the environmental setting, which includes the microsystem, mesosystem, and exosystem. The macrosystem in this study refers to the overall patterns and involves the socio-cultural context; that is the underground environment at the selected mine. The discussion around the macrosystem includes the following main categories: the health and safety milieu, mine as a hazardous working environment, gendering of mining industries and psychosocial working environment. These subsections encompass the findings of the women underground mineworkers, professional nurses and mine management.

5.5.1 HEALTH AND SAFETY MILIEU

The health and safety milieu is embedded within the three pieces of South African Legislations; the Mine Health and Safety Act No. 29 of 1996, the Occupational Health and Safety Act No. 85 of 1993 and the South African Constitution Act 108 of 1996. In addition, providing health care in the working environment is influenced not only by legislative requirements, but also by employment structures, the type of work done in that industry and the risks related to the organisational activity; including the availability of healthcare rendered outside the mining site (Adams et al. 2007:104).

The MHSA No. 29 of 1996, states that every manager must ensure that the employees perform their work safely and without any risk to their health; and that the employees becomes familiar with work-related hazards, risks and the measures that must be taken to eliminate, control and minimise those hazards and risks. In addition, the MHSA affirms that every employer should provide a reasonably practicable safe and healthy work environment so that workers can perform their work without endangering their health and safety or that of any other person. In mining, the health and safety environment is important for the lives of all the mineworkers (Abrahamsson 2014:7). In this study, poor sanitation of the underground section led to poor living standards for WIM, especially at the change houses and toilets (Ashworth et al. 2004:22).

As Occupational Health and Safety Act No. 85 of 1993 indicates the employer must, before any employee is exposed or may be exposed to lead, ensure that the employee consults the health and safety committee. Furthermore, the employee should be properly advised and trained, on both practical aspects and theoretical knowledge, with regard to the contents and scope of these regulations, including the potential sources of exposure; the potential health risks caused by exposure to lead, including the health risks to employees' families who may be exposed to lead-contamination from employee's equipment and clothing that they take home.

The South African Constitution Act No 108 of 1996 directs all employers should make certain that the work environment is assessed and maintained to ensure that it is risk free. Previous studies confirm that women's bodies are physically and biologically different from those of men, and in cases of pregnancy it should be considered that the lives of two people, the mother and the baby, are at risk which needs to be eliminated.

The health and safety milieu at the mine should be improved through reasonable measures that can prevent pollution and ecological degradation, promote conservation and secure sustainable use of natural resources while promoting economic and social development. Most mining companies have exclusive changing rooms or temporary arrangement to cater for women underground mineworkers. Where it was not possible to provide a permanent structure, the mines provided portable toilets, which were hired.

The indication in this study was that some of the change rooms had inadequate space, given the number of women who were to be accommodated in those change rooms. In this study, findings were that portable toilets were a huge challenge for women, because men underground mineworkers utilise women's toilets, even if there is a sign stating that the toilet is for women. Some women underground mineworkers, especially the mechanics at the workshops do not utilise the unhygienic underground portable toilets. They were very grateful that their workstation was next to the underground entrance, because they just went out and walked to the clean surface toilets. It took them 15 minutes to walk out to the surface toilets and back to the workshops and the productivity was not affected by the short distances and time spent attending to their needs such as walking to the surface toilets.

In this study, it was identified that most of the women were of child-bearing age and had young children. The night shift negatively affected most of them, more than the demanding mining work itself, because they had to leave their children with neighbours or relatives when working night shift. Women stated that the need for a childcare centre has been under discussion for ages and the union representatives and mine management were not reaching an amicable agreement. It has been noted by Veninga (2000:23) that if employers do not attend to the overall needs of their workers, including accommodating needs of women working night shift, such employers tend not to reach their companies target productively and financially. To prevent such losses, the mine should ensure that all the environmental and physical health needs of women are attended to. Van Aardt (2008:17) also corroborates the importance of a healthy work environment for WIM, such as clean and adequate toilets for women and men.

Women underground mineworkers also pointed out the dissatisfaction about the appalling state of the change houses. The toilets and showers were unhygienic and in the same place where, if one

is showering this side, others are defecating on the other side while others are sitting on benches chatting and watching those who are showering. What made things worse was that those showers were not designed correctly and they did not have doors.

Most WIM were uncomfortable with exposing their bodies in front of the other women mineworkers. It is advisable that the showers and the toilets be separated so that women may have privacy when showering. Doors should also be installed to ensure that nobody is watching the other one while showering. Moreover, the change houses were full and congested; the WIM bumped at each other when they were dressing up because the space was insufficient. While the mine was still appointing more women employees, there was no extension of the existing change houses to accommodate the increasing numbers of mineworkers.

The current union representatives are currently seen to be trusted and understood by mine management, compared to those from its predecessor. However, there are no constructive discussions and amicable agreements reached as far as the extension of change rooms are concerned. Furthermore, the women believed that mine management is dominating the union representatives because there are multiple issues they have raised which are not attended to by the mine.

The participative leadership style should be practised in which mineworkers engage with mine management and give positive feedback to the membership. Mine management of the mine should also be a role player, by building and maintaining a relationship that is founded on trust and avoid being domineering in this union-management relationship. In the end, the union representatives need to play a more forceful and assertive role in the spirit of participative management systems without compromise. The union should always convey the message to their membership and use new approaches that are more effective when deliberating on health-related matters which pose risks for WIM (Ashworth 2003:30). This will improve the health and safety of mineworkers and the environment will be less hazardous.

5.5.2 THE MINE AS A HAZARDOUS WORKING ENVIRONMENT

The mining sector as a hazardous working environment is dependent on the three legislations which are: the Mine and Health and Safety Act No. 29 of 1996, Occupational Health and Safety Act No. 85 of 1993 and the Hazardous Chemical Substances Regulations of 1995.

The Mine and Health and Safety Act No. 29 of 1996's. These regulations intention is to provide for and protect mineworkers' health and safety. This in turn will promote a culture of health and safety and provide for the enforcement of health and safety measures. Furthermore, the employer should

ensure that the employee is always wearing appropriate personal protective equipment when working in a hazardous environment. Good housekeeping in the workplace and personal hygiene should be adhered to, including the safe working procedures regarding the use, handling, processing and storage of any material containing lead.

The HCS Regulation of 1995's goal is to ensure that the employer provides a workplace that is free of hazardous exposure such as lead. Furthermore, the Act emphasises that mineworkers should not work in environments that exceed the occupational exposure limit without wearing respiratory protective equipment. Such areas should be zoned off as a respirator zone where it is clearly demarcated and identified by notice indicating that the relevant area is a respirator zone. The respiratory protective equipment and protective clothing envisaged in regulation 12 must be worn and no person should be allowed to enter that demarcated area without wearing a respirator or the required respiratory protective equipment and protective clothing (Van Aardt et al. 2008:21).

In this study, it was found that WIM suffer from the dust related conditions because they cannot put a dust mask on and keep it on until they knock off. Some WIM confirmed that they had an insight of the consequences when not complying with the dust mask, but explained that they felt distracted and uncomfortable when wearing the dust mask. The WIM further acknowledged that this act was incorrect and agreed that they needed to follow the company rules and ensure that they put the dust masks when working underground. Zungu (2012:10) substantiates that when the PPE is not used properly, the erosive underground dust may advance to systemic respiratory conditions.

The challenge encountered was that underground there is dust, which is fundamentally associated with the breaking of rocks. Such work should be performed in a well-illuminated and well-ventilated underground section. During the processes of mining and blasting, harmful gases are discharged into the underground environment. According to Hermanus (2007:531), these health hazards may affect the health of mineworkers and the health of those living nearer the mines, including the environment they live in.

Wearing of PPE while working is vital in the mining sector. To prevent NIHL, mineworkers working in noisy environments such as borehole areas should always wear their HPDs. The WIM admitted that they always put in earplugs to protect themselves from hearing loss. Previous literature confirms that excessive noise which is work-related has been identified as one of the illnesses reported to MBOD for compensation (AngloGold Ashanti 2007; Van Aardt et al. 2008:22). Ashworth et al. (2004:36) confirmed that excessive noise exposure may increase the blood pressure of a pregnant woman. This may also have a negative impact on costs to the economy and hinder sustainable development of the selected coalmine in Mpumalanga South African mine in this study. Ranchod (2008:11) agrees that in order for women to curb hunger and decrease

poverty, the mining industry should ensure that the number of WIM is increased for economic opportunity, sustainability and development purposes.

According to Hermanus (2007:531) the mineworkers' health and safety, including the mining environment can be affected by the occupational health hazards and occupational accidents happening underground. The finding in this study was that underground mineworkers work with dust, especially those working inbyes and in underground sections where most mining processes take place. Such mineworkers usually experience breakdowns, which make them not to have time to eat because of working prolonged hours to fix those machines. The sections are not like the outbyes, because there is no water to wash hands and to even drink and the WIM were concerned about not being able to wash their hands and eat with those black hands, which is a health hazard. An unhygienic working environment may lead to the spread of infection such as tuberculosis which may hinder the company's production when WIM are sick and then be absent from work (Mbokoto Mining Group, 2015:6).

The mining environment can be easily affected due to degrading which happens in an excessive manner, due to mining and blasting processes that change the environment. The findings were that some things that cannot be prevented underground such as the personal protective equipments, which minimises but does not prevent the illnesses because of the type and severity of coal dust in the underground section. However, Nayak and Mishra (2005:8) advise that WIM should be wary and always wear safety goggles to protect themselves from eye damages. In addition, hearing protective devices are to be worn appropriately to prevent them from NIHL.

Furthermore, ergonomic hazards are also common in the mining environment especially when carrying heavy equipment and performing heavy jobs in confined spaces of the mining environment. These ergonomic hazards normally occur due to poor engineering design, which leads to increased safety risks (Zungu 2007:18). Women continue to be psychologically affected within the selected coalmine. It was identified that there were gender difference and pay inequities with predominantly white male mineworkers working a normal day shift, which does not make him qualify for a shift allowance, but earning it (shift allowance). This is confirmed by Benya (2009:18) that in the mining industry there is a salary difference between women and men and it usually discriminates against women. Furthermore, the author confirmed that men mineworkers dominated the underground mining industry by bullying, intimidating and sexually harassing women.

5.5.3 GENDERING OF MINING INDUSTRIES

In South Africa, there are four areas of legislation that relate to engendering the mining industry. These Acts are the Basic Conditions of Employment Act No 75 of 1997, the Occupational Health and Safety Act No. 85 of 1993, and the South African Constitution Act No 108 of 1996.

Section 26 of the Basic Conditions of Employment Act No. 75 of 1997, states that no employer may require or permit a pregnant employee or an employee who is nursing her child to perform work that is hazardous to her health or the health of her child. During an employee's pregnancy, and for a period of six months after the birth of her child, her employer must offer her suitable, alternative employment on terms and conditions that are no less favourable than her ordinary terms and conditions of employment, if the employee is required to perform night work, as defined in section 17 (1). Previous studies confirm that gender differences are related to diverse access to resources, which are driven by cultural attitudes towards gender, societal group, social policy and labour market systems (Marsden et al. 1993:372). At the coalmine, it was found that there was no privacy for WIM change rooms; the shower rooms and toilets were combined with no doors to close. The WIM's dignity can be restored if the mine can improve sanitation issues including women's request for access to sanitary towels within the underground section.

Occupational Health and Safety Act No. 85 of 1993

According to this Act, the employer shall:

provide for protection of the health and safety of employees and other persons at mines and, for that purpose to promote a culture of health and safety; to provide for the enforcement of health and safety measures; to provide for appropriate systems of employee, employer and State participation in health and safety matters; to establish representative tripartite institutions to review legislation, promote health and enhance properly targeted research; to provide for effective monitoring systems and inspections, investigations and inquiries to improve health and safety.

The South African Constitution Act 108 of 1996 affirms that all employers should make certain that the work environment is assessed and maintained to ensure that it is risk free. Badenhorst (2009:57) agrees that a woman's body is physically and biologically different from that of a man, and in cases of pregnancy, it should be recognized that the risks to the lives of two people, which is the mother and the baby, are at risk and needs to be eliminated. As confirmed in the mine's standard operating procedure on pregnancy in the workplace, the goal is to ensure the protection of female employees during pregnancy and after childbirth at the coalmine is prioritised.

Management should be provided with guidelines that will enable them to accommodate women's health needs including that of the pregnant women and their unborn children at the workplace.

Protection from Harassment Act No 17 of 2011

In this study, findings indicated that resistance against women in the male-dominated mining environment still exists. Stereotypes, such as 'mining is not a place for women', 'its 50/50 we should work equally because we get an equal pay' are still heard from men mineworkers at the selected coalmine.

According to mine management and professional nurses, women know the processes to follow when being harassed in a working environment. Another mine manager mentioned that the mine's Human Resources disciplinary process is an open book, which is effective, and men mineworkers have been disciplined before due to harassing women.

Although physical sexual harassment was not found during the study, verbal sexual harassment which involves unwelcome insinuations, impressions, recommendations, remarks with sexual connotations, sexual offences and jokes or insults, unwanted sexual advances, hostile illustrative remarks on individual's anatomical position in the presence of the individual directed towards WIM was found to be happening at the selected coalmine (Miner-Rubino & Cortina 2004:112). Some women had to be removed from the sections where they were harassed, which did not prevent the recurring harassment.

Some workers perceive women as being a problem, hence the mine management may transfer them to another section. That on its own is humiliating because colleagues in the new section where the WIM will work might have a different perception and not associate with the WIM freely. The mine needs to come up with stringent policies which prohibit violence at work and avoid moving women from sections. The Employment Equity Act stresses the importance of trade unions advocate for the employment of women in underground mining. However, mine management and male mineworkers tried to use the patriarchal ideology of victimising women (Buhlungu & Bezuidenhout 2008:280). The researcher's finding was that although the number of women at the mine had reached the target of 10% by 2009, it had not grown rapidly as anticipated in the last decade or two. Participants confirmed to the researcher that there was a gender based barrier in which men mineworkers were seen to be exploiting women mineworkers by not assisting them when performing difficult tasks.

With the emphasis of the South African legislations (Protection from Harassment Act No. 17 of 2011; Employment Equity Act No 55 of 1998 as amended by Employment Equity Act, Act No 47 of

2013), different organisations engage in formal and ongoing awareness campaigns on sexual harassment to enlighten newly appointed employees about the procedures to follow if sexual harassment occurs. Despite these attempts, sexual harassment remains a matter of concern and such incidents do take place (Botha 2016:259). It was pointed out in the study that sexual harassment had taken place within the mine. In one incident, the woman underground mineworker reported a male supervisor who continuously harassed her verbally. After the disciplinary hearing, the woman mineworker had to be moved from that section to another one where she did not have problems. In another section where a similar incidence occurred, the male mineworker was dismissed due to sexually harassing the woman underground mineworker. This concurs with what was mentioned by mine management that the selected coalmine views sexual harassment as a serious offence, according to its disciplinary code of conduct, which is uncompromising and effective. When such behaviours are not taken seriously, women may suffer from psychosocial conditions (Bailey-Kruger 2012:15).

5.5.4 PSYCHOSOCIAL WORKING ENVIRONMENT

When discriminatory conduct such as sexual harassment is not taken seriously, women suffer in different ways, including emotionally and psychosocially (Bailey- Kruger 2012:15). The psychosocial working environment refers to interpersonal and social interactions which influence development and behaviour in the workplace.

According to Hansen et al. (2015:15) psychosocial aspects of a working environment refers to the nature and content of the work, the organisation of the work, and the social relations and conditions under which the work is performed. An unhealthy psychosocial working environment affects employees' physical and psychological health including work performance and effectiveness (Schnall et al. 1994: 381; Bond & Punnett 2007:3).

By law, employers are obliged to protect the health and safety of their workers. Psychosocial working disorders are endorsed by the two pieces of legislation. The Occupational Health and Safety Act No. 85 of 1993 states that:

the employer shall provide for protection of the health and safety of employees and other persons at mines and, for that purpose to promote a culture of health and safety; to provide for the enforcement of health and safety measures; to provide for appropriate systems of employee, employer and State participation in health and safety matters; to establish representative tripartite institutions to review legislation, promote health and enhance properly targeted research; to provide for effective monitoring systems and inspections, investigations and inquiries to improve health and safety.

In this study, women complained about their psychosocial working environment; they believe that nobody takes them seriously and their suggestions and inputs are not implemented. What frustrates them the most is that they belong to a union where they pay some monthly subscriptions. Their union representative reported all their concerns to mine management and her feedback was that mine management would respond or mine management was busy researching the issues raised by women and they would come back to them with an answer, but this never seems to happen. Previous studies confirm that in general, the trade unions usually consider and assist when male employees have issues, while female employees have to attend to their own matters without the assistance from the trade union (Lahiri-Dutt 2011:2).

The Compensation for Occupational Injuries and Diseases Act No. 130 of 1993

The mining industry is regulated to render medical care and compensation of occupational diseases and illnesses in South Africa. This industry considers work-related injuries and illnesses serious and complies with the country's legislations by promptly reporting these injuries and diseases. WIM, whose work is physically strenuous, should be considered to be at increased risk of injury when pregnant or after the birth of a child. In addition, sitting or standing for long periods during a pregnancy can have serious health consequences. Standing for long unbroken periods can result in complications during pregnancy such as deep vein thrombosis, varicose veins, premature labour and even a miscarriage. At the selected coalmine, the standard operating procedure is called Occupational Illness Investigation to establish the process of investigating and diagnosing a work-related illness. This standard operating procedure's main aim, as contemplated in section 5/11 of the Mine Health and Safety Act, is to identify appropriate controls to prevent re-occurrence of such incidents and to report all incidents as required by the Act and corporate governance. This applies to investigations of suspected or confirmed occupational illnesses such as Pulmonary Tuberculosis, Silicosis, Pneumoconiosis and Chronic Obstructive Airway Diseases, amongst the few.

While the bonus system serves to improve productivity amongst mineworkers, it has also been used by male workers to discriminate against women. Men mineworkers do not prefer to work with women in their teams because men perceive women to be slow and that may impact on the team's bonuses (Benya 2009:77). This was alluded to by the women underground mineworkers. In addition, they did not report work-related injuries because these were linked to the bonus system. When a team member had been involved in a work-related accident, the bonus money they earned was compromised or cancelled. With every accident that happens at the selected coalmine, the mineworkers lose shifts. The mine has strict rules on reporting accidents, whether major or minor. However, mineworkers do breach these rules by not reporting accidents (Benya 2009:117).

At the mine, it was found that there were different committees, which assisted all mineworkers, particularly WIM when faced with mining challenges. Some of these committees include Health and Safety, Mommy's and WIM committees often meet monthly to discuss and deliberate on health and safety issues faced by women underground mineworkers. These committees were effective in ensuring compliance regarding the health of women mineworkers.

The Statements to formulate the guidelines

The in-depth discussion on the findings about women's health concerns from the study prompted the researcher to self-engage on the means and ways to formulate the guidelines in this study. The researcher tapped on the SEM as the framework to identify statements that can be considered in the formulation of guidelines from both the participants' voices in Chapter 4 and discussion in Chapter 5. Weaving through the SEM, the researcher used Health Promotion Standard Operating Procedure of the selected coalmine. The SOP unpack the roles of different stakeholders when reporting illnesses and injuries (either work related or not) at the selected coalmine. The researcher linked the findings (through participants' voices) with the discussion to demonstrate to the role players in different levels/structures what they are supposed to do in case of reporting illnesses and injuries (either work related or not). This assisted the researcher to identify initial statements for the formulation of the guidelines as seen in **Table 10 and Table 11**.

5.6 SUMMARY

This chapter provided a discussion of the findings of the first phase of the case study. The findings were guided by the SEM embedded with constructivism as the lens of the entire study. The SEM espoused the women's health concerns of underground mineworkers from the different levels of structures. These levels included micro (individual participants), meso (interpersonal relationships of participants), macro (organisational, factors at the mine) and exosystems (community environment and policy factors, postulated to affect health problems). The policy documents from relevant sectors especially those from the DMR, National Department of Health and Department of Labour on mining and women's health were used as a reference in drafting the statements for the guidelines. After having these statements, the researcher started to recruit the experts who would be involved in the formulation of guidelines.

This chapter 6 explains how the researcher formulated and refined the drafted guidelines based on the data collected and analysed in Phase 1 of the study and on evidence produced by a comprehensive literature review. The next chapter discusses phase two of the research, with a specific focus on the methodology of how the guidelines to address women's health concerns of mineworkers at the selected coalmine were drafted and formulated.

CHAPTER 6

FORMULATION AND REFINEMENT OF GUIDELINES

6.1 INTRODUCTION

The interpretation of the findings was guided by the socio-ecological model (SEM) and informed by a critical constructivist lens of this study, which was used to inform the development of OHS guidelines. The SEM espoused the women's health concerns of underground mineworkers from the different levels of structures as well as the interconnections between the levels. These levels related to micro (individual participants), meso (interpersonal relationships of participants), exo (workplace environment) and macrosystems (socio-cultural and policy factors, postulated to affect health problems).

This chapter focuses on phase two of the research, including how guidelines for women's health concerns of mineworkers were formulated. Additionally, the formulation of the guidelines was guided by the SEM to address health concerns of both underground and above ground female mineworkers, the OHS staff and the mine management at the selected mine. The chapter also explains how the researcher drafted, formulated and refined guidelines based on the data collected and analysed in phase one of the study as described in Chapter 4.

6.2 GUIDELINES FORMULATION IN HEALTH AND NURSING

Guidelines, in the context of health and nursing, are statements that are logically formulated to assist practitioners and patients to achieve OHS benchmarks (Woolf et al. 2012:1). Grol et al. (2010:394) further describe guidelines as a warehouse or archive where therapists get essential opinions or recommendations intended to optimise patient care that is informed by a systematic review of the evidence. According to the WHO (2012:1), guidelines are formulated to ensure that the needs of the community are consistently met without any prejudice.

The guideline formulation was initially introduced within the healthcare sector in the United States around 1990. Since then, healthcare workers and clinicians in hospitals continue to use guidelines on a regular basis (Robertson 2007:2). Healthcare workers also formulate their own guidelines to improve their work environments (MacDermid et al. 2005:2). The process of guideline formulation

and the methodology is a rigid scientific process (Woolf et al. 2012:2). The process is explained later in this chapter.

In the literature, several techniques are described to formulate guidelines. These include traditional Delphi, Nominal Group Discussions and, more recently, E-Delphi. The traditional Delphi method is transparent, organised and a recreated method of blending individuals' understanding of the concept. This method has been widely utilised for guideline formulation in health-related research, including women's health research (Graefe & Armstrong 2010:6; WHO 2010:34). Thangaratnam and Redman (2005:120) define the Delphi technique as a method of "obtaining a collective view from individuals about issues where there is no or little definite evidence and opinion is important". The Delphi technique has been utilised in health and social research to strengthen decision-making processes and reach consensus (Hart et al. 2009:1). The consensus is defined as a "general agreement of a substantial majority" (>75%) (van der Linde et al. 2005:694). According to van der Linde et al. (2005:694), the "Delphi technique is a structured communication aimed at producing detailed critical examination and discussion, not a quick compromise."

A technique that is often used in consensus methodology is the Nominal Group Technique (NGT). Lennon et al. (2012:1) define the NGT as "an evaluative methodology, which allows for the generation of ideas and thoughts from group participants, through the posing of a single question, while maintaining anonymity throughout. The process requires direct participant involvement and is non-hierarchical in nature, thus ensuring a democratic, valuing experience on the part of the participants". While Oosthuizen (2014:3) refers to NGT as a structured variation of a small-group discussion to reach consensus, information is gathered by asking individuals to respond to questions posed by a moderator and then asking participants to prioritise the ideas of all group members. The process prevents the domination of the discussion by a single person, encourages all members of the panel to participate, and results in a set of prioritised solutions or recommendations that represent the group's preferences. During the NGT, it is important that the participants physically assemble to explore and discuss the guidelines to reach consensus. In this study, it was not possible to follow the NGT because all the experts were engaged at their different places of employment. Hence the researcher followed the E-Delphi process, which could be accessed remotely at their own time at their vicinities (Brüggen & Willems 2009:364). This study used an E-Delphi process to formulate an OHS programme to address women mineworkers' health concerns of mineworkers. The draft guidelines were formulated from health promotion and work-related injury perspectives.

The E-delphi technique was chosen as a technique to deliberate and decide on how to meet women's health concerns. In this study, the experts who committed to participate in the study were unable to convene in one place (Bardhan et al. 2012:25; Oosthuizen 2014:3). According to van der

Linde et al. (2005:693), the E-Delphi technique is essential in evidence-based research and assists in assembling ideas online in case of minimal proof or explanation and methods of collecting evidence. Its role in this regard was to reach consensus in the formulation of guidelines for an OHS programme to address women's health concerns at the coalmine.

6.3 E-DELPHI AS A STRATEGY FOR E-RESEARCH

E-research is promoted by the European Union and is known as Responsible Research Innovations (RRI). RRI recently became popular within the framework of policy research formulation, especially in the European Commission. RRI addresses the wider dimensions and implications of science and innovation (Angelaki 2016:1). Currently, researchers and scholars use different types of technologies and devices to conduct e-research. The definition of e-research as the use of information technology to support existing research through online knowledge methods spoke directly to the researcher (Beaulieu & Wouters 2006:56). Within this context, the researcher chose to use E-Delphi as the appropriate technique to conduct a process of guideline formulation (Avery et al. 2005:4) in this digital era. The guidelines were to be used to protect and enhance the mineworkers' health within the selected coalmine (Department of Mineral and Resources (DMR's) Guideline for the Compilation of a Mandatory Code of Practice for an Occupational Health Programme on Thermal Stress 2016:12). The researcher took advantage of technology as transformative by using an e-platform to undertake a process to formulate the guidelines.

The E-Delphi technique allowed the experts to participate in an asynchronous and anonymous manner (van der Linde et al. 2005:694). The E-Delphi technique strengthened the diversified co-learning through a shifted paradigm in a guideline formulation arena. With the E-Delphi technique, some of the common biases that normally occur in a face-to-face group process were removed (van der Linde et al. 2005:694). Using the E-Delphi was somehow both exciting and challenging since these were uncharted waters, as most scholars have no idea on how e-platforms can be used to enhance research (van der Linde et al. 2005:694).

The advantages of using the E-Delphi technique within the context of this study, ensured anonymity and confidentiality of the experts' participation as they did not meet physically for various discussion meetings (Thangaratinam & Redman 2005:122). E-Delphi allowed participants to provide more information about the discussion at their own time, pace and place. Most importantly, E-Delphi was a less labour-intensive and paperless method (Chou 2002:236). Through E-Delphi, the participants reflected on the information prior logging in on the e-discussion forum. According to Claxton et al. (1980:3), E-Delphi may involve three rounds, depending on the number of research questions and time available to reach consensus. In this study, only two e-rounds were conducted as most of the important aspects on consensus were reached during the exploration of the scope and the purpose.

In this study, the experts for the E-Delphi process were recruited and selected from the mining industry, the field of women's health in the National Department of Health, and those with experience and background of the phenomenon under study who could contribute helpful input (Hsu & Sandford 2007:1). The description of the recruitment process follows below.

6.4 RECRUITMENT AND SELECTION OF THE EXPERTS FOR FORMULATION OF THE GUIDELINES

The results of phase one of the study prompted the researcher to identify experts who could be of assistance in the formulation of guidelines for the OHS programme to address women's health concerns of mineworkers at the selected coalmine. The researcher identified and invited 18 experts to participate in the study. The recruitment of experts was based on their knowledge expertise on the Occupational Health and Women's Health sectors. The experts' experience ranged from business owners of occupational health care services to high-ranking officers of the National Department of Health responsible for Occupational Health services. The other experts were from the mining industries, factory industries, municipalities and government entities. All have extensive experience in Occupational Health. Others were Occupational Health Managers from the Department of Minerals and Resources, which is the department that governs the mining industries and ensures compliance within the mining industries. To enhance rigour of the guidelines, the researcher included experts from South African Universities with a broader scope and understanding of Occupational Health and Safety experience. Out of the 18 experts invited, only six of them agreed and signed the written consent form to participate in the study. Below are the profiles of the six experts who agreed to participate after signing a written study consent form.

6.5 BIOGRAPHICAL DATA OF EXPERTS

The biographical data of the panel of experts is summarised in the table below,

TABLE 13: PROFILE OF EXPERTS

Expert	Occupational Health Qualification/Experience	
1	Registered Nurse B. Tech in Occupational Health Nursing	Occupational Health Practitioner with 21 years of experience in different Occupational Health settings (Mining and Government entities), now the business owner of an Occupational Health and Safety Centre and mobile services in three Provinces
2	Registered Nurse	Occupational Health Practitioner with 18 years

	B. Tech in Occupational Health Nursing	of experience, working for a private company as a practitioner in Occupational Health setting.
3	Registered Nurse Master's degree in Nursing Science B. Tech in Occupational Health Nursing	Occupational Health Practitioner 20 years of experience; Previously worked for different Occupational Health and Safety Centre (OHSC) within Gauteng Province Currently working for a Government entity as a manager in an OHSC
4	Associate Professor PhD in Nursing and Occupational Health	Associate Professor at a South African University, working as a postgraduate research consultant for almost seven years; A former Associate Professor at the Canadian University, teaching undergraduate and graduate nursing students for three years; Director Research, teaching graduate students and supervising masters and doctoral candidates for five years; and now working for a private company as a practitioner in Occupational Health setting.
5	Registered Nurse PhD in Nursing	A Registered Nurse, Registered Midwife, Registered Community Health Nurse and Registered Nurse Educator; Senior Lecturer at a South African University; and a researcher in Women's Health, Violence against Women, African Knowledge.
6	Sociologist PhD in Sociology	Formerly a Senior Lecturer in Sociology and Gender Studies at a South African University; a Human Rights activist

These experts were identified based on their vast knowledge and experience in Occupational Health as well as in research. Notwithstanding the fact that the findings indicated to the researcher as whom to purposively recruit, the researcher provided the experts with an information leaflet (see Appendix D) that contains all the relevant information about the study and a consent form, which

was signed by those willing to participate. The contribution of the experts to the process of formulation of guidelines is reflected in section 6.8 below.

6.6 METHODOLOGY FOR THE GUIDELINES FORMULATION IN THE CURRENT STUDY

This section will discuss the phases that the researcher followed to formulate the guidelines using an e- platform. The phases were: the preparatory phase which was the initial phase of E-Delphi platform and process design, followed by the exploration phase of the scope and purpose of the guidelines, followed by the consensus phase and refinement phase.

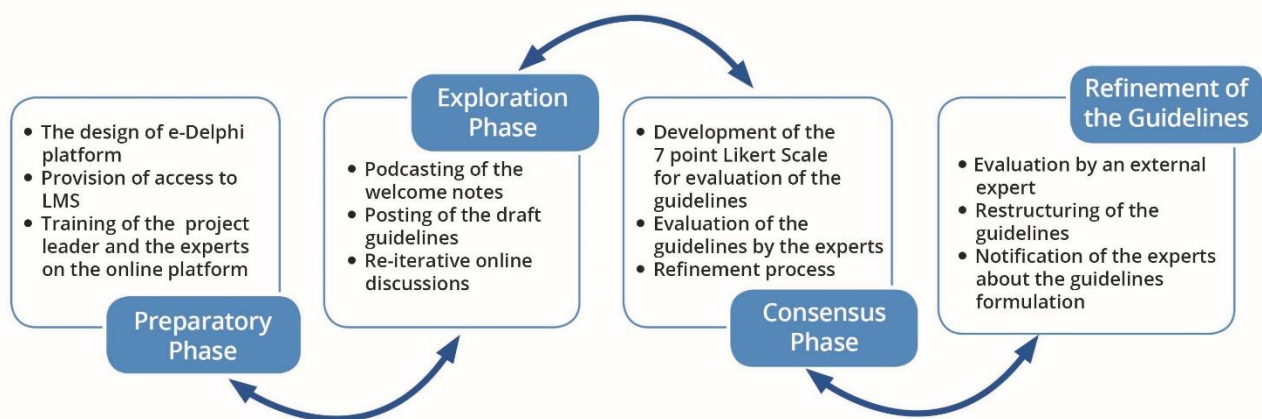


FIGURE 10: GUIDELINE FORMULATION PROCESS

6.6.1 PHASE 1: PREPARATORY PHASE FOR THE DESIGN OF THE E-DELPHI PLATFORM

The supervisory team consulted the instructional designer and the system administrator of the University of Pretoria's Learning Management Systems (LMS). E-Delphi was designed according to the needs of the project. The LMS was free of charge available for the project leader who was a registered student and for the staff members who were part of the expert team. For the experts not affiliated with the University, access was provided by the systems administrator. The inclusion criteria of the experts were that they had worked or were currently working within Occupational Health Centres. The project leader was trained by the instructional designer on how to access and respond on the e-platform. A user manual was designed for the experts on how to access the e-platform.

6.6.2 PHASE 2: EXPLORATION PHASE OF THE SCOPE AND PURPOSE OF THE GUIDELINES

In this phase, the researcher concurrently posted and podcasted information about the eight draft statements which were to be developed into guidelines for implementation in the selected coalmine in this study. To kick-start this phase, the researcher recorded the podcast welcome note where

the experts were to brainstorm the purpose and scope of the guidelines. In the podcast, the entire process that was to be followed, together with the role of the experts, was outlined. To check the feasibility of the platform in week one, only two statements for guidelines were posted. These statements were on change management and hazardous environment. In the second week, four statements for draft guidelines were posted. These statements related to the psychosocial working environment, health care, human dignity and safety participation compliance. In week three, the last two statements for drafted guidelines were posted. These statements related to health care service access and inspiring hope and resilience. The aim of the entire E-Delphi process was to explore the scope and purpose of the drafted guidelines through stakeholder involvement. Throughout the process, the researcher responded and commented online on the experts' online inputs and comments. Those online reiterative engagements are discussed in detail later in this chapter.

6.6.3 PHASE 3: CONSENSUS PHASE

The researcher, as project leader, formulated a 7-point Likert scale for using the AGREE II tool. The researcher then drafted guidelines from the input and comments of the experts from the exploration phase. The project leader posted the 7-point Likert scale and the drafted guidelines on the e- platform. The experts were invited to evaluate the guidelines by using the 7-point Likert scale. The evaluation of guidelines occurred in 2 e-rounds. In the first e-round, the experts evaluated the draft statements. The response scorings ranged from 4 to 7 on the 7-point Likert scale. Experts also posted comments on the statements. Figure 10 indicates the process that ensued in the formulation of the guidelines. The project leader incorporated the comments on the guidelines and posted them for evaluation for the second round. On the second e-round, the experts evaluated the draft guidelines. A unanimous score of 7 on the Likert scale was achieved, indicating that consensus had been reached.

Lately, in digital research there are various techniques that are used to measure consensus among the experts or panellists (Heiko 2012:1529). One is called the 90-9-1 principle which mirrored the well-established pareto-principle that is dominantly used in market research (Mongin 2016: 512). Another consensus measurement which has been sporadically been used in traditional Delphi technique is "Average Percent of Majority Opinions" (APMO) Cut off Rate (Heiko 2012:1529). Consensus using APMO is calculated based on the majority agreements plus the majority disagreements multiple by 100 and divide by total opinions expressed (Heiko 2012:1529). The APMO formula is:

$$\text{APMO} = \frac{\text{Majority agreements} + \text{the majority disagreements}}{\text{Total opinions expressed}} \times 100$$

APMO cut off rate is the most convenient measurement of consensus as it leaves much freedom of analysis and interpretation to the Delphi facilitator (Heiko 2012:1529). In this study, the “post-group consensus” (Heiko 2012:1529) was used. The post consensus measurement in this regard was done after the second e-round; where the experts scored 7 to all the items on the Likert Scale and agreed individually with their own final group aggregates and those of others.

Refer to **Figure 10** on the processes that were followed to formulate the guidelines. The formulated guidelines were as follows:

- For change management: A supportive organisational environment wherein women mineworkers can function to their full potential;
- For hazardous environment: Effective measures for controlling hazardous environments that affect women mineworkers;
- For psychosocial working environment: Fit for work and fit for life work environment for female underground mineworkers, within the coal mine context.
- For health care: A supportive and conducive environment in which women underground mineworkers can express their health concerns in the coal mine context;
- For human dignity: Women underground mineworkers’ human dignity in the coal mine context be upheld, and the human rights framework for non-discrimination against women be adhered to;
- For safety participation compliance: Safety procedures in reporting accidents and injuries be adhered to;
- For health care service access: The on-site health care services to promote women mineworkers’ health, and wellbeing, be accessible, available and relevant;
- For inspiring hope and resilience: Hope and resilience for female underground mineworkers in a coal mine context be inspired.

6.6.4 REFINEMENT PHASE

The researcher sought verification of the draft guidelines by an external expert. The external expert provided virtual comments on structuring and wording of the guidelines. See par. 6.9 for more detail. The guidelines were formulated through rigorous and iterative evaluation processes using the AGREE II tool, as discussed below.

6.7 AGREE II TOOL IN EVALUATION OF GUIDELINES

AGREE II is an international tool that is used to appraise and evaluate guidelines (Brouwers, Kho, Browman, Cluzeau et al. 2009:1). According to Grol et al. (2010:395), guidelines formulation is

used by many organisations, both locally and internationally. Such organisations utilise validated tools like the AGREE instrument (MacDermid et al. 2005:1) to evaluate the effectiveness of the guidelines. The AGREE tool evaluates the methodological rigour and transparency in which a guideline is formulated. The refinement of the original AGREE instrument has resulted in the new AGREE II instrument which includes a new User's Manual. The domains addressed by the AGREE II tool are: Domain 1 - scope and purpose, Domain 2 - stakeholder involvement, Domain 3 - rigour of development, Domain 4 - clarity of presentation, Domain 5 - applicability, and Domain 6 - editorial independence. In the current study, the researcher formulated a 7-point Likert scale which ranged from 1–strongly disagree to 7–strongly agree to evaluate each domain. The “How to Rate” section for each item included details about assessment criteria and aspects specific to the item.

TABLE 14: EXAMPLE OF 7-POINT LIKERT SCALE

DOMAINE 1 SCOPE AND PURPOSE						
1. The overall objective(s) of the guideline is (are) specifically described.						
1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

The overall evaluation required the AGREE II user to make a judgement as to the quality of the guideline, taking into account the appraisal items considered in the assessment process (Brouwers, Kho, Browman, Cluzeau, Feder, Fervers, Hanna & Makarski on behalf of the AGREE Next Steps Consortium 2010). A score of 1 was given when no information was relevant to the AGREE II item or if the concept was very poorly reported. A score of 7 was given if the quality of reporting was exceptional and where the full criteria and considerations articulated had been met (See Annexure J). A score between 2 and 6 was assigned when the reporting of the AGREE II item did not meet the full criteria or considerations. In addition, a score was assigned depending on the completeness and quality of reporting. The score increased when more criteria were met, and the aspect or determinant was addressed.

6.8 ONLINE RESPONSES AND COMMENTS

Below are the voices of the experts and the researcher (from the e-platform).

Extract #1 Round 1

'Women who find themselves working in the mining sector, especially underground would do that [to fulfil] a need [and] to provide for their families. It is one of the field of work where one needs to be physically capable. It requires a good to an excellent physical fitness, abdominal endurance,

and strength, including the strength of lower back, legs, elbows, shoulders, and a good lung function or respiratory system. It is not all women who have that endurance and strength because the woman's body cannot take the physical strain, and stamina required underground, which is supported by previous studies'.

'The argument of this discussion is that if women are in a hazardous environment, they will need to ensure that they are wearing the correct PPE. The PPE is the overall, hard hat, goggles if needed, harnesses, ropes, safety boots, and so forth. All these PPE, are heavy, which is another weight, adding on the heavy tasks that need to be performed'.

'It is really a difficult, non-conducive environment to allow a woman to work in such conditions, mainly because of the physical strain that would allow one to be exposed to'. 'One last comment is that women, every month go through a menstrual cycle whereby she will need to refresh herself often, by changing a sanitary pad, or tampon. It is a fact that there is no built ablutions underground which exposes a woman to an unhealthy working environment which is totally contrary to what the Acts emphasise'

The researcher's comment was:

'It is true that the environment is full of hazards that may affect the health of the women mineworkers and the health of those living nearer to the mines, including the environment itself (Hermanus 2007:531). The Hazardous Chemical Substance Regulation of 1995 also specified that the employers should provide the workplace that is free of hazardous exposures, and further emphasised that mineworkers should also not work in environments that exceed the occupational exposure limit (OEL) without wearing of Personal Protective Equipment (PPE). Wearing of PPE while working is vital, e.g. to prevent noise-induced hearing loss (NIHL), Mineworkers working in noisy environments like bore-hole areas should always wear their hearing protective devices (HPDs). As much as coal is the essential mineral which does not only generate electricity but is also useful in the production of steel and cement; coalmine managers should comply by ensuring that the hazardous working environment is managed, mineworkers are also monitored to prevent occupational injuries and illnesses. Impairments and fatalities may also have a negative impact on the costs to the economy, may hinder sustainable development [and full productivity of female mineworkers.]'

Extract #2 Round 1

'Some studies relate that hazardous work causes cancers, such as lung cancers, due to coal dust exposures, breast cancers caused by night work (Oxford University study, hazard 136, Oct-Dec 2016). From these studies, we can deduce that hazardous environments are the greatest risk of ill health. This requires effective safety precautionary measures to be put in place, correct, meaningful policies and procedures in ensuring compliance.'

The researcher's comment was:

'Some women return back to work post-delivery so that they can put food on the table for their families. The companies including mining sectors should create a women-friendly environment where women's health needs can be addressed. In the case of breastfeeding women, hygienic and safe spaces to express breast milk and keep it safe should be provided for. Such facilitating [would] benefit both the employee and the employer. In South Africa, issues on the duration of paid maternity leave should be benchmarked and revisited. SA government should tap on this issue from countries such as Serbia, Denmark and Croatia where the employees are given 52 weeks maternity leave with full pay.'

Extract #3 Round 1

'Hazardous environment in the workplace can mean anything from water, food, noise, atmospheric pollutions and other toxic substances. I have had a recent case where employees in a particular section of the manufacturing industry I worked for, inhaled some fumes from "rodent repellent" chemical. A question was directed to the Risk department as to whether enough had been done to research on assessing the chemical beforehand? In other words, that particular section was environmentally affected. The environmental hazard control depends on defining acceptable levels of exposure, therefore, it was expected of the Risk department to assess and keep exposure below a specified threshold.'

'There were women employees in the group, and the main concern was what if some of them were pregnant? Was that not going to have adverse effects on the baby or so that some of them do hide their pregnancy especially the learners on contract with the fear of losing their jobs or contracts terminated. For any potential environmental hazard, one of the main principles should be identification, monitoring and control.'

The researcher's comments were:

'As we know employers have the responsibility to protect employees against a hazardous work environment; however, regulations to prevent occupational diseases are in most cases involved in the protracted controversy between clashing interests [as well] as a conflict of interest, employees have the right to know all hazards associated with the environment they work in. This will equip them and they can always refuse to work into work in an environment believed to be dangerous'.

'According to the Occupational Health and Safety Act, No. 85 of 1993 as amended by Occupational Health and Safety Amendment Act, Act No 181 of 1993, regular workplace inspections are to be done. Such inspections assist in identifying the hazards, recording monitoring and recommending the corrective action. When this is adhered to, all workers, including the pregnant workers will be free from hazards, and they will have healthy pregnancies and deliver healthy babies'.

Extract #4 Round 1

'Employees have a responsibility to ensure appropriate measures are taken to protect the woman. This includes supplying information and training and identifying risks and hazards that employees are exposed to. Employers are required to provide and maintain a work environment that is safe to work in, and the measures include the policies, procedures and standards that are to be developed and followed without risk. Risk assessment is an important factor in this working environment especially regarding the special or specific needs that a woman may have in the mining industry. An open and non- threatening culture that is just and fair goes a long way in ensuring woman's needs are considered'.

The comments by the researcher were:

Safety climate culture is embedded to the four legislations in South Africa, i.e. Mine Health and Safety Act 29 of 1996, the Basic Conditions of Employment Act 75 of 1997, the Constitution of Republic of South Africa, Act No 108 of 1996 and Occupational Health and Safety Act 85 of 1993'.

'Section 1 of Chapter 1 of the MHSA's main intention is to promote a culture of health and safety in the mining industry; training in health and safety in the mining industry; and co-operation and consultation on health and safety between the State, employers, employees and their representatives. And the other three Acts (BCEA, the Constitution of South Africa and the OHSA) stipulate that:

- employers should ensure that the working hours of employees are in accordance with the*

provisions of any Act governing occupational health and safety;

- *considering the health and safety of employees; their family responsibilities and also the permission to work more than 45 hours per week; and*
- *nine hours per day if the employee works for five days or fewer per week; or eight hours per day if the employee works for more than five days per week’.*

These are some of the responses during which the researcher and participants were communicating. The researcher identified 18 individuals who were to participate as experts. Out of the 18, only 6 ultimately participated (**see Annexure F**). In this domain, the views and preferences of the experts were discussed under Guideline 1 which was to ‘ensure a supportive organisational environment wherein women mineworkers could function to their full potential’ as indicated below. Online responses and comments from the researcher and the experts to ensure supportive organisational environment wherein women mineworkers could function to their full potential were as follows:

Extract #1 Round 2

‘Communication is integral in any working relationship because without it; there will be no understanding from different parties. Supportive policies and guidelines in mining are needed to ensure that there is a harmonious working relations and submission of many cases that are reported nationally, illustrate inequality in the mining sector amongst women. The mining environment needs to ensure an effective communication strategy to protect the rights of women in this field, while ensuring a productive working environment’.

‘We need to emphasise the fact that the communication has to be effective, and address the types of communication because not all kinds of communication are relevant. It is the duty of senior managers to meet with relevant stakeholders on a regular basis to confirm if the processes of communication are effective and if it addresses the needs of the role players’.

The researcher’s comment was:

‘When the lines of communication are open, a healthy working environment is promoted, and misunderstandings are eliminated. It has come to light that although mine management is communicating change management implementation, to a degree, there is a noticeable lack of engagement with them. Managers should foster a positive working environment by managing their teams in a transparent and equitable manner, promoting a culture of involvement and consultation, as well as recognising positive contributions made by employees’.

Extract #2 Round 2

'In promoting the role of women in mining or any other industry, I believe Employment Equity should be emphasised in all corners of the workplace that will ensure the growth of women in top roles. The company must ensure that it takes the right direction to leadership roles, in that way it will attract women into business and again they will be preparing those who are currently in the business for management positions.'

'Recently the number of women in core business skills has increased, women do contribute to a certain percentage of the total workforce, and I believe the total participation of women across the management level should also grow.'

The researcher's comments were:

'Fast-tracking of women in mining industry can happen if the employers can adhere to the principles of EEA. Mining houses should strive to identify and implement initiatives that will promote and execute gender transformation issues.'

'Change is becoming a long-standing feature of organisational life. However, while many organisations welcome the need for change, they require new technology to do things differently (Knowles 1998:373), many of them accepted that their change management programmes do not always achieve their intended consequences. To ensure that change is managed effectively, it is the employer's responsibility to introduce change and analyse the effect of the change process (D'Ortenzio 2012:13). For organisations to implement change effectively, Pakalnis (2015:9) agreed that buy-in from all stakeholders is essential in enhancing the importance organisational change.'

'It is true that the number of women in the organisations including the coalmine is increasing. Mine management need to transform the coalmine industry, by training and promoting capable WIM (Kontos & Poland 2009:5).'

Extract #3 Round 2

'Change is always necessary but never easy. When change is managed by including all parties it goes a long way to inform, increase confidence and ease the ability of management to lead.'

'Policies and procedures go a long way in ensuring compliance of most actions in the workplace. Testing ideas before implementation strive to have an informed staff. Problems need to be tackled head on. As the mining industry comes from a long history of male domination, we should educate and encourage people to change. Identify the change and take active and deliberate attempts to embrace the change.'

The responses of the researcher were:

'When change is introduced, all stakeholders (in this study management, mineworkers and union representatives) should be part of the process. This improves teamwork and increases trust amongst the stakeholders. There is a need for collaboration between mine management and mineworkers, especially women, to improve their work relationships by being supportive and creating conducive work environment. That environment will in turn yield positive results where these mineworkers will perform optimally and improve production (Campbell 2012:1)'.

'Most organisations have good policies and procedures; however, the challenge is on the implementation of those policies. Mine management need to develop some strategies, put them (strategies) in place and ensure that all mineworkers adopt and work according to such strategies'.

From the deliberations through the online engagement and evaluation, the researcher sought verification from an external expert. This process became the refinement phase of the guidelines.

6.9 REFINEMENT OF THE GUIDELINE FORMULATION PROCESS

The external expert provided virtual comments on structuring and wording of the guidelines as shown below.

"Thank you for the opportunity to review the guidelines developed for women mineworkers in a coalmine in Mpumalanga. I have gone through the eight (8) guidelines and after reviewing them I realized that something is missing in all of them. Starting from the beginning to the end, I am not sure if you did not give me everything deliberately or this is what you have. I am of the opinion that currently you don't have guidelines but it looks more of broad recommendations for the coal mining industry. If these 8 items that are in front of me right now are guidelines, they should have a step-by-step process or procedure to be followed by coalmine management in ensuring them. For instance, how is management going to ensure a supportive organizational environment wherein women mineworkers can function to their full potential? There are pieces of information that are needed to do so. The eight items that you have currently are too broad and they need strategies to ensure them. I am not sure if the word "ensure" is appropriate for a guideline unless you are still going to develop them further or already such content is available to do so."

6.10 RIGOUR OF THE GUIDELINES

Through the E-Delphi reiterative communication loop, the researcher ensured credibility of the guidelines. According to Engles and Kennedy (2007:436), this is regarded as member checks. To

make sure that dependability was achieved, the researcher included a range of experts (Cornick 2006:64). Confirmability was assessed by maintaining a detailed description of the E-Delphi data collection and analysis process, while transferability was established by verification of the applicability of the E-Delphi findings. The researcher provided the experts through the E-Delphi with the draft guidelines as well as the AGREE II criteria to use for evaluating the quality of the guidelines.

6.11 DESCRIPTION OF THE FORMULATED GUIDELINES

Eight guidelines were formulated together with their scope and purpose. Each guideline has a description, rationale, how to operationalise the guideline and the anticipated outcomes.

EIGHT GUIDELINES FOR AN OCCUPATIONAL HEALTH AND SAFETY PROGRAMME TO ADDRESS WOMEN'S HEALTH CONCERNS OF MINeworkERS AT A SELECTED COALMINE IN MPUMALANGA, SOUTH AFRICA

6.11.1 PURPOSE OF THE GUIDELINES

The formulation of the guidelines for an OHS programme to address women's health concerns of mineworkers in this study is quite essential not only to women mineworkers in South Africa but to all women in mining. To accelerate in addressing women's health concerns in the coalmines, these guidelines may assist in empowering women in mining, professional nurses working within the mining industries as well as mine management in addressing women's health-related concerns. As indicated in the Mineral and Petroleum Resources Development Act No 28 of 2002 (South Africa 2002), this guideline is amongst the few to assist mine management in promoting a supportive work environment. It is paramount that such an environment includes accepting that women participate at all levels within the workplace to improve work relations. Promoting equal opportunities and equity in the workplace and eliminating unfair direct and indirect discrimination against women workers is of critical importance. The purpose is to achieve the goals of the Constitution of the Republic of South Africa of human dignity, equality, freedom and human rights.

6.11.2 SCOPE OF THE GUIDELINES

The guidelines are applicability to the selected coalmine to address women's health concerns in OHS programme with enabling policy and management processes. With the increased employment of women in the traditionally male dominated environment, multiple challenges confront women. Due to insufficient published data on how to address the health concerns of women in mining, these guidelines are expected to assist the mine management and the

professional nurses in providing suitable health care services to women mineworkers and to promote and protect the human dignity and equality of women in mining.

Guideline # 1: The mine management and professional nurses to create effective measures to enforce change management and supportive organisational environment wherein women mineworkers can function to their full potential

Change management refers to the way people, teams and companies change, using different methods to re-direct utilisation of resources, allocation of budgets, business processes, or any other plan of work that will transform the organisation (Rijal 2009:132). Szamosi and Duxbury (2002) see change management as an integral part of most organisations. The coal mining industry in South Africa is faced with huge challenges which need to be addressed to accomplish and attain the standards of the international mining industry and women empowerment.

Rationale

To promote change simultaneously and encourage the uptake of change among the employees, management should strive to change management values, organisational practices and improve communication and employee involvement in the workplace. Coalmines must follow the current developments that are used in the mining industry. Checking how the mine compares against other mining houses, introducing new technology and evaluating their own approaches, may assist in bringing change, which will increase productivity, decrease costs and make the company sustainable for women miners (D’Ortenzio 2012:4; Pakalnis 2015:6). For change management to be visible, suggestions from mineworkers, regarding their working conditions should be considered and be implemented to promote change. Communication is an integral part of the change and the change process (Duck 1993; Kotter 1995; Freda, Arn & Gatlin-Watts 1999).

Operationalisation of effective measures to enforce change management in the mining industry

Mine Management

- Changes in policy and procedure may have a positive effect if mine management enforce policy correctly and if they are adhered to by all workers to create a supportive work environment for women mineworkers.
- When a policy is outdated or irrelevant, it is essential for mine management to assist the supervisor in updating it. The supervisor and the committee should schedule regular reviews

and evaluation of existing policy and make suitable changes to ensure that policies are gender responsive, and promote women empowerment and equity.

- Women should be empowered and encouraged to participate at all levels of management to contribute to policies that improve their work environment.

OHS Professional Nurse

- When a policy is outdated or irrelevant, it is essential that the professional nurses notify the section supervisor. The professional nurses should assist mine management and mineworkers in reviewing the existing policy and make suitable changes to make policies responsive to women's health concerns.

Mineworkers

- Workers, through their union representatives, should be empowered to understand and participate in developing gender responsive policies and practices.

Anticipated Outcome

Women mineworkers experience equality and equity in an enabling workplace environment where everyone is able to fulfill their full potential.

Guideline # 2: The mine management and professional nurses to create effective measures for controlling hazardous environments that affect women mineworkers' health

A hazardous environment in mining can be defined as an area that can cause harm or damage to humans, property and or a place and if possible, no one should be exposed to such an area for long periods (Basic Conditions of Employment Act, No 75 of 1997; Chemical Substances Regulations, 1995). In the case of coal mining statutory mandates of the mining industry in South Africa must facilitate endorsing policies and methods that strive to maximise the levels of safety while minimising work-related accidents and illnesses. The Code of Good Practice on the Protection of Employees during Pregnancy and after the Birth of a Child (Section 5) emphasise that every employer should provide at least four months maternity leave and ensure that the pregnant or nursing womenis prohibited from performing work that is hazardous to her health and that of her baby.

Rationale

Coal mining endangers human life due to the release of noxious and poisonous gases (Singh 2013:79). The production of noxious gases when coupled with climate change coal mining is linked with hazardous environmental effects such as spontaneous heating and fire in coalmines. Henceforth, aspects such as the wearing of PPE while working are vital in the mining sector. Reasonable precautionary measures are considered to eliminate hazards and substitute the hazardous materials or machines with ones that are less hazardous ones to women mineworkers' health.

Operationalisation of effective measures for controlling hazardous environments that affect women mineworkers

Mine management

- It is essential that mine management performs a risk assessment to identify risk and hazards associated with that particular work environment. Such assessment determines the method of controlling workplace hazards, which will minimise and prevent costly, time-consuming, stressful and inconvenient incidents.
- Mine management should train and supervise mineworkers when working, to ensure that the correct personal protective clothing is always worn when on duty.
- Mine management should ensure that supervisors train newly employed women mineworkers when using new equipment.
- Mine management should supply appropriate safety and personal protective equipment.

OHS Professional Nurse

- Professional nurses should perform a risk assessment to identify risk and hazards associated with a particular work environment, with a view to preventing illnesses associated with the identified hazards.
- Professional nurses should encourage mineworkers to express concerns and suggest improvements on health and safety issues, for example, through safety talks and safety meetings.
- Professional nurses should identify safety needs, communicate safety hazards and investigate hazardous conditions and accidents.

Mineworkers

- Mineworkers should be exposed to continuous safety training until they are familiar and

experienced mineworkers.

- Mineworkers should wear PPE as well as dust masks to prevent dust related illnesses throughout their shift.
- Mineworkers working in noisy environments such as bore-hole areas should always wear their Hearing Protective Devices (HPDs).

Anticipated outcome

Women's health concerns are addressed through effective measures for controlling hazardous environments that affect mineworkers' health.

Guideline # 3: Mine management and professional nurses to create effective measures for suitable psychosocial working environment to ensure fit for work and fit for life for women underground mineworkers, within the coalmine context

The psychosocial working environment refers to interpersonal and social interactions which influence development and performance in the workplace. The term is associated with that part of the workplace which has to do with the nature and content of the work, the organisation of the work, and the social relations as well as the conditions under which the work is performed". Psychosocial working environment usually affects employees' physical and psychological health status that includes work performance and effectiveness (Schnall et al. 1994: 381; Bond & Punnett 2007:3).

Rationale

The mining industry is the most high-risk workplace with a large number of traumatic accidents. There are multiple traumatic stressors which lead to psychosocial working disorders such as post-traumatic stress disorder (Zungu 2013:22) with common post-traumatic stress disorder (PTSD). In South Africa, PTSD was not considered a work-related injury, until the Compensation for Occupational Injuries and Diseases Act (COIDA) No. 230 of 1993 as amended came into effect. Since COIDA came into effect, PTSD is now considered as a work-related issue. A suitable psychosocial working environment in SA is endorsed by the three pieces of legislations: Broad Based Socio-Economic Empowerment Charter for the South African Industry and the Compensation for Occupational Injuries and Diseases Act No. 230 of 1993. In addition to the pieces of legislation, the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 (COIDA) as amended, outlines the process that is to be followed when employees are to

claim work-related injuries or illnesses that might cause them not to be either fit for work or life.

From this study, women mineworkers indicated anxiety and mental stress, due to the heavy work and shift work they are engaged in. Research studies suggest that WIM are very diligent, committed, reliable, manageable, organised, neat, punctual, attentive, more so than their male colleagues. One of the aspects that hinder the fit for work and fit for life notion in the mining industry is the issue of gender stereotypes ascribed to reproductive issues such as regular menstruation as a signal for woman's health and fertility. From the study, menstruation is not perceived as 'feminine' by male colleagues of the WIM. Hence, WIM is expected to hide menstruation and go to great lengths to conceal it while working underground with male counterparts.

Strategies to operationalise a suitable psychosocial working environment

Mine Management:

- Collect and disgregate data by gender in regular monitoring, evaluation and reporting.

OHS professional nurse

- Establish a health and safety committee that works hand in hand with mine management, unions and mineworkers.
- Fit for work and fit for life work environment for women underground mineworkers, within the coalmine context should be psychologically, socially and physically conducive, so that women can perform their duties optimally.
- Medical surveillance is done to determine mineworkers' fitness to work, including the capability and strength which are measured by conducting the physical work capability and functional work capacity assessments.
- Such evaluations are done to determine if mineworkers can cope with the demanding work underground. The lung capacity, vision, hearing and x-rays of mineworkers are also evaluated periodically or annually, upon employment or pre-employment, and also when the employee is transferred from one workplace to another to ensure that the employee is fit for work in that particular area of work.

Mineworkers

- Mineworkers are responsible for adhering to the guidelines of their safety programme to ensure that they are fit for employment and for adhering to all safety rules, safe work

procedures, and wearing and using personal protective equipment when required.

- Mineworkers are responsible for participating in safety training programmes and informing supervisors of any unsafe working conditions.

Anticipated Outcomes

The psychosocial work environment of women enable fit for work and fit for life for all mineworkers.

Guideline #4: Mine management and professional nurses to create effective measures for healthcare service to ensure a supportive and conducive environment in which women mineworkers can express their health concerns in the coalmine context

Globally, the mining industry is an economic stepping stone for women (Labonne 1996:119). Employment of WIM in SA started around 2004 (Response to Mining Charter 2007:2). Women have individual health and safety needs due to their anatomical and physiological features (Zungu 2012:6). Women's physique and anatomical structures are not designed to carry heavy equipment like their male counterparts in the mine or any other workplace. (Zungu 2012:6; Van Aardt et al. 2008:11). It is for this reason that women in mining are classified as a vulnerable group of workers by the International Labour Organisation (ILO). Of importance, is that women mineworkers suffer from the occupational health related diseases such as muscular-skeletal and reproductive ill health compared to the men mineworkers. Here then it becomes essential that healthcare services in the mining industry should be available and gender-specific to support and cater for the needs of both women and men.

Rationale

Legislation in the mining industry sets the stage for the provision of health care in, as well as the employment structures, the type of work and the risks associated with work. A high number of occupational diseases occur annually (Hermanus 2007:533). All these conditions and illnesses warrant a strong health care provision strategy as endorsed by the DMR in South Africa.

The need for a gender-specific health care provision is required by the Convention on the Elimination of Discrimination Against Women (CEDAW) to addresses the "distinctive features and factors that differentiate between women and men, such as pregnancy and menstruation".

Strategies to operationalise health care service that supports the health needs of women mineworkers

Mine Management

- The working environment should always be conducive for women underground mineworkers. Such health care should include education, training and empowerment of women mineworkers where their rights are concerned.
- Mine management should be committed to maintaining an Occupational Health and safety programme to ensure that the goals of women's health are met.
- Mine management to be responsible for enhancing safety consciousness to all workers.
- Mine management to ensure that all their mineworkers are trained in safe work procedures to obtain optimal output without accident or injuries.

OHS Professional Nurse

- Professional nurses to be advocates for women's rights and render services that meet the health rights of women, including their reproductive and sexual health rights.

Mineworkers

- All mineworkers to support the occupational health and safety programme and integrate effective health and safety practices into their daily activities with a special focus on meeting the needs and health concerns of women,

Anticipated Outcome

Women receive appropriate and accessible health care that are in line with their human rights and employers' duties to give effect to women's rights, including health rights.

Guideline #:5 Mine management and professional nurses to create effective measures to uphold the human dignity and adherence to a human rights framework of non-discrimination against women mineworkers.

Women still face challenges and obstacles in workplaces where they are unable to have the pleasure and enjoy their human rights as required in the Bill of Rights. The principle of human dignity is a universal affirmation that people have the highest value. Various articles and protocols endorse human and women's rights by calling on States to ensure the rights of women throughout the life cycle such as the Vienna Programme of Action and the Cairo Programme of Action on

Population and Development. There is still a lack on parameters of discrimination regarding the workplace, except to be given a definition of being disadvantaged or being unfairly treated (Adu-Oppong 2015:3; Channer et al. 2011:179).

Women in the workplace have less social power than men. Such social control exposes women to be at risk of being abused by their male counterparts. Additionally, these women feel belittled and frequently regarded as less entitled individuals who are always neglected and treated with arrogance. (Adu-Oppong & Arthur 2015:12).

Rationale

Women work harder to counteract gender stereotypes that they cannot perform like their male counterparts. Irrespective of their hard work, WIM continue to experience negative utterances from the men mineworkers. One of the challenges that WIM experience is isolation, where women find themselves working alone amongst men underground mineworkers. Such situations expose WIM to derogatory utterances from the men underground mineworkers without witnesses. In South Africa, there is no regulation that prohibits an employee from working alone. However, employers still have normal legal duties as stipulated in section 21 of the OHS Act No. 85 of 1993, that the employer shall provide and maintain as far as is reasonably practicable for an employee a working environment that is safe and free of risks to health. Women underground mineworkers felt isolated, around the male colleagues. Hence it is important for the mine management to allocate underground women and men evenly to prevent isolation.

Strategies to operationalise human dignity and adherence to human rights framework for non-discrimination against women underground mineworkers

Mine Management

- Mine management should put measures in place, which will accommodate and protect women's rights as human rights, as endorsed by various United Nations (UN) articles and protocols such as the Beijing Declaration and Platform for Action and CEDAW.
- Mine management is to ensure that male mineworkers adhere to such measures. Such behaviour would create an appropriate place of work for all mineworkers.
- Mine management is to implement safe work procedures and make compliance a condition of employment for all mineworkers.
- Mine management is responsible and accountable for ensuring that mineworkers

understand and use safe work procedures.

- Mine management is to educate mineworkers about the risks and safe work procedures by exposing workers to health and safety education.
- Mine management and supervisors are to orientate all new employees and employees transferred to new jobs to avoid humiliation.
- Mine management is to provide appropriate, safe ablution and sanitary facilities to avoid humiliation and promote human dignity of workers.

OHS Professional Nurse

- Professional nurses are to educate mineworkers on the risks and safe work procedures by exposing women and men to health and safety education
- Professional nurses are to promote and protect human dignity of mineworkers.

Mineworkers

- Everyone the right to human dignity, equality and freedom; which need to be respected, protected and promoted fully. This also applies in the underground mining context.
- All mineworkers and those at risk are responsible for ensuring the safety of all mineworkers at the selected coalmine.

Anticipated outcomes

Men respect gender equality and equity in health and safety in all work procedures to attain women rights in mining.

Guideline #6: Mine management and professional nurses to create effective measures for safety participation compliance to ensure adherence to safety procedures in reporting work-related accidents and injuries

Safety participation compliance is referred to as an agreement where employers, workers and worker representatives are adhering to work safety and ensure that the injuries and illnesses are reported and attended to as stipulated in the COIDA and OHS. According to Neal et al. (2000:101), it is essential that performance elements depict the magnitude of the job-relevant behaviours included in every task at hand. The safety compliance constitutes the adherence to safety measures in every task performed and assisting workers in working safely.

Rationale

The mining industry in South Africa operates within the parameters of the Mine Health and Safety Act No. 29 of 1996, the Basic Conditions of Employment Act No. 75 of 1997, the Constitution of Republic of South Africa Act No 108 of 1996, OHSA No 85 of 1993, as well as the Compensation for Occupational Injuries and Disease Act (COIDA) No 130 of 1993 and Occupational Diseases in Mines and Works Act No 78 of 1973. The nexus of these pieces of legislation is about the health and safety measures for the mineworkers regarding normal hours of work and overtime except in the case of an agreement. In the current study, it was found that non-work illnesses were addressed differently from work-related injuries. In the case of or non-work illnesses, the policy was that sick mineworker's report at the OHSC for assessment and then be referred to his or her private doctor, public hospital or clinic as mineworkers have a subsidised medical aid scheme which allows them to consult their private doctors.

In the case of work-related injuries, the employee reports the injury to the immediate supervisor who in turn arranges transport for the injured employee to be transported to the surface area, where the ambulance transports the injured employee to the OHSC. At the OHSC, the injured employee is assessed and treated if the accident is minor. If the injury is serious, the injured employee is transferred to the private hospital. The divergence indicates a preference over injuries than illnesses of the mineworkers.

Strategies to operationalise safety participation compliance

Mine Management

- Educate employees on the importance of reporting accidents and illnesses and discourage mineworkers from hiding these incidents, including when women are involved. Ensure that such reporting is treated with privacy and confidentiality.
- Establish Occupational Health and safety policies and procedures that are inclusive and responsive to the gender needs and health concerns of women, and provide training on revised policies.
- Provide general direction to supervisors and mineworkers about their responsibilities and roles in providing a safe and healthy workplace for women, with specific direction to safety representatives and ambulance personnel.

OHS Professional Nurse

- Ensure that the process of reporting both injury and illness is done ethically with privacy.

- To review reports and other information about health and safety in workplaces performing similar work, as well as general information about workplace injury and disease prevention, to improve the existing OHS programme.
- To perform continuous evaluation and monitoring to determine risks and necessary corrective measures to prevent unsafe work conditions from developing with health personnel and safety representatives.

Mineworkers

- Work-related injuries and illnesses should be reported according to the legislations, whether or not women are involved.
- Men are to support women co-workers to prevent accident or injury
- During each task performed in the workplace, hazards to be identified to eliminate or minimise the potential for injuries, disease, or loss of life, with consideration of women's specific needs.

Anticipated Outcome

Women fully and effectively participate in a healthy and safe work environment that complies with regulations and standard operating procedures.

Guideline #7: Mine management and professional nurses to create effective measures for accessibility, availability and relevant on-site health care services to promote women mineworkers' health and wellbeing

It is scientifically proven that women utilise healthcare services more often than men. It is a known fact that a workplace with strong primary health care systems always yields better health results and job performance at a cheaper cost. In the case of mine work which is labour-intensive coupled with hormone cycles of women mineworkers, demand accessible, available and acceptable health care services. Health care service access refers to "having timely use of personal health service to achieve the best health outcome" (National Healthcare Quality Report 2011). Scheffler et al. (2015:2) describe medical service as a basic human right in which individuals receive the health care of high quality without fear of favour, to the satisfaction of people. Furthermore, the access to health care service comprised of three steps that is entering the health care system, getting access to sites of care where patients can receive needed services and finding health care providers who meet the patients' needs. This makes the client to develop trust in such a system.

Rationale

Access to health care services is one of the concurrent rights which are embedded in the Constitution of the Republic of South Africa Act, 108 of 1996. Reproductive health care services are amongst the health priorities that are endorsed by SA health legislations. Coalmining endangers human life and healthcare access is constitutionally enshrined for all, including mineworkers. Access is an opportunity and freedom to use appropriate services by users that encompass appropriate service utilisation. Accessibility of the healthcare service in the mining industry may improve the mineworkers' quality of life which may increase productivity.

In this coalmine, access to the primary healthcare services that includes HIV and AIDS treatment, antenatal care, postnatal care and family planning, were a challenge. Accessibility was not only the barriers to healthcare for the mineworkers in this coalmine; but affordability, availability, and acceptability were of great concern. On a daily basis, the OHSC closes at 16:00; which is a challenge to mineworkers especially women who need services such as family planning around the clock. Monitoring of chronic conditions such as HIV and AIDS was offered by an outsourced health service provider.

There was an excessive information gap about healthcare access, and even health policies in this selected coalmine. For example, pregnancy in a workplace policy is known as the FLD.HSEC.STA.031:2012 [Functional Level Document. Health, Safety, Environment and Community Standard]. The aim of this policy is to protect women mineworkers during pregnancy and after childbirth. From the study, it was found that women mineworkers were not familiar with this policy.

Strategies to operationalise accessibility, availability and relevant on-site healthcare services to promote women mineworkers' health and wellbeing

Mine Management

- Mine management to ensure that appropriate healthcare is available to all mineworkers in the coalmine context to protect their right to health.
- Mine management to monitor and evaluate the appropriateness of the healthcare service rendered to the mineworkers.
- Mine management and supervisors to respect privacy of mineworkers' health related matters

- Mine management to provide appropriate 24 hours healthcare services to all its mineworkers
- Mine management to take steps in promoting equal opportunities in the workplace by eliminating unfair discrimination against women workers in relation to the provision of healthcare.

OHS Professional Nurses

- Professional nurses in the OHS Centre should have healthcare workers who attend to the workers' health challenges, holistically and 24 hours of the day.
- Occupational Health personnel (together with management) to provide mineworkers with the information, instruction, training, and supervision necessary to protect their health and safety, including information on women's health and men's health.
- Occupational Health workers to consult and cooperate with individuals carrying out Occupational Health and safety duties (including ambulance personnel, health and safety committee members, safety representatives and first aid officers).
- Health workers to refrain from divulging mineworkers' health matters to management and supervisors. Health personnel to always adhere to confidentiality respect and privacy of mineworkers.

Anticipated Outcome

Women access relevant on-site health care services for optimal health and wellbeing

Guideline #8: Mine management and professional nurses to create effective measures of hope and resilience for women underground mineworkers in a coalmine context.

Scholars such as Snyder et al. (1991:571) and Diffenderfer (2014:40) define **hope** as "a positive motivational state that is based on an interactively derived sense of success". This involves agency (goal-oriented energy) and pathways (planning to meet goals).

Resilience, on the other hand, is described as the ability to bounce back and cope successfully with a system despite adverse circumstances of that particular situation (Adger 2000:349; Youssef & Luthans 2007:778). When people have hope, they can keep going regardless of what life offers to them; and with hope, individuals find meaning, begin to see a future and cope with things that come their way (Yohani & Larsen 2009:248). As much as there are challenges regarding the

women's health concerns in mining, the study highlighted opportunities to encourage hope and resilience in women.

Rationale

In this study, besides the circumstances of mining being perceived as a hostile and unfriendly environment, which is meant for men, women continue to work and cope with underground shift work. Such resilience was attested to by the low rate of absenteeism for women compared to men; as alluded to by the mine management. Redesigning PPE and use of toilet and menstruation technological devices such as she-wee were introduced. These attempts show signs of a quantum leap in the mining industry that acknowledges women underground mineworkers and give hope for the future.

Operationalisation of hope and resilience for women underground mineworkers in a coalmine context

Mine Management

- Develop family-friendly employment policies for example policies that permit flexible working hours for women.
- Review policies for gender responsiveness.
- Improve women's work environment and inspire hope and resilience.
- Evaluate and monitor the working relationship between women and men workers and management, and promote mutual trust.
- Mine management to advance women's health by transforming hostile and sexist work environments.

Mineworkers

- All mineworkers to respect the human dignity, freedom and equality of women and men at all times.

Anticipated Outcomes

Women choose mining as a career to meet their aspirations for quality of life.

6.12 SUMMARY

This chapter focused on phase two of the research. The chapter discussed the entire process of how the guidelines were formulated. The researcher used an E-Delphi process through three phases for the drafting, formulation and refinement of the guidelines. These phases were preparatory phase, exploration phase, consensus and verification phase.

The E-Delphi was utilised because it allowed experts who were unable to convene in one place to discuss and take decisions on the formulation of guidelines. The researcher used the AGREE II tool to evaluate the methodological rigour and transparency in which a guideline is formulated, and the methodology of how the guidelines to address women's health concerns of mineworkers at the selected coalmine were drafted and formulated. To design the e-platform, three phases were followed which were: the preparatory phase, the exploration phase and the consensus phase. The researcher designed and posted the 7-point Likert scale on the e-platform where the experts evaluated the guidelines. The evaluation of guidelines occurred in 2 e-rounds, and consensus was reached in the second phase. The refined guidelines were formulated, and eight guidelines were verified.

The next chapter outlines the detailed recommendations and conclusion to ensure that the women's health needs at the selected mine are addressed.

CHAPTER 7

SUMMARY, CONCLUSION, IMPLICATIONS, LIMITATIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

The researcher worked for almost two decades as a professional nurse in different coal mining industries in Mpumalanga, South Africa, with a specific focus on the women mineworkers' health concerns. The ongoing referrals for counselling of women who had miscarriages and those who were willing to have babies despite the hazardous work environment, prompted the researcher to explore the risks these women were exposed to within their work environment. The richness of this experience provided a framework and context for the researcher to design the research, collect, analyse and interpret the data and to develop guidelines for an occupational health and safety programme for women's health.

7.2 OVERVIEW OF THE METHODOLOGY

In **phase 1**, the researcher explored and described the women's health concerns of mineworkers in the selected coalmine. This phase included exploring and describing the perceptions of the professional nurses working at the OHS centre on women's health concerns, as well as the mine managers' views on expectations of guidelines incorporating women's health services into the existing OHS programme. In **phase 2**, the aim was to draft formulate draft guidelines to incorporate women's health services into the current OHS programme. Additionally, **phase 2** was intended to refine the formulated guidelines.

Bronfrenbrenner's Social Ecological Model (SEM) guided the researcher to understand the different systems related to women's health in the coalmine environment. These were micro (individual), meso (relationship with the context), exo (institutional context), and macrosystems (socio-cultural context). It was through these systems that the researcher connected with participants during the data collection stage (McLaren & Hawe 2005:10). During interaction with the participants, the researcher gained insight into the interdependence of aspects within and

across all levels of the women's health spectrum (Croyley 2005), and how the health of women underground mineworkers was influenced by the work they performed. It also became clear that individuals have different experiences and perceptions while in the same environment.

During phase one of the study, the researcher followed a single holistic case design. In order to gain insight and understanding of the study over a period of time, it was appropriate for the researcher to include different populations. These populations were: women underground coalmine workers, professional nurses at the OHS centre and mine managers. With this method, the researcher viewed different populations within one environment as relevant. The single holistic case study design enabled the researcher to capture women's health concerns in much more detail and in context. Previous studies have revealed that in the coalmine context the boundaries between women's health concerns were not evident (Yin 2014:2), hence the researcher chose to follow the single, holistic case study design.

The researcher collected rich data from each study participant to address the study questions. Semi-structured interview protocols were used. By asking open-ended questions, the researcher could broaden the scope and allow the participants freedom to relate their experiences and health concerns. The researcher interviewed the women underground mineworkers to get the details of their health concerns, followed by interviewing the professional nurses, and finally mine management. In this way, the researcher avoided being influenced by the ideas of managers before identifying the health concerns of women mineworkers.

The researcher's concurrent data collection and analysis offered her an opportunity to analyse data based on examining, categorising, tabulating and testing the qualitative evidence to address the research questions. This meant that when analysing the validity in content analysis, there were factors considered when reporting the process of analysis and the results. The credibility of the research findings indicated how well the categories incorporated the data analysis process and the validity of results (Graneheim & Lundman 2004:109). The advantage of the process was that there was no generalisation, since the study was inductive and facts were presented to the researcher by all participants. Previous studies used theoretical propositions in some case studies to shape the data collection plan and analytical strategy (Yin 2014). However, the researcher did not use theoretical propositions but used an interview guide to shape the data collection. The researcher used inductive content analysis as described by Elo and Kyngäs (2008) to analyse the data, hence no generalisation was involved in the study. The researcher believed that the decisions and processes regarding the coding approach and techniques were utilised in establishing the

trustworthiness of the qualitative study. Patterns, themes, and categories were retrieved in the data.

The objective of **Phase two** was for the researcher to draft and formulate guidelines to address women's health concerns of mineworkers in a holistic and seamless manner once implemented, as part of the OHS programme at the selected coalmine. Through the podcast and e-platform, the researcher gained information from the experts who assisted her in the drafting of the guidelines. During this phase, the researcher used the E-Delphi technique to obtain a collective view from individual experts on the guidelines formulation. To gather diverse ideas, the researcher identified experts and invited them to participate in the study. Following a preparatory, exploratory, consensus and verification phase, the researcher could formulate the guidelines. After refining the guidelines, the researcher and the experts reached consensus on the adoption of the guidelines. A set of eight guidelines was developed for implementation by the professional nurses at the OHS centre and the mine managers at the selected coalmine.

7.3 CONCLUSIONS OF FINDINGS

7.3.1 CONDITIONS IN THE UNDERGROUND ENVIRONMENT

Through interaction with the women mineworkers, they explained the situation they are exposed to in the underground environment. Working in an unsanitary environment with no water to drink, nothing to eat and no accessible and appropriate ablution facilities for 8-hour shifts or longer may contribute to susceptibility to illnesses. In addition, women endure harassment by male supervisors and male colleagues, in the name of production and targets to be met. Some mine managers said that coalmine pays the women better salaries, so in return, they should work under those dirty work conditions. This is a concern that requires a management response. Managers acknowledged the gaps and committed to working towards improving the working environment.

7.3.2 SERVICES AT THE OHS CENTRE

Women mineworkers have access to OHS programmes as part of their employment conditions. In this study, the findings indicated that the participants were not happy with the limited range healthcare services rendered at the OHS centre. The professional nurses alluded to insufficient resources, both human and financial, which have an adverse impact on women's health services. The primary healthcare programme is a basic medical need as any health sector. This this has been confirmed by managers during the interaction. However, at the mine, mineworkers are

referred to their healthcare provider off-site, which makes healthcare time-consuming and poses a risk to a sick mineworker.

The OHS centre at the selected coalmine renders OHS services related to compliance to the OHS statutory and regulatory requirements. It does not render primary healthcare services, including contraception and HIV prevention services. Although the professional nurses indicated that they were not fully rendering the health care service based on their training and scope of practice, they also indicated that they also had to comply with company policies. Not rendering primary healthcare and referring the sick mineworker to her own doctor illustrated this practice. On the other hand, the mine management gave the researcher the impression that the OHS centre was rendering services which included primary healthcare and occupational health care. Women mineworkers related to the researcher that they no longer report illnesses at the OHS centre because it was a waste of time. Instead they consulted their doctors and brought the sicknote back to work with them. It is advisable that the selected coalmine considers rendering primary healthcare as is the practice at other sister-mines. According to literature, a workplace with a strong primary healthcare system always yields better health results and work performance at a cheaper cost (Starfield & Shi 2002:211).

The OHSC centre's operating hours do not accommodate shift workers. Consequently, mineworkers are unnecessarily absent due to the travel distance of 55km to consult a private healthcare practitioner after hours. Health information resources, awareness and education about health promotion, include only day shift workers and those with computer access.

At the OHSC, health information was captured on electronic databases and manual registers, to be accessed by the hygiene department, human resources department and risk department. Such data is used for statistical purposes. Professional nurses capturing the information ensure that medical confidentiality is maintained. The information is captured in a way that is easily retrievable, protected against damage, protected against loss, stored for forty years after the last medical examination, stored in a fire-resistant archive and in privacy, as stipulated by section 15 of the MHSA. In this study, however, the female participants felt uncomfortable when they were requested by the professional nurses at the OHS centre to bring a letter from the doctor stating the method of delivery after giving birth, before being allowed back to work.

An HIV and AIDS awareness and education programme offers partial voluntary counselling and testing for all mineworkers. However, the treatment is a concern because it is rendered and administered by the external health service provider. The Employee Assistance Programme and

Counselling is available, but one needs to travel 55 km away from the workplace or wait for the external service provider who comes once a week for a specific limited period to render such a service.

7.3.3 GENDER RELATIONS, STEREOTYPES AND EQUITY

Participants in the study acknowledged transformation in the country that enabled them to be incorporated into the mining industry and given employment. However, a traditional and misguided belief that women cannot do a variety of mining jobs, coupled with the absence of career development support, makes career development very difficult for women; they may be stuck in their first jobs for years. Some of the women, especially the learners, were concerned about not knowing whether they would be appointed permanently by the coalmine after finishing their six months' training. Few women succeeded to climb the ladder from general worker to a learnership, before the appointment to a permanent position. Women also fought to be considered for those learnerships at the selected coalmine. This contributed to a great deal of dissatisfaction and unhappiness about the handling of promotions at the selected coalmine.

Women who were working in the underground environment were mostly of child-bearing age. They were exposed to this environment not necessarily by choice, but because of the lack of alternative viable employment in the geographical area where they reside. The human rights framework provides protection for women living and working in these circumstances. Specific measures have been put in place to ensure that women are not discriminated against and are not treated unfairly in the work environment. Moreover, employers are obliged to promote women's empowerment, development and inclusion in decision-making (for example Beijing Declaration 1996:10). Various human rights instruments emphasise that men and women have the right to live their lives and raise their children in dignity, free of hunger and fear of violence, oppression or injustice. Mine management at the selected coalmine acknowledged that there is still more to be done to engender the mining industry and to attend to women's health concerns.

In this study, some of the women underground mineworkers indicated that they are not permitted by their supervisors to report work-related accidents and injuries. Barker et al. (2002:6) indicates that young workers are prone to work-related injuries due to a lack of work experience and skills. In this mine, supervisors discourage women from reporting accidents and injuries, arguing that they would be disqualified for receiving safety bonuses due to the reported injuries. Cornish (2008:15) agrees that women are often bullied to appear as if they lack decision-making skills in occupational health and safety.

At the mine, women perceived a slow rate of transformation. Women related that their suggestions submitted to mine management via their union representative to promote change had largely been ignored. This study also found that women felt that the mine management undermines the woman who is a union representative. Although she had been negotiating on their behalf, no progress was made. Mine management kept on telling the woman representative that they were still researching about women's PPE and it was taking a long time. However, mine management confirmed that they have been engaging robustly with the National Union of Mineworkers (NUM) as far as addressing the women's health concerns. According to mine management, NUM is the union with the largest membership at the selected coalmine and they bargain with mine management on matters affecting all the mineworkers, and women in particular. Also, mine management confirmed that they work towards goal attainment with the NUM.

7.4 GUIDELINES RECOMMENDATION

1. Mine management and professional nurses should create effective measures to enable change and create a supportive organisational environment wherein women mineworkers can function to their full potential.
2. Mine management and professional nurses should create effective measures for controlling hazardous environments that affect women mineworkers' health.
3. Mine management and professional nurses should create effective measures for a suitable psychosocial working environment to ensure a fit for work and fit for life work environment for women underground mineworkers.
4. Mine management and professional nurses should create effective measures for healthcare service to ensure a supportive and conducive environment in which women underground mineworkers can express their health concerns.
5. Mine management and professional nurses should create effective measures to uphold human dignity and adhere to a human rights framework of non-discrimination against women underground mineworkers, as well as implementing equity measures to ensure that women are able to participate fully and effectively in mining.
6. Mine management and professional nurses should create effective measures for safety compliance to ensure adherence to safety procedures in reporting work-related accidents and injuries.
7. Mine management and professional nurses should create effective measures for accessibility, availability and relevant on-site health care services to promote women mineworkers' health and wellbeing, including primary health care.

8. Mine management and professional nurses should create effective measures to foster hope and resilience for women underground mineworkers in a coalmine context.

7.5 IMPLICATIONS FOR OHS SERVICE

This study has the following implications for OHS service:

- Improve service and treatment rendering by OHS centre personnel by providing a primary health care nurse;
- Extend the service hours at the OHS centre, to accommodate shift workers;
- Promote compliance with the OHSA and related regulations, and
- Provide accessible, available and relevant on-site healthcare services to promote women mineworkers' health and wellbeing.

7.6 IMPLICATIONS FOR MINE MANAGEMENT

The implications of the study for mine management are as follows:

- Provide a supportive organisational environment wherein women mineworkers can function to their full potential and avoid increasing the number of women could lead to cost savings and higher production;
- Promote effective measures for controlling hazardous environments that affect women mineworkers in a more vigorous and substantial manner to curb absenteeism and increase production and profits;
- Promote a fit for work and fit for life work environment for females underground mineworkers, within the coalmine context. Willingness to emphasise the importance of having women within the work environment could reduce gender barriers and create a more collaborative work environment;
- Provide a supportive and conducive environment in which women underground mineworkers may express their health concerns in the coalmine context, and raise awareness on these issues among their male co-workers;
- Uphold women underground mineworkers' human dignity and other adhere to the human rights framework for non-discrimination against women, including the provision of health services relevant to women;
- Promote the adherence to safety procedures in reporting accidents and injuries and continuous education on this subject, and

- Inspire hope and resilience for female underground mineworkers in a coalmine context and stress the importance of equity in the underground environment.

7.7 LIMITATIONS OF THE STUDY

While there are numerous health and safety risks and service needs within the coalmine environment, which vary from physical, biological, chemical, ergonomic and lifestyle (Berger & Hobbs 2006), this study focused only on the women's health concerns of underground mineworkers at the selected coalmine. The study was limited to the selected coalmine in Mpumalanga. Hence, the transferability of the findings to other populations may be affected. However, the researcher provided sufficient information that could be used by other researchers to determine whether the findings apply to their situation.

7.8 RECOMMENDATIONS FOR FURTHER RESEARCH

The need for further research on a range of issues has been identified in this study, including the following:

Status of women in mining: For the mining sector to be progressive and responsive to the needs of women, there is a need to further research the gendered experiences, needs and concerns of women in mining, and to audit and monitor gender relations in mining.

Research Methods that unmute the voices of women in the mining industry: Researchers must consider the use of research methods that blend several interpretative approaches. Such methods are capable to authentically situate women mine workers in the context of their workplace in detail (Ngunjiri 2007: 3). Such research methods include ethnography and portraiture to capture women's social, cultural, economic, and political realities and bring them to the scientific arena.

Exploration of knowledge theories related to innovation: As research and scholars move into the digital era, technology such as E-Delphi offers an approach to examine research questions that seek to answer questions related to client care, emerging and existing illnesses including those that address mining health concerns. Researchers should re-think the theories that underpin their studies. This study, brought to light how consensus can be reached without face-to face meetings. Such digital research beseeches the use of relevant theories like Anticipation and Responsible Research Innovation.

LIST OF REFERENCES

- Abrahamsson, L., Segerstedt, E., Nygren, M., Johansson, J., Johansson, B., Edman, I. & Akerlund, A. 2014. *Gender, Diversity and Work Conditions in Mining*. Lulea University of Technology. Swedish. 1:52.
- Adams, S., Ehrlich, R., Ismail, N., Quail, Z. & Jeebhay, M.F. 2012/2013. Occupational health challenges facing the Department of Health: protecting employees against tuberculosis and caring for former mineworkers with occupational health disease. In Padarath, A. & English, R. eds. *South African Health Review 2012/13*. Durban: Health Systems Trust.
- Adams, S., Morarii, R., Kolbe-Alexander, T. & Jeebhay, M. F. 2007. *Health and Health Care in the Workplace*. University of Cape Town. South Africa. 2003:103- 122.
- Adger, W.N. 2000. Social and ecological resilience: are they related? *Progress in Human Geography*, 24(3): 347-364.
- Adu-Oppong, A.A. & Arthur, C. 2015. Gender Discrimination in the Workplace: A Study of Women's Participation in the Higher Education Management in Ghana. *Afro Asian Journal of Social Sciences*. Volume VI, No 3. Quarter III: 1-15.
- Ajami, M., Grabner, L., Giambene, G., Le, V., Luong, D. & Pearson, J. Online platform for conducting responsible research and innovations. *Research Challenges in Information Science (RCIS)*, IEEE Tenth International Conference on, 2016. IEEE, 1-2.
- Allen, A. L. 2012. An Ethical Duty to Protect One's Own Information Privacy. *Alabama Law Review*, 64(4):845-66.
- Alvesson, M., 2009. (Post-) positivism, social constructivism, critical realism: three reference points in the philosophy of science." In *Reflexive methodology: new vistas for qualitative research*, edited by M. Alvesson and K. Skoldberg. London: Sage Publications.
- Amiel, T. & Reeves, T. C. 2008b. Design-based research and educational technology: Rethinking technology and the research agenda. *Journal of Educational Technology & Society*, 11(4):29-40.

- Amponsah-Tawiah, K. 2013. Occupational Health and Safety and Sustainable Development in Ghana. *International Journal of Business Administration*. Vol. 4 No. 2:174-78.
- Anderson, C.A. & Anderson, K.B. 2008. Men Who Target Women: Specificity of Target, Generality of Aggressive Behavior. *Aggressive Behaviour*. Volume 34:605–622.
- Angelaki, M. An Introduction to Responsible Research and Innovation. Pasteur4OA. UK. 2006:1-5.
- Anglogold Ashanti. 2007. *Report to Society 2007*. Available from: www.anglogoldashanti.com/en/Media/Reports/Sustainability%20Reports/AGA-sustainable-gold-2007.pdf. 17th August 2010
- Avery, A., Savelyich, B., Sheikh, A., Cantrill, J., Morris, C., Fernando, B., Bainbridge, M., Horsfield, P. & Teasdale, S. 2005. Identifying and establishing consensus on the most important safety features of GP computer systems: e-Delphi study. *Journal of Innovation in Health Informatics*, 13(1):3-11.
- Appleton, J.V. & King, L. 2002. Journeying from the philosophical contemplation of constructivism to the methodological pragmatics of health services research. *Methodological Issues In Nursing Research*: 640-648.
- A Strategic Framework for Implementing Sustainable Development in the South African Minerals Sector: Towards Developing Sustainable Development Policy and Meeting Reporting Commitments. 2007. Discussion Document. Department of Mineral and Energy. South Africa:1-83.
- Ashworth, G. 2003. Audit and diagnostic assessment of productivity in continuous miner sections. *Coaltech 2020*.Task 7.1:1-90.
- Ashworth, G., Molapo, M., Molefe, N., Schutte, S. & Zitha, M. 2004. Human and Social Issues influencing the Incorporation of Women into the Mining Workforce. *Coaltech 2020*.Task 2.8.1. South Africa. Accessed 14/7/2011. Available at: [http://www.coaltech.co.za/chamber%20databases/coaltech/Com_DocMan.nsf/0/9A00B504B65A82CB42257403002A19B2/\\$File/Task%202.8.1%20-%20Women%20in%20Mining.pdf](http://www.coaltech.co.za/chamber%20databases/coaltech/Com_DocMan.nsf/0/9A00B504B65A82CB42257403002A19B2/$File/Task%202.8.1%20-%20Women%20in%20Mining.pdf)
- Badenhorst, C.J. 2009. *Occupational Health and Safety considerations for the employment of female workers in hard rock mines*. The Southern African Institute of Mining and Metallurgy. Hard Rock Safe Safety Conference 2009:55-74.
- Baeva, L. 2012. Existential axiology. *Cultural International Journal of Philosophy of Culture and Axiology*, 9(1), 73-83.

- Bailey-Kruger, A. *The psychological wellbeing of women operating mining machinery in a fly-in fly-out capacity*. Edith Cowen University. 2012:1-82.
- Baker, J.L., Coleman B.L. & Sormin, S.M. *Workplace Health Promotion: Assessing employees' health-related needs*. Elgin St. Thomas Health Unit Ontario. Canada. 2002:1-76.
- Bardhan, T., Ngeru, J. & Pitts, R. 2012. *A Delphi-Multi-Criteria Decision-Making Approach in the Selection of an Enterprise-Wide Integration Strategy*. Journal Proceedings of the 2nd International Conference on Information and Evaluation. Ryerson University. Toronto Canada:24-37.
- Barker, F. S. 2007. *The South African Labour Market. Theory and Practice*. Johannesburg: Van Schaik.
- Barratt, M., Choi, T.Y. & Li, M. 2011. Qualitative case studies in operations management: Trends, research outcomes, and future research implications. *Journal of Operations Management*, 29, 329–342.
- Barillaro, P., Metz, J, Perran, R. & Stokes, W. 2006. Constructivist Epistemology: An Analyst. In Satariano, W. A. (2006). *Epidemiology of Aging: An Ecological approach*. Sudbury Mass: Jones and Bartlett Publishers.
- Barriball, K.L. & While, A.1994. Collecting data using a semi-structured interview: a discussion paper. *Journal of Advanced Nursing*.19: 328-335.
- Bashwira, M., Cuvelier, J., Hilhorst, D. & van der Haar, G. 2013. *Not only a man's world: Women's involvement in Artisanal Mining in Eastern DRC*. Resources Policy:1-9
- Batstone, T., Berry, E., Burgoyne, W., Cole, D., Crowe, K., Deller, N., Howson, T., Kennedy, M., King, A., Lee, K., Mallat, B., McCallum, T., Messing, K., Riklik, L., Wigmore, D. & Willet, B. 2001. *Workplace Reproductive Health Research and Strategies*. Best Start: Ontario's Maternal Newborn and Early Child Development Resource Centre: 1-74.
- Baxter, P. & Jack, S. 2008. Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *The Qualitative Report*. Volume 13. Number 4:544-559.
- Beaulieu, A. and Wouters, P. 2009. *E-research as Intervention*. Routledge, New York.
- Benya, A.P. 2009. *Women in mining: a challenge to occupational culture in mines*. Unpublished MA Dissertation. Industrial Sociology. Johannesburg: University of Witwatersrand. South Africa.
- Berger, A.M. & Hobbs, B.B. 2006. Impact of shift work on the health and safety of nurses and patients. *Clinical Journal of Oncology Nursing*, 10(4), 465-471.

~~BHP Billiton Energy Coal South Africa. 2009. SOP-BECSA-OHH-006. Version 1.0 28/01/2009:1-14.~~

~~BHP Billiton Energy Coal South Africa. 2009. SOP-BECSA-OHH-016. Version 1.0 11/02/2009:1-16.~~

Binder, C.R., Hinkel, J., Bots, P.W.G & Pahl-Wostl, C. 2013. Comparison of Frameworks for Analyzing Socio-ecological Systems. *Ecology and Society*. Vol.18. No. 4.

Bisman, J.E. & Highfield, C. 2012. The road less travelled: an overview and example of constructivist research in accounting. *Australasian Accounting Business and Finance Journal*, 6(5):3-22.

Blandford, A.E. 2013. Semi-structured qualitative studies. The Interaction Design Foundation.

Bliss, L.A. & Rocco, T.S. 2013. *"Mind the gap": Qualitative Researchers and Mixed Methods Research*. Florida International University. USA.

Boerner, H. 2007. In Focus: Positive Period Alternatives. http://www.teenwire.com/infocus/2007/if-20070116p473-period.php...1_of_2_2/11/07. Accessed on 21/05/2011.

Bond, M.A. & Punnett, L. 2007. *Expanding our Understanding of the Psychosocial Work Environment. A Compendium of Measures of Discrimination, Harassment and Work-Family Issues*. Department of Health and Human Services. Centers for Disease Control and Prevention National Institute for Occupational Safety and Health:1-275.

Borowski, A.M., 2011. *Are American women turning to reusable and greener menstrual products due to health and environmental pollution concerns?* Rochester Institute of Technology.

Botha, D. 2016. Women In Mining: An Assessment of Workplace Relations Struggles. *Journal Social Science Vol. 46 No. 3:251-263*.

Botha, C., Fourie, J.D., Botha, D. & Bischoff, C. 2012. Progress in implementing the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) provisions for the employment of women in mining. *The Journal of The Southern African Institute of Mining and Metallurgy*. Volume 112. May:395-404.

Bradley, H. 1989. *Men's Work, Women's Work: A Sociological History of the Sexual Division of Labour in Employment*. UK: Polity Press.

Bronfenbrenner, U. 1994. Ecological Models of Human Development. *International Encyclopedia of Education*, Vo.3, 2nd Ed. Oxford: Elsevier: 37-43.

- Bronfenbrenner, U. 1977. Toward an experimental ecology of human development. *American Psychologist*. 513-531.
- Bronkhorst, B., Tummers, L., Steijn, B & Vijverberg, D. 2014. Organizational Climate and Employee Mental Health Outcomes: A Systematic Review of Studies in Health Care Organizations. PubMed. US National Library of Medicine National Institutes of Health
- Brouwers, M.C., Kho, M.E., Browman, G.P., Burgers, J.S., Cluzeau, F., Feder, G., Fervers, B., Graham, I.D., Grimshaw, J., Hanna, S.E., Littlejohns, P., Makarski, J. & Zitzelsberger, L. for the AGREE Next Steps Consortium. 2010. AGREE II: advancing guideline development, reporting and evaluation in health care. *Canadian Medical Association Journal*, 182(18), E839-E842.
- Brouwers, M., Kho, M.E., Browman, G.P., Cluzeau, F., Feder, G., Fervers, B., Hanna, S. & Makarski, J. on behalf of the AGREE Next Steps Consortium. 2010. AGREE II: Advancing guideline development, reporting and evaluation in healthcare. *Can Med Assoc J*. 51(5):421-424.
- Brown, S.A., Upchurch, S.L. & Acton, G.J., 2003. A Framework for Developing a Coding Scheme for Meta-Analysis. *Western Journal of Nursing Research*. 25 (2):205-222.
- Brown, T.H. 2005. Beyond constructivism: Exploring future learning paradigms. *Education Today*. Issue 2:1-11.
- Brown, J.C. 2006. A case study of a school implementing a constructivist philosophy. Florida: University of South Florida:1-191.
- Brüggen, E. & Willems, P. 2009. A critical comparison of offline focus groups, online focus groups and e-Delphi. Maastricht University. PWNEXT. *International Journal of Market Research* Vol. 51, 3:363-381.
- Buhlungu, S. & Bezuidenhout, A. 2008. Union Solidarity under Stress. The Case of the National Union of Mineworkers in South Africa. *Labor Studies Journal*. Volume 33(3):262-287.
- Burnard P. 1991. A method of analysing interview transcripts in qualitative research. *Nurse Education Today* 11: 461–466.
- Burnard P. 1996. Teaching the analysis of textual data: an experiential approach. *Nurse Education Today* 16: 278–281.
- Burns, N. & Grove, S.K. 2005. *The Practice of Nursing Research: Conduct, Critique & Utilization*. St Louis: Elsevier Saunders.

- Burton, J. 2010. WHO Healthy Workplace Framework and Model: Background and Supporting Literature and Practice. Geneva Switzerland
- Bustreo, F., Chestnov, O., Knaul, F.M., de Carvalho, I.A., Meriardi, M., Temmermana, M. and Beard, J.R. 2013. At the crossroads: transforming health systems to address women's health across the life course. *Bulletin World Health Organization*, 91: 622.
- Cambridge Dictionaries Online. 2006. Cambridge: Cambridge University Press. Available online at <http://dictionary.cambridge.org>. Accessed on 20/11/2016.
- Campbell, H. 2012. *Organisational Change Management Maturity*. Change Management Institute. RSA.
- Caplin, A. & Leahy, J. 2001. Psychological Expected Utility Theory and Anticipatory Feelings. *Economics Journal*. Oxford University Press.
- Cardenas, D., Henderson, K.A. & Wilson, B.E. 2009. Physical Activity and Senior Games Participation: Benefits, Constraints, and Behaviors. *Journal of Aging and Physical Activity*:135-153.
- Carrillo-García C., Solano-Ruiz, M.D.C., Martínez-Roche, M.E. and Gómez-García, C.I. 2013. Job satisfaction among health care workers: the role of gender and age. *Revista Latino-americana de enfermagem*. 21 (6):1314-1320
- Casey, D. & Murphy, K. 2009. Issues in using methodological triangulation in research. *Nurse Researcher*. Vol. 16. No. 4:40-55.
- Cavanagh S. 1997. Content analysis: concepts, methods and applications. *Nurse Researcher*4, 5–16.
- Chambers, D., Thiekotter & Chambers, L. 2013. Preparing Student Nurses for Contemporary Practice: The Case for Discovery Learning. *Journal of Nursing Education and Practice*. Vol. 3 No. 9:106-113.
- Channar, Z.A., Abbassi, Z. & Ujan, I.A. 2011. Gender Discrimination in Workforce and its Impact on the Employees. *Pakistan. Journal. Commerce. Social Sciences*. Vol. 5 (1):177-191
- Choi, T.Y. and Hong, Y. 2002. Unveiling the structure of supply networks : case studies in Honda, Acura, and DaimlerChrysler. *Journal of Operations Management*, 20 (5) :469-493.
- Chou, C. 2002. Developing the e-Delphi System: a web-based forecasting tool for educational research. *British Journal of Educational Technology*. Vol 33. No. 2:233-236.

- Churchland, P.M. 1986. *Scientific realism and the plasticity of mind*. Cambridge University Press.
- Christensen, W.D. & Hooker, C.A. 2000. Anticipation in Autonomous Systems: Foundations for a Theory of Embodied Agents. Department of Philosophy, University of Newcastle, Australia.
- Clarke, C. & Reed, J. 2010. The research process in nursing. 5th edn. Blackwell Publishing.
- Claxton, J.D., Ritchie, J.B. and Zaichkowsky, J.1980. The nominal group technique: Its Potential for Consumer Research. *Journal of Consumer Reserarch*, 7 (3):308-313.
- Clements, D.H. & Battista, M.T. 1990. Constructivist learning and Teaching. *Research into Practice*. Vol. 38 No. 1:34-35.
- Clinical Practice Guidelines We Can Trust.2011. The Institute of Medicine of the National Academies. Report Brief. March 2011:1-4
- Colliver, J.A. 2002. Constructivism: the view of knowledge that ended philosophy or a theory of learning and instruction? *Teaching and Learning in Medicine: An International Journal*, 14(1): 49-51.
- Cornick, P. 2006. Nitric oxide education survey — use of a Delphi survey to produce guidelines for training neonatal nurses to work with inhaled nitric oxide. *Journal of Neonatal Nursing*, 12 (2): 62–68.
- Cornish, M. 2008. Realizing the Right of Women to Safe Work – Building Gender Equality into Occupational Safety and Health Governance. Commissioned as an ILO Concept Note for presentation at the XVIII World Congress on Occupational Safety and Health. June 29-July 2, 2008:1-32, Seoul: Korea.
- Cresswell J.W. 2003. Research Design. Qualitative, Quantitative and Mixed Methods Approaches. Second Edition. Thousand Oaks: Sage Publications.
- Croyle, R.T. 2005.*Theory at a glance. A Guide for Health Promotion Practice*. 2nd edn. U.S. Department of Health and Human Services: National Institutes of Health.
- Cruickshank, K. 2012. Constructions of Language and Learner Identity in the Classroom: Confessions of a Failure. *Australian Review of Applied Linguistics: Faculty of Education and Social Work*: 7170-182.
- Dahlberg, R., Karlqvist, L., Bildt, C. And Nykvist, K. 2004. Do work technique and musculoskeletal symptoms differ between men and women performing the same type of work tasks? *Applied Ergonomics*, 35 (6):521-529.

- Danermark, B., Ekstrom, M. and Jakobsen, L. 2001. *Explaining society: an introduction to critical realism in social sciences*. Routledge.
- Davies, S.M. 2001. *Relative's Experience of Nursing Home Entry: Constructivist Inquiry*. Faculty of Medicine. School of Nursing and Midwifery. Sheffield: University of Sheffield:1-304.
- Dearnley C. 2005. A reflection on the use of semi-structured interviews. *Nurse Researcher*. Vol 13(1):19-28.
- Delanty, G. 1997. *Social Science: Beyond Constructivism and Realism*. Minnesota: University of Minnesota Press:11-38.
- Department of Mineral Resources. Annual Report. 2010/2011. Pretoria: DMR; 2011.
- De Vos, A.S., Strydom, H., Fouche, C.B. & Delpont, C.S.L. 2011. *Research at grass roots. For the social sciences and human service professions*. 4th ed. Pretoria: Van Schaik Publishers.
- Department of Mineral and Resources Mine Health and Safety Inspectorate. 2016. Guideline for the Compilation of a Mandatory Code of Practice for an Occupational Health Programme. (Occupational Hygiene and Medical Surveillance) on Thermal Stress. 5 February 2016:8-87.
- Dieffenderfer, V.M. 2014. *The Relationship between Hope and Self-Directed Learning in the Workplace*. University of Tennessee, Knoxville. 132. http://trace.tennessee.edu/utk_graddiss/3119. Accessed on 16 March 2016
- Dieronitou, I. 2014. The Ontological and Epistemological Foundations of Qualitative and Quantitative Approaches to Research with Particular Reference to Content and Discourse Analysis of Textbooks. *International Journal of Economics, Commerce and Management* Vol. II Issue 10:1-17.
- Dollard, M., Bailey, T., McLinton, S., Richards, P., McTernan, W., Taylor, A. & Bond, S. 2012. The Australian Workplace Barometer: Report on psychosocial safety climate and worker health in Australia. *Safe Work Australia*. 1-95.
- Donoghue, A.M. & Bates, G.P. 2000. The risk of heat exhaustion at a deep underground metalliferous mine in relation to surface temperatures. *Occupational Medicine*. Vol. 50 No. 5:334-336.
- Doolittle, P.E. 1999. *Constructivism and Online education*. Virginia Polytechnic Institute & State University. Semantic Scholar.org.

- D'Ortenzio, C. 2012. *Understanding change and change Management processes*. Unpublished PhD thesis. University of Canberra, Australia.
- D'Souza, M.S., Somayaji, G. & Karkada S.N. 2011. Determinants of reproductive health and related quality of life among Indian women in mining communities. *Journal of Advanced Nursing*, 67(9), 1963–1975.
- D'Souza, M.S., Karkada, S.N. Somayaji, G. & Venkatesaperumal, R. 2013. Women's wellbeing and reproductive health in Indian mining community: need for empowerment. *Reproductive Health*. 1-12.
- Eisner, H.S & Leger, J.P. 1988. Safety in South African mines: An analysis of accident statistics. *Journal of the South African Institute of Mining and Metallurgy*. Vol.88 No.1: 1-7.
- Eisenhardt, K.M. 1989. Building Theories from Case Study Research. *Academy of Management Review*. Vol. 14. No.4:532-550.
- Elo, S. & Kyngäs, H. 2008. The qualitative content analysis process. *Journal of Advanced Nursing* 62 (1): 107–115.
- Engebretson, J. & Littleton, L.Y. 2001. Cultural Negotiation: A Constructivist-Based Model for Nursing Practice. *Nursing Outlook*. Volume 49. Number 5:223-230.
- Engles, T.C.E. & Kennedy, H.P. 2007. Enhancing a Delphi study on family-focused prevention, *Technol. Forecast. Soc. Change*, 74 (4), 433–451.
- Epstein, R.M., Franks P, Shields, C.G., Meldrum, S.C., Miller, K.N., Campbell, T.N. & Fiscella, K. 2005. Patient-Centred Communication and Diagnostic Testing. *Annals of Family Medicine*. Volume 3. Number 5:415-421.
- European Centre for Disease Prevention and Control. Evidence-based methodologies for public health. 2011. How to assess the best available evidence when time is limited and there is lack of sound evidence. Stockholm: 1-58.
- Faculty of Medicine, University of Ottawa. 2014. *What is women's health?* Available from: www.med.uottawa.ca Accessed on 6th February 2014.
- Gable, L. 2011. Reproductive Health as a Human Right. Wayne State University Law School Legal Studies Research. USA. Paper Series No. 10-20. Vol. 60 No 4. June 2011:957-996

- Gibson, G. & Klinck, J. 2005. Canada's Resilient North: The Impact of Mining on Aboriginal Communities. *Pimatisiwin. A Journal of Aboriginal and Indigenous Community Health* 3 (1):116-139.
- Goldberg, I., Hill, A. & Shostack, A. 2001. Trust, Ethics and Privacy. *Boston University Law Review*. Vol. 81:101-116.
- Golden, S.D. and Earp, J.A.L. 2012. Social ecological approaches to Individuals and their contexts: twenty years of health education & behavior health promotion interventions. *Health Education & Behavior*, (39)3:364-372.
- Graefe, A. & Armstrong, J.S. Comparing Face-to-Face Meetings, Nominal Groups, Delphi and Prediction Markets on an Estimation Task. *International Journal of Forecasting*. 2010:1-20.
- Gray, D.E. 2014. *Doing Research in the Real World*. Third Edition. University of Greenwich. UK. Sage.
- Greenleaf, A.T. & Williams, J.M. 2009. Supporting Social Justice Advocacy: A paradigm Shift towards an Ecological Perspective. University of Iowa. *Journal for Social Action in Counseling and Psychology*. Volume 2. Number 1:1-14.
- Grol, G., Gibbons, R.J., Antman, E.M& Smith, S.C.2010. Has guideline development gone astray? The move to evidence based medicine has led to a proliferation of guidelines. *BMJ*. Volume 340:394-395.
- Gruender, C.D. 1996. Constructivism and Learning: A philosophical Appraisal. *Education Technology*. Vol. 36 No. 3:21-29.
- Graneheim, U. H. & Lundman, B. 2004. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24, 105-112.
- Grimpe, B., Patel, M., Jirotko, M., Wilford, S., Niemelä, M. & Ikonen, V. 2014. 'Context of RRI report' GREAT (Governance of Responsible Innovation) FP7 Grant Agreement No.321480.
- Guba, E.G. & Lincoln, Y.S. 1985. *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications.
- Guba, E.G. & Lincoln, Y.S. 1994. Competing Paradigms in Qualitative Research. In N.K. Denzin & Y.S. Lincoln (eds.), *Handbook of Qualitative Research* (105-117). Thousand Oaks: Sage.
- Guba, E.G. & Lincoln, Y.S. 2005. Paradigmatic Controversies, Contradictions, and Emerging Confluences, in N.K. Denzin & Y.S. Lincoln (eds.), *Handbook of Qualitative Research* (163-188) Thousand Oaks: Sage.

- Guest, G, Bunce, A. & Johnson, L. 2006. How Many Interviews Are Enough? An Experiment with Data Saturation and Variability. *Field Methods*. Vol 18 No 1:59-82.
- Guidance Note for Fatigue Risk Management. 2013. State of Queensland, Department of Natural Resources and Mines. QGN 16.1-64.
- Guthrie J., Yongvanich, K. & Ricceri, F. 2004. Using content analysis as a research method to inquire into intellectual capital reporting. *Journal of Intellectual Capital* 5: 282–293.
- Hansen, T., Lidsmoes, L.C., Laursen, P., Mathiassen, L., Jensen, A., Raby, C.S., Sorensen, L., Jurvelius, H., Rintala, J., Steinar Harðarson, S and Sveinsdóttir, P. 2015. *Psychosocial working environment. Workplace Inspection of the psychosocial working environment in the Nordic countries*. Nordic Council of Ministers.
- Harrel, M.C. and Bradley, M.A. 2009. *Data collection methods. Semi-structured interviews and focus groups*. Rand National Defense Research Inst Santa Monica Ca
- Hart, L.M., Jorm, A.J., Kanowski, L.G., Kelly, C.M. & Langlands, R.L. 2009. Mental health first aid for indigenous Australians: using Delphi consensus studies to develop guidelines for culturally appropriate responses to mental health problems. *BioMed Central Psychiatry*: 1-12.
- Hart, P.L., Brannan, J.D. and De Chesnay, M., 2014. Resilience in nurses: an integrative review. *Journal of Nursing Management* 22 (6):720-734.
- Hashemnezhad, H. 2015. Qualitative Content Analysis Research: A Review Article *Journal of ELT and Applied Linguistics. JELTAL* Volume 3, Issue-1, March: 45-62.
- Healy, M. and Perry, C. 2000. Comprehensive criteria to judge validity and reliability of qualitative research within realism paradigm. *Qualitative market research: An international journal*, 3(3):118-126.
- Heemskerk, M. & Ketani, V. 2006. *Gender baseline study. A sustainable livelihoods perspective on women and their families in the non-traditional mining sector of Zambia*. Lusaka: Mining Sector Diversification Programme. EU/MSDP Project No. 8ACP ZA 036.
- Heikkinen, A., Wickström, G & Leino-Kilp, H. 2006. Understanding Privacy in Occupational Health Services. *Nursing Ethics* Vol 13. No.5:515-530.
- Heiko, A., 2012. Consensus measurement in Delphi studies Review and implications for future quality assurance. *Technological Forecasting & Social Change*, 79, 1525-1536.

- Heilman, M.E., Wallen, A.S., Fuchs, D. & Tamkins, M.M. 2004. Penalties for Success: Reactions to Women Who Succeed at Male Gender-Typed Tasks. *Journal of Applied Psychology*. Vol. 89 No.3:416–427.
- Henritze, D., Paul, R. and Kent, M. 2015. An eye to the future. *Adapting to change in a volatile mining industry*. KPMG Global Mining Institute. US.
- Hermanus, M.A. 2007. Occupational Health and Safety in mining-status, new developments and concerns. *The Journal of the Southern African Institute of Mining and Metallurgy*,107: 531-538.
- Hermanus, M., Coulson, N. & Pillay, N. 2015. Mine Occupational Safety and Health Leading Practice Adoption System (MOSH) examined – the promise and pitfalls of this employer-led initiative to improve health and safety in South African Mines. *The Journal of the Southern African Institute of Mining and Metallurgy*. Volume 115. August: 717-727.
- Hinton, J.J. 2011. *Gender Differentiated Impacts and Benefits of Artisanal Mining: Engendering Pathways out of Poverty*. A Case Study in Katwe Kabatooro Town Council: Uganda: 1-305.
- Hinton, J.J., Veiga, M.M. and Beinhoff, C. 2003. *Women and Artisanal Mining: Gender Roles and the Road Ahead. The Socio-Economic Impacts of Artisanal and Small-Scale Mining in Developing Countries*. Swets Publishers Netherlands.
- Holloway, I. & Wheeler, S. 2010. *Qualitative research in nursing and healthcare*. 3rd ed. Chichester: Wiley-Blackwell.
- Houghton, C., Casey, D., Shaw, D. & Murphy, K. 2013. Rigour in qualitative case-study research. *Nurse Researcher*, 20, 4: 12-17.
- House, S., Mahon, T. & Cavill, S. 2012. *Menstrual hygiene matters: A resource for improving menstrual hygiene around the world*. First Edition. UK: UKAid.
- Hruschka, D., Schwartz, D., St. John, D.C., Picone-decaro, E., Jenkins, R.A. & Carey, J.W. 2004. Reliability in Coding Open-Ended Data: Lessons learned from HIV Behavioural Research. Centers for Disease Control and Prevention. Atlanta. Georgia. *Field Methods*. Vol. 16, No. 3, August:307–331.
- Hsieh H.-F. & Shannon S. 2005. Three approaches to qualitative content analysis. *Qualitative Health Research* 15: 1277–1288.
- Hsu, C.C. & Sandford, B.A. 2007. The Delphi Technique: making sense of consensus. *Practical Assessment, Research & Evaluation*,12(10),1-8.

- Huberman, A.M & Miles, M.B. 1994. Data Management and Analysis Methods, in N.K. Denzin & Y.S. Lincoln (eds.), *Handbook of Qualitative Research* (428-444). Thousand Oaks: Sage.
- Huebner, A.J. and Betts, S.C., 1999. Examining fourth generation evaluation: Application to positive youth development. *Evaluation*, 5(3):340-356
- Hunt, S.D., 1990. Truth in marketing theory and research. *The Journal of Marketing*:1-15.0
- Hussain, A., Case, K., Marshall, R. & Summerskill, S. 2013. *Achieving Workplace Inclusiveness by using Ergonomics Risk Assessment*. Proceedings of the 11th International Conference on Manufacturing Research (ICMR2013), Cranfield University, UK. 19th - 20th September 2013:337-342.
- Hussain, I. 2012. Use of Constructivist Approach in Higher Education: An Instructors' Observation. *Scientific Research*. Vol.3 No.2 2012:179-184. <http://dx.doi.org/10.4236/ce.2012.32028>. Accessed on 6th February 2014
- International Finance Corporation (IFC). Lonmin. 2009. *Women in Mining: A guide to integrating women into the workforce*. World Bank Group. Johannesburg: 1-75
- International Labour Organisation (ILO). 1935. C045 - *Underground work (women) convention, 1935 (No. 45). Convention concerning the employment of women on underground work in mines of all kinds*. Available from: http://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:312190. Accessed on 8th February 2011
- International Labour Organisation. 2008. *Global Employment Trends for Women*. Geneva International Labour Office. Switzerland.
- Johnson, T. & Fendrich, M. 2002. *A validation of the Crowne-Marlowe Social Desirability Scale: 1661-1666*. Available from: <http://www.srl.uic.edu/publist/Conference/crownemarlowe.pdf>. Accessed on 1st September 2012.
- Judge, T.A., Charles L. Hulin, C.L. & Dalal, R.S. 2009. *Job Satisfaction and Job Affect*. The Oxford University Press. New York.
- Kahveci, A. & Ay, S. 2008. Different approaches-common Implications: Brain-based and constructivist learning from a paradigms and Integral Model perspective. Volume 5. Number 3:124-129. Available at <http://cepa.info/304>. Accessed on 30th September 2013.

- Kauppinen, K. & Kumpulainen, R. 2003. Gender issues in safety and health at work: A review. European Agency for Safety and Health at Work. Gender FIOH, Finland.
- Kelly, T., Lercel, D. & Patankar, M. 2015. Influence of Trust and Job Satisfaction on Safety Climate among Managers at a Large U.S. Air Carrier. *Management and Organizational Studies* Vol. 2. No. 2:58-67.
- Kieft, R.A.M.M., de Bouwer B.B.J.M., Francke A.L. & Delnoij, D.M.J. 2014. How nurses and their work environment affect patient experiences of the quality of care: qualitative study. *BMC Health Services Research*. Volume 14 Number 249.
- Kincaid, H. 1996. *Philosophical foundations of the social sciences: Analyzing controversies in social research*. Cambridge University Press.
- King, M. & Bruner, G. 2000. Social desirability bias: a neglected aspect of validity testing. *Psychology and Marketing*, 17(2):79–103.
- Kitamura, Y. & Takahashi, M. 2002. *Evaluating Network Theory and Constructivism based on the Ten Criteria for Evaluation*: 77-102.
- Kitson, A., Harvey, G. & McCormack, B. 1998. Enabling the implementation of evidence based practice: a conceptual framework. *Quality in Health Care*: 149–158.
- Knowles, W. M. 1998. Transforming mining-a framework for dramatic changes in performance. Faculty of Engineering and Information Science. University of Wollongong. Australia: 365-373.
- Kontos, P.C. & Poland, B.D. 2009. Mapping new theoretical and methodological terrain for knowledge translation: contributions from critical realism and the arts. *Implementation Science*. *BioMedCentral*. 4 (1)1-10.
- Kowalski-Trakofler, K.M., Vaught, C., Brnich Jr, M.J. & Jansky, J.H. 2010. *A Study of First Moments in Underground Mine Emergency Response*. Pittsburgh Research Laboratory, Mining Safety and Health Research, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention:1-30.
- Kuyek, J.N. 2003. Overburdened: understanding the impacts of mineral extraction on women's health in mining communities. *Canadian Woman Studies*, 23(1).
- Kyngäs, H. & Vanhanen, L. 1999. Content analysis (Finnish). *Hoitotiede* 11, 3–12.
- Labonne, B. 1996. Artisanal mining: an economic stepping stone for women. *Natural Resources Forum*. Vol. 20 No. 2:117-122.

- Lahiri-Dutt, K. 2011. Gendering the Field: Towards Sustainable Livelihoods for Mining Communities. *Asia-Pacific Environment Monograph* 6: 1-18.
- Laplonge, D. 2014. You gotta be tough to explore gender in mining. *ACLW Leading Issues Journal*: 21-22.
- Lauckner, H., Paterson, M. & Krupa, T. 2012. Using Constructivist Case Study Methodology to Understand Community Development Processes: Proposed Methodological Questions to Guide the Research Process. *The Qualitative Report*. Volume 17, 25:1-22.
- Lee, C.G. 2012. Reconsidering constructivism in qualitative research. *Educational Philosophy and Theory*. Vol. 44 No. 4:403-412.
- Leech, N. L., & Onwuegbuzie, A.J. 2008. Qualitative data analysis: a compendium of techniques and a framework for selection for school psychology research and beyond. *School Psychology Quarterly*, 23, 587-604.
- Lennon, R., Glasper, A. & Carpenter, D. 2012. *Nominal group technique: its utilization to explore the rewards and challenges of becoming a mental health nurse, prior to the introduction of the all graduate nursing curriculum in England*. Working Papers in Health Sciences 1:2. ISSN2051-6266/20120000.
- Lo Biondo-Wood, G. & Haber, J. 2010. *Nursing Research. Methods and critical appraisal for evidence-based practice*. 7th edn. New York: Mosby.
- Locke, E. A. 1976. The nature causes and causes of job satisfaction. In Dunnette M. C. (Eds.), *Handbook of industrial and organizational psychology* (1297–1349). Chicago, IL: Rand McNally.
- MacDermid, J.C., Brooks, D., Solway, S. Switzer-McIntyre, S. Brosseau, L. & Graham, I.D. 2005. Reliability and validity of the AGREE instrument used by physical therapists in assessment of clinical practice guidelines. *BMC Health Services Research* Vol 5. No.18:1-12.
- Mahy, P.K. 2012. Gender equality and corporate social responsibility in mining: an investigation of the potential for change at Kaltim Prima Coal, Indonesia.
- Malamuth, N.M. & Thornhill, N.W. 1994. Hostile Masculinity, Sexual Aggression and Gender-Biased Domineeringness in Conversations. *Aggressive Behavior*. Volume 20:185-193.
- Malik, A. 2013. Efficacy, Hope, Optimism and Resilience at Workplace-Positive Organisational Behaviour. *International Journal of Scientific and Research Publications*. Volume 3. Issue 10:1-4.

- Mara, D., Lane, J., Scott, B. and Trouba, D. 2010. Sanitation and Health. *PLoS medicine*, 7(11), e1000363.
- Margolis, K.A. 2010. Underground coal mining injury: A look at how age and experience relate to days lost from work following an injury. *Safety science*, 48(4):417-421.
- Marsden, P.V., Kalleberg A.L. & Cook, C. 1993. Gender Differences in Organizational Commitment. Influences of Work Positions and Family Roles. *Work and Occupations*. Vol. 20 No.3. August: 368-390.
- Martin, J. 2011. The Interactivist Social Ontology of Persons: A Descriptive and Evaluative Synthesis, with Two Suggestions. *Axiomathes*, 21(1):173-183.
- Masondo, S. *Female miner, killed underground*. Times LIVE 14 February 2012-02:33.
- Masvaure, P., Ruggunan, S. & Maharaj, A. 2014. Work Engagement, Intrinsic Motivation and Job Satisfaction among Employees of a Diamond Mining Company in Zimbabwe. *Journal of Economics and Behavioural Studies*. Vol. 6 No 6: 488-499.
- Mbokoto Mining Group. 2015. Integrated Women in Mining Value Proposition. *Women Safety and Development*. November: 1-20.
- McCallum, T. & Wilson, K. 2003. Healthy Pregnancies at Work: A worksite Reproductive Health Promotion Programme. *Regional Niagara Public Health Department, Reproductive Health Programme*. 2nd edition: 1-31.
- McCambridge, J., De Bruin, M. and Witton, J. 2012. The effects of demand characteristics on research participant behaviours in non-laboratory settings: a systematic review. *PloS one*, 7 (6) e39116.
- McGuire, J. & Clark, S. 2011. PTSD and the Law: An update. *PTSD Research Quarterly. Advancing Science and Promoting Understanding of Traumatic Stress*. Volume 22. No.1:1-6.
- Mclaggan, E., Bezuidenhout, A. & Botha, C.T. 2013. Leadership style and organisational commitment in the mining industry in Mpumalanga. *SA Journal of Human Resource Management*. Department of People Management and Development, Tshwane University of Technology: 1-9.
- McLaren, L. & Hawe, P. 2005. Ecological perspective in health research. *Journal of Epidemiology and Community Health*, 59(1), 6-14.
- McLeroy, K. R., Bibeau, D., Steckler, A. and Glanz, K. (1988) An ecological perspective on health promotion programs. *Health Education Quarterly*, 15, 351-377. [MedlineWeb of Science](#)

- Meckler, M. and Baillie, J. 2003. The truth about social construction in administrative science. *Journal of Management Inquiry*, 12(3):273-284
- Merchant, K. 2012. How men and women differ: Gender differences in communication styles, influence tactics, and leadership styles. CMC Senior Theses. Paper 513. *scholarship.claremont.edu/cgi/viewcontent.cgi*.
- Merriam, S.B. 2009. *Qualitative research*. San Francisco: Jossey-Bass.
- Mertens, D.M. 2015. Philosophical assumptions and program evaluation. *Enrico Guglielminetti Luciana Regina*, 75-85.
- Messing, K. & Östlin, P. 2006. Gender equality, work and health: a review of the evidence
- Miner-Rubino, K., & Cortina, L.M. 2004. Working in a Context of Hostility Toward Women: Implications for Employees' Wellbeing. *Journal of Occupational Health Psychology*. Vol. 9 No. 2. 107–122.
- Miranda, M., Chambers, D, & Coumans, C. 2005. Framework for responsible mining: a guide to evolving standards. Center for Science in Public Participation.
- Mishra, G.D., Cooper, R. & Kuh, D. 2010. A life course approach to reproductive health: Theory and methods. *Maturitas*, 65(2): 92–97.
- Mongin, P., 2016. Spurious unanimity and the Pareto principle. *Economics & Philosophy*, 32(3), 511-532.
- Munro, L. 2007. Absenteeism and presenteeism: possible causes and solutions. *The South African Radiographer*. Volume 5 No. 1:21-23.
- Musvoto A.N. 2001. Mining Minerals Sustainable Development. Research Topic 3: Mining and Society. *Gender and Mining: Community*. August:1-42.
- National Council of State Boards of Nursing 2011. White paper: a nurse's guide to the use of social media. *Journal of Practical Nursing*, 61(3):3-9. Chicago. www.ncsbn.org:1-14.
- National Healthcare Quality Report. 2011. Access to Health Care. Chapter 9. 2011.
- Nayak P. & Mishra, S.K. 2005. Gender and Sustainable Development in Mining Sector in India: 1-12.
- Neal, A., Griffin, M.A, & Hart, P.M. 2000. The impact of organizational climate on safety climate and individual behavior. *Safety Science Volume* 34: 99-109.

- New York Committee for Occupational Safety and Health. 2013. Risks Facing Women in Construction. www.nycosh.org:1-5.
- Ngunjiri, F. W. 2007. Painting a counter-narrative of African womanhood: Reflections on how my research transformed me. *Journal of Research Practice*, 3(1), 1–13.
- Nickols, F. 2016. Four Strategies for Managing Change. http://www.nickols.us/four_strategies.pdf
- Nyback, M.H. 2011. A constructivist approach to teaching and learning at the degree programme in nursing at Novia University of Applied Sciences.
- O'Brien, L. E-Research: An Imperative for Strengthening Institutional Partnerships. *Educause Review*. November/December 2005:64-76.
- Occupational Health Service. 2012. Nottingham University Hospitals NHS Trust. *Privacy and Confidentiality in Occupational Health: 1-3*.
- Oosthuizen, T.J.F. 2014. The application of a selection of decision-making techniques by employees in a transport work environment in conjunction with their perceived decision-making success and practice. *Journal of Transport and Supply Chain Management* 8(1):1-9.
- Owen, R. Macnaghten, P & Stilgoe, J. 2012. Responsible research and innovation: From science in society to science for society, with society. *Science and Public Policy* Vol 39: 751–760.
- Owusu, B. 2014. *An Assessment of Job Satisfaction and its Effect on Employees' Performance: A Case of Mining Companies in the [Bibiani Anhwiaso - Bekwai District] in the Western Region*. A Thesis submitted to the Department of Managerial Science, Kwame Nkrumah University of Science and Technology. School of Business, KNUST College of Art and Social Sciences: 1-97.
- Pakalnis, V. 2015. The Impact of New Technology and Change Management. *Mining Health and Safety Conference Sudbury*. April 14-16 2015:1-13.
- Parlour, R. and McCormarck, B. 2012. Blending critical realist and emancipatory practice development methodologie:making critical realism work in nursing research. *Nursing inquiry*, 19(4):308-321.
- Parpio, Y., Malik, S., Punjani, N.S& Farooq, S. 2013. Critical Realism: Tenets and Application in Nursing. *International Journal of Innovative Research & Development*. Vol 2 Issue 11. November:490-493.

- Patel, D., Goetzel, R.Z., Beckowski, M., Milner, Greyling, M., da Silva, R. Kolbe-Alexander, T. Tabrizi, M.J. & Nossel, C. 2013. The healthiest company index. A campaign to promote worksite wellness in South Africa. *Journal of Occupational and Environmental Medicine*, 00(00), 1-7.
- Patton, M.Q. 2002. *Qualitative Research and Evaluation Methods*. Thousand Oaks, CA: Sage.
- Patton, M.Q. 2003. *Qualitative Research and Evaluative Methods*. Third Edition. Thousand Oaks. CA: Sage.
- Pearson, J., Gianni, R., Ikonen, V. & Haick, H. 2016. *From Technology Assessment to Responsible Research and Innovation (RRI):1189-1198*. In Future Technologies Conference (FTC)
- Pelle, S. & Reber, B. 2013. The Theoretical Landscape. *GREAT (Governance of Responsible Innovation)*
- Peters, L.D., Pressey, A.D., Vanharanta, M. & Johnston, W.J. 2013. Constructivism and critical realism as alternative approaches to the study of business networks:Convergences and divergences in theory and in research practice. *Industrial Marketing Management*, 42(3):336-346
- Pitsoe, V.J. 2007. *A conceptual analysis of constructivist classroom management*. Pretoria: University of Pretoria: 1-281.
- Polit D.F., & Beck, C.T. 2012. *Nursing Research. Generating and assessing evidence for nursing practice*. 9th edn. Philadelphia, Lippincott Williams & Wilkins.
- Ponterotto, J.G. 2005. Qualitative research in counselling psychology” a primer on research paradigms and philosophy of science. *Journal of Counseling Psychology*, 52(2), 126 – 136.
- Primeau, L.A. 2003. Reflections of self in qualitative research: stories of family. *American Journal of Occupational Therapy*, 57, 9-16.
- Privacy and Health Information: Challenges for Nurses and for the Nursing Profession. *Ethics in Practice for Registered Nurses*. November 2003:1-12.
- Ranchod S. 2001. Mining Minerals Sustainable Development Southern Africa. *Research Topic 3: Mining and Society. Gender and Mining: Workplace*.
- Reio, Jr, T.G.and Kidd, C.A.2006. An Exploration of the Impact of Employee Job Satisfaction, Affect, Job Performance, and Organizational Financial Performance: A Review of the Literature. *Online Submission*

- Richard, S.W., Audrey, B.S. and Scott, E. 2011. Nine best practices for effective talent management. *Development Dimensions International Inc. white paper available online at <http://www.ddiworld.com>.*
- Richard, L., Gauvin, L. & Raine, K. 2010. *Ecological Models Revisited: Their Uses and Evolution in Health Promotion Over Two Decades*:307-326. School of Public Health, University of Alberta, Edmonton, Alberta. Canada.
- Richards, E., Riner, M.E. and Sands, L.P. *A Social Ecological Approach of Community Efforts to Promote Physical Activity and Weight Management*. Journal of Community Health Nursing. Routledge Taylor & Francis Group. 2008:179–192.
- Riegler, A. 2001, June. The Role of anticipation in cognition. In *AIP Conference Proceedings* (Vol.573, No. 1:534-542). AIP.
- Riegler, A. 2012. Constructivism. *Paradigms in Theory Construction*: 235-255
- Rijal, S. 2009. Leading The Learning Organization. *Business Education and Accreditation*, 1(1):131-140.
- Risman, B,J, & Davis, G. 2012. From sex roles to gender structure. *Sociopedia.isa*. 1-16.
- Robinson, I., Van Averbeke, N., Harding, A.J., Duval, J.A.G., Mwape, P. & Perold, J.W. 2005. South Africa's Mineral Industry. Directorate: Mineral Economics. Department: Minerals and Energy. Republic of South Africa. 22nd Revised Edition. 2004-2005: 1-185.
- Rolfe, G. 2006. Validity, trustworthiness and rigour: quality and the idea of qualitative research. *Journal of Advanced Nursing*, 53(3), 304-310.
- Rose K. 1994. Unstructured and semi-structured interviewing. *Nurse Researcher*. April 1 (1):23-32.
- Roos, M. 2014. *Determining mutual challenges faced by opencast mines and their women employees*. Mini-dissertation submitted in partial fulfilment of the requirements for the degree Master of Business Administration at the Potchefstroom Campus of the North-West University. 2014.
- Rosoff, A.J. The Role of Clinical Practice Guidelines in Healthcare Reform: An Update. *Annals of Health Law*. Volume 21. Issue 1 Special Edition 2012:20-33.
- Rycroft-Malone, J., Harvey, G., Seers, K., Kitson, A., McCormack, B and Titchen, A. 2004. An exploration of the factors that influence the implementation of evidence into practice. *Journal in Clinical Nursing*. 13(8): 913–924.

- SADC Gender Policy. African Future. Southern African Development Community. Towards a Common Future 2007:1-36.
- Safety Matters @ Work. 2011. Workers Compensation Board of PEI. Guide to Working Alone Regulation. *WCB Information Series publication*: 1-12.
- Sass, J, 2002. Women men and environmental change: the gender dimensions of environmental policies and programs. USAID.
- Schaufeli, W. B. & Bakker, A. B. 2004. Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior*, 25(3), 293-315.
- Scheffler, E. Visagie, S. & Schneider, M. 2015. The impact of health service variables on healthcare access in a low resourced urban setting in the Western Cape, South Africa. *African Journal of Primary Health Care & Family Medicine* 7(1):1-11.
- Schilling, J. 2006. On the Pragmatics of Qualitative Assessment. Designing the Process for Content Analysis. *European Journal of Psychological Assessment*. Vol. 22 No.1:28–37.
- Schnall, P.L., Landsbergis, P.A. & Baker, D. 1994. Job strain and cardiovascular disease. *Annual Review of Public Health* Volume 15:381–411.
- Scott, D.F. & Grayson R.L. 2008. *Social and Economic Perspectives*. Phuskele P, ed., Hyderabad, India: Icfai University Press.
- Shahriari, M. Mohammadi, E. Abbaszadeh, A. & Bahrami, M. 2013. Nursing ethical values and definitions: A literature review. *Iranian Journal of Nursing and Midwifery*. Vol. 18, 1:1-8.
- Sharma, S. 2010. The impact of mining on women: lessons from the coal mining Bowen Basin of Queensland, Australia. *Impact Assessment and Project Appraisal*, 28 (3), September 2010: 201–215.
- Shenton, A.K. 2004. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22: 63–75.
- Shih, F. 1998. Triangulation in Nursing Research: issues of conceptual clarity and purpose. Methodological issues in nursing research. *Journal of Advanced Nursing*. Vol 28, 3:631-641.
- Simons, H. 2009. *Case study research in practice*. 2nd edn. Los Angeles: SAGE.

Simpson, R. 2004. Masculinity at Work: The Experiences of Men in Female Dominated Occupations. *Work Employment and Society*, Vol 18 No. 2:1-35.

Sithole, M., 2008. *Maintaining competitive advantage through the strategic integration of women into Impala Platinum mining* (Doctoral dissertation, North-West University).

Skar A. 2010. The Meaning of Autonomy in Nursing Practice. *J. Clinical Nursing*. August 19:2226-2234.

Skiba, R.J., Michael, R.S., Nardo, A.C. & Peterson, R.L. 2002. The Color of Discipline: Sources of Racial and Gender Disproportionality in School Punishment. *The Urban Review*, Vol. 34 No. 4 December: 317-342.

South Africa. 1991. *Maternity Benefit Act No 53 of 1961 as Amended in 2017*

South Africa. 1991. *Minerals Act, Act No 50 of 1991*.

South Africa. 1993. Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 as amended by Compensation for Occupational Injuries and Diseases Amendment Act No 61 of 1997.

South Africa. 1993. Occupational Health and Safety Act No. 85 of 1993 as amended by Occupational Health and Safety Amendment Act, Act No 181 of 1993.

South Africa. 1995. Hazardous Chemical Substances Regulations of 1995.

South Africa. 1995. Labour Relations Act No. 66 of 1995 as amended by Labour Relations Amendment Act No 42 of 1996 and Proclamation No. 66 of 1996 as amended by Labour Relations Amendment Act, Act No 127 of 1998.

South Africa. 1996a. Mine Health and Safety Act, Act No 29 of 1996.

South Africa. 1996b. Constitution of the Republic of South Africa, Act No 108 of 1996.

South Africa. 1997. Basic Conditions of Employment Act, Act No 75 of 1997.

South Africa. 1998. Employment Equity Act, Act No 55 of 1998 as amended by Employment Equity Act, Act No 47 of 2013.

South Africa. 2000. Mineral and Petroleum Resources Development Act, Act No. 28 of 2000.

South Africa's Code of Practice on Workplace Violence of 2003.

South Africa. 2003. National Health Act, Act No 61 of 2003.

- South Africa. 2008. Skill Development Act, Act No. 37 of 2008.
- South Africa. 2010. Mining Act, Act No 14 of 2010.
- South Africa. Protection from Harassment Act, Act No. 17 of 2011.
- South Africa. Protection of Information Act, Act No. 4 of 2013.
- Spitzer, D.L. 2005. Engendering Health Disparities. *Canadian Journal of Public Health*. Department of Anthropology, University of Alberta. Volume 96. Supplement 2. March –April: S78-S96.
- Staiger, T.O., Kritek, P.A., Blakeney, E.L., Zierler, B.K., O'Brien, K. and Ehrmantraut, R.H. 2017. A conceptual framework for applying the anticipatory theory of complex systems to improve safety and quality in healthcare. In *Anticipation and Medicine*:31-40. Springer International Publishing.
- Starfield, B. and Shi, L. 2002. Policy relevant determinants of health: an international perspective. *Health Policy*, 60 (3):201-218.
- Steel, A., Frawley, J., Dobson, A., Jackson, C., Lucke, J., Tooth, L., Brown, W., Byle, J. and Mishra, G. 2013. Women's health in NSW—a life course approach: a rapid review. *NSW Ministry of Health*, Sydney.
- Suchman, A.L. 2006. A New Theoretical Foundation for Relationship-centred Care. *Complex Responsive Processes of Relating*. January. Volume 21 Issue S1:540-544.
- Summary of the Beijing Declaration and Platform for Action. 1996. Advocates for Human Rights. Minnesota. January:1-39.
- Swim, J.K., Mallett, R. & Stangor, C. 2004. Understanding Subtle Sexism: Detection and Use of Sexist Language. *Sex Roles*, Vol.51, No. 3/4 August: 117-128.
- Tallichet, S.E. 1995. Gendered Relations in the Mines and the Division of Labour Underground. *Gender and Society*. Vol.9, No.6. December: 697-711.
- Thangaratinam, S. & Redman, C.W.E. 2005. The Delphi Technique. *The Obstetrician and Gynaecologist*, 7(2), 120-125.
- Tracy, S.J. 2010. Qualitative Quality: Eight "Big-Tent" Criteria for Excellent Qualitative Research. *Qualitative Inquiry*: 837-851.
- Turner, D.W. 2010. Qualitative interview design: A practical guide for novice investigators. *The qualitative report*, 15(3):754.

Tzannatos, Z. Women and Labor Market Changes in the Global Economy: Growth Helps, Inequalities Hurt and Public Policy Matters. *Social Protection Discussion Paper Series*. Social Protection Unit. Human Development Network. The World Bank. April 1998:1-29.

United Nations. 1979. *Convention on the Elimination of All Forms of Discrimination against Women*. Available from: <http://www.un.org/womenwatch/daw/csw/issues>

United Nations Millenium Declaration. 2000. Resolutions adopted by the General Assembly [without reference to a Main Committee (A/55/L.2)]. 8th plenary meeting. 8 September 2000.

Van Aardt, I., Bendeman, H., C. Christie, C., Gazi, S. & Schutte, P.C. 2008. Exploratory survey of women in mining in the South African mining industry with specific regards to but not limited to Occupational Health and Safety issues': Literature Review. *Draft Final Report*: 1-48.

Van der Linde, H., Hofstad, C.J., van Limbeek, J., Postema, K. & Geertzen, J.H.B. 2005. Use of the Delphi Technique for developing national clinical guidelines for prescription of lower-limb prostheses. *Journal of Rehabilitation Research & Development*, 42(5): 693-704.

Van de Mortel, T.F. 2008. Faking it: social desirability response bias in self report research. School of Health and Human Sciences. Southern Cross University. ePublications@SCU. *Australian Journal of Advanced Nursing*. Volume 25 Number 4: 39-48.

Van Teijlingen, E., Pitchforth, E., Bishop, C. and Russell, E. 2006. Delphi method and nominal group technique in family planning and reproductive health research. BMJ Publishing Group for Royal College of Obstetricians and Gynaecologists, Faculty of Sexual and Reproductive Healthcare.

Veninga, R.L. 2000. Managing hope in the workplace. Five simple strategies can help transform organizations. *Health progress (Saint Louis, Mo.)*, 81(2): 22.

Walby, S. 2005. Gender mainstreaming: Productive tensions in theory and practice. *Social Politics: International Studies in Gender, State & Society*, 12(3): 321-343.

Wang, M. 2013. Academic Library, e-Science/e-Research, and Data Services in a Broader Context.

Ward, B., Strongman, J., Eftimie, A& Heller, K. 2011. Gender-Sensitive Approaches for the Extractive Industry in Peru. *Improving the Impact on Women in Poverty and Their Families: Guide for Improving Practice*. 1-76.

- Wellins, R.S., Smith, A.B. and Erker, S. 2009. Nine best practices for effective talent management. *Development dimensions international*: 1-14.
- WHO. Department of Gender Women and Health. *Gender, Health and Work*. Gender and health information sheet. September 2004:1-4.
- WHO. *WHO Handbook for Guideline Development*. March 2010.:1-67. Geneva: WHO Press.
- Wilford, S.H., 2016. What is required of requirements? A first stage process towards developing guidelines for responsible research and innovation. *ACM SIGCAS Computers and Society*, 45(3):348-355.
- Willmott, R., 2002. Reclaiming metaphysical truth for educational research. *British Journal of Educational Studies*, 50(3):339-362
- Wolf, S., Schünemann, H.J., Eccles, M.P., Grimshaw, J.M. and Shekelle, P. 2012. Developing clinical practice guidelines: types of evidence and outcomes; values and economics, synthesis, grading, and presentation and deriving recommendations. *Implementation Science*, 7(1):61.
- World Health Organisation. 2009. *Women and health. Today's evidence tomorrow's agenda*. Geneva: WHO Press.
- World Health Organization, 2012. *Addressing the challenge of women's health in Africa: report of the Commission on Women's Health in the African Region*. World Health Organization.
- World Health Organization, 2014. *WHO handbook for guideline development*. World Health Organization.
- Yin, R.K. 2009. *Case study research. Designs and methods*. 4thedn. Thousand Oaks: SAGE.
- Yin, R.K. 2014. *Case study research. Designs and methods*. 4th edn. Thousand Oaks: SAGE.
- Yohani, S.C. & Larsen, D.J. 2009. Hope Lives in the Heart: Refugee and Immigrant Children's Perceptions of Hope and Hope-Engendering Sources During Early Years of Adjustment. *Canadian Journal of Counselling/Revue canadienne de counseling/* Vol. 43. No.4:246-264
- Youssef, C.M. & Luthans, F. 2007. Positive Organizational Behavior in the Workplace: The Impact of Hope, Optimism, and Resilience. *Journal of Management* Vol. 33 No.5 October:774-800.
- Zamenopoulos, T. and Alexiou, K., 2007. Towards an anticipatory view of design. *Design Studies*, 28(4): 411-436.

Zokwana, S. 2007. *10th year anniversary of women in mining*. Speech delivered to the NUM, 30 August, Gallagher Estates, Midrand.

Zungu, L.I. 2007. An evaluation of the occupational health programmes of the on-site clinic at a newspaper production industry in South Africa: Peer reviewed. *Occupational Health Southern Africa*. November/December2007:14-19.

Zungu, L.I. 2016.Guidelines for the South African Small-Scale Mining to Comply with the Mine Health and Safety Act. *Draft Guidelines Mine Health and Safety Council*:1-185.

Zungu, L.I. 2012. Occupational Health and Safety challenges reported by women in selected South African gold and platinum mines. *Occupational Health Southern Africa*, 18 (5):6-13.

Zungu L.I. 2013. Prevalence of post-traumatic stress disorder in the South African mining industry and outcomes of liability claims submitted to Rand Mutual Assurance Company. *Occupational Health Southern Africa*. Vol.19 No. 2. March/April: 22-26.



ANNEXURES

ANNEXURE A1

INFORMATION LEAFLET AND INFORMED CONSENT FOR UNDERGROUND COALMINE WORKERS

TITLE OF STUDY:

THE FORMULATION OF GUIDELINES FOR AN OCCUPATIONAL HEALTH AND SAFETY PROGRAM TO ADDRESS WOMEN'S HEALTH CONCERNS OF MINeworkERS AT A SELECTED COALMINE IN MPUMALANGA, SOUTH AFRICA

Dear Participant

1) INTRODUCTION

I invite you to participate in a research study. This information leaflet will help you to decide if you want to participate. Before you agree to take part, you should fully understand what is involved. If you have any questions that this leaflet does not fully explain, please do not hesitate to ask the investigator, Mrs P Msibi

2) THE NATURE AND PURPOSE OF THIS STUDY

The purpose of this research is to find out what your health concerns as a woman underground mineworker are and how to find a way to get these women's health concerns addressed when you visit the Occupational Health and Safety (OHS) Centre when at work. You are a very important source of information regarding the women's health concerns of underground coalmine workers and how these women's health services can be included into current health services at the OHS centre.

3) EXPLANATION OF PROCEDURES TO BE FOLLOWED

After obtaining your consent I will do an interview with you, asking you some questions about your women's health concerns and how it can be addressed in the current health services provided to underground mine workers. You may feel uncomfortable about the nature of the information you need to provide. However, if you do not want to answer a question, you will not be forced to do so and nothing will happen to you or your position as an underground miner.

4) RISK AND DISCOMFORT INVOLVED

There are no risks in participating in the study other than some of the questions may make you feel uncomfortable. However, you need not answer these questions if you don't want to. Should the questions cause you to become emotionally upset, there will be trained counsellor available to assist you. The interview will take about 45 to 60 minutes of your time.

5) POSSIBLE BENEFITS OF THIS STUDY

Although you will not benefit directly from the study, the results of the study will enable me to make recommendations to the management of the mine to include women's health services as part of the health care services they are currently providing.

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 interview without giving any reason. Your withdrawal will not affect you or your access to the OHS centre in any way.

7) HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received written approval from the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria, telephone numbers 012 3541677 / 012 3541330.

8) INFORMATION AND CONTACT PERSON

The contact person for the study is Mrs P Msibi. If you have any questions about the study please contact her at the following cell phone number 082 468 1217. Alternatively, you may contact my supervisor at telephone number 012 354 2134.

9) COMPENSATION

Your participation is voluntary. No compensation will be given for your participation.

10) CONFIDENTIALITY

All information that you give will be kept strictly confidential. Once I have analysed the information no one will be able to identify you. Research reports and articles in scientific journals will not include any information that may identify you, your mine or OHS centre.

CONSENT TO PARTICIPATE IN THIS STUDY

I confirm that the person asking my consent to take part in this study has told me about nature, process, risks, discomforts and benefits of the study. I have also received, read and understood the above written information (Information Leaflet and Informed Consent) regarding the study. I am aware that the results of the study, including personal details, will be anonymously processed into research reports. I am participating willingly. I have had time to ask questions and have no objection to participate in the study. I understand that there is no penalty should I wish to discontinue with the study and my withdrawal will not affect any treatment or access to the OHS centre in any way.

I have received a signed copy of this informed consent agreement.

Participant's name (Please print)

Participant's signature: Date.....

Investigator's name (Please print)

Investigator's signature Date.....

Witness's Name (Please print)

Witness's signature Date.....

VERBAL INFORMED CONSENT

I, the undersigned, have read and have fully explained the participant information leaflet, which explains the nature, process, risks, discomforts and benefits of the study to the participant whom I have asked to participate in the study.

The participant indicates that s/he understands that the results of the study, including personal details regarding the interview will be anonymously processed into a research report. The participant indicates that s/he has had time to ask questions and has no objection to participate in the interview. S/he understands that there is no penalty should s/he wish to discontinue with the study and his/her withdrawal will not affect any treatment or access to the OHS centre in any way. I hereby certify that the underground mine worker has agreed to participate in this study.

Participant's Name (Please print)

Person seeking consent (Please print)

SignatureDate.....

Witness's name (Please print)

SignatureDate.....



ANNEXURE A2**INFORMATION LEAFLET AND INFORMED CONSENT FOR OCCUPATIONAL HEALTH PROFESSIONALS****TITLE OF STUDY:****THE FORMULATION OF GUIDELINES FOR AN OCCUPATIONAL HEALTH AND SAFETY PROGRAMME TO ADDRESS WOMEN'S HEALTH CONCERNS OF MINEWORKERS AT A SELECTED COALMINE IN MPUMALANGA, SOUTH AFRICA**

Dear Participant

1) INTRODUCTION

I invite you to participate in a research study. This information leaflet will help you to decide if you want to participate. Before you agree to take part, you should fully understand what is involved. If you have any questions that this leaflet does not fully explain, please do not hesitate to ask the investigator, Mrs P Msibi

2) THE NATURE AND PURPOSE OF THIS STUDY

The purpose of this research is to find out what the health concerns of woman underground mineworkers are and how to find a way to get these women's health concerns addressed when they visit the Occupational Health and Safety (OHS) Centre when at work. You are a very important source of information regarding your perceptions of women's health concerns of underground coalmine workers and how these women's health services can be included into current health services at the OHS centre.

3) EXPLANATION OF PROCEDURES TO BE FOLLOWED

After obtaining your consent I will do an interview with you, asking you some questions about the type of women's health concerns underground mineworkers present with and how it can be addressed in the current health services provided to underground mine workers. You may feel uncomfortable about the nature of the information you need to provide. However, if you do not want to answer a question, you will not be forced to do so and nothing will happen to you or your position as a professional nurse at the OHS centre.

4) RISK AND DISCOMFORT INVOLVED

There are no risks in participating in the study other than some of the questions may make you feel uncomfortable. However, you need not answer these questions if you don't want to. Should the questions cause you to become emotionally upset, there will be trained counsellor available to assist you. The interview will take about 45 to 60 minutes of your time.

6) WHAT ARE YOUR RIGHTS AS A PARTICIPANT?

2. Your participation in this study is entirely voluntary. You can refuse to participate or stop at any time during the interview without giving any reason. Your withdrawal will not affect you in any way.

7) HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received written approval from the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria, telephone numbers 012 3541677 / 012 3541330.

8) INFORMATION AND CONTACT PERSON

The contact person for the study is Mrs P Msibi. If you have any questions about the study please contact her at the following cell phone number 082 468 1217. Alternatively, you may contact my supervisor, Dr Leech at telephone number 012 354 2134.

9) COMPENSATION

Your participation is voluntary. No compensation will be given for your participation.

10) CONFIDENTIALITY

All information that you give will be kept strictly confidential. Once I have analysed the information no one will be able to identify you. Research reports and articles in scientific journals will not include any information that may identify you, your mine or OHS centre.

CONSENT TO PARTICIPATE IN THIS STUDY

I confirm that the person asking my consent to take part in this study has told me about nature, process, risks, discomforts and benefits of the study. I have also received, read and understood the above written information (Information Leaflet and Informed Consent) regarding the study. I am aware that the results of the study, including personal details, will be anonymously processed into research reports. I am participating willingly. I have had time to ask questions and have no objection to participate in the study. I understand that there is no penalty should I wish to discontinue with the study and my withdrawal will not affect me in any way.

I have received a signed copy of this informed consent agreement.

Participant's name (Please print)

Participant's signature: Date.....

Investigator's name (Please print)

Investigator's signature Date.....

Witness's Name (Please print)

Witness's signature Date.....

ANNEXURE A3**INFORMATION LEAFLET AND INFORMED CONSENT FOR MINE MANAGEMENT****TITLE OF STUDY:**

THE FORMULATION OF GUIDELINES FOR AN OCCUPATIONAL HEALTH AND SAFETY PROGRAMME TO ADDRESS WOMEN'S HEALTH CONCERNS OF MINeworkERS AT A SELECTED COALMINE IN MPUMALANGA, SOUTH AFRICA

Dear Participant

1) INTRODUCTION

I invite you to participate in a research study. This information leaflet will help you to decide if you want to participate. Before you agree to take part, you should fully understand what is involved. If you have any questions that this leaflet does not fully explain, please do not hesitate to ask the investigator, Mrs P Msibi

2) THE NATURE AND PURPOSE OF THIS STUDY

The purpose of this research is to find out what the health concerns of woman underground mineworkers are, and how these health concerns can be addressed when they visit the Occupational Health and Safety (OHS) Centre when at work. You are a very important source of information in this study regarding your perceptions on how women's health concerns can be addressed when women underground mineworkers visit the Occupational Health and Safety (OHS) Centre.

3) EXPLANATION OF PROCEDURES TO BE FOLLOWED

After obtaining your consent I will conduct an interview with you, asking you questions regarding how the women's health concerns of underground mineworkers can be addressed in the current health services provided to women underground mine workers. You may feel uncomfortable about the nature of the information you need to provide.

However, if you do not want to answer a question, you will not be forced to do so and nothing will happen to you or your position at the mine.

4) RISK AND DISCOMFORT INVOLVED

There are no risks in participating in the study other than some of the questions may make you feel uncomfortable. However, you need not answer these questions if you don't want to. The interview will take about 45 to 60 minutes of your time.

5) POSSIBLE BENEFITS OF THIS STUDY

Although you will not benefit directly from the study, the results of the study will enable us to make recommendations to mine management on incorporating women's health services as part of the health care services you are currently providing to the underground mine workers.

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 interview without giving any reason. Your withdrawal will not affect you in any way.

7) HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received written approval from the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria, telephone numbers 012 3541677 / 012 3541330.

8) INFORMATION AND CONTACT PERSON

The contact person for the study is Mrs P Msibi. If you have any questions about the study please contact her at the following cell phone number 082 468 1217. Alternatively, you may contact my supervisor, Dr Leech at telephone number 012 354 2134

9) COMPENSATION

Your participation is voluntary. No compensation will be given for your participation.

10) CONFIDENTIALITY

All information that you give will be kept strictly confidential. Once I have analysed the information no one will be able to identify you. Research reports and articles in scientific journals will not include any information that may identify you.

CONSENT TO PARTICIPATE IN THIS STUDY:

I confirm that the person asking my consent to take part in this study has told me about nature, process, risks, discomforts and benefits of the study. I have also received, read and understood the above written information (Information Leaflet and Informed Consent) regarding the study. I am aware that the results of the study, including personal details, will be anonymously processed into research reports. I am participating willingly. I have had time to ask questions and have no objection to participate in the study. I understand that there is no penalty should I wish to discontinue with the study and my withdrawal will not affect me in any way.

I have received a signed copy of this informed consent agreement.

Participant's name (Please print)

Participant's signature: Date.....

Investigator's name (Please print)

Investigator's signature Date.....

Witness's name (Please print)

Witness's signature Date.....

ANNEXURE B1

INTERVIEW GUIDE WOMEN UNDERGROUND MINeworkERS

- What are the most common health problems that you experience when working as underground mineworker at this mine?
- What are the available services for these types of health problems at the mine?
- What do you think can be done to ensure your own optimal health at work?
- In what way does the underground work environment contribute to the health problems?

The researcher will probe on issues as revealed in the interview.



ANNEXURE B2

INTERVIEW GUIDE PROFESSIONAL NURSES AT OHS CENTRE

- What services are provided at the OHS Centre for women underground mineworkers? Why these specific services?
- What are the specific women's health problems women underground mineworkers present with in this specific coalmine?
- What can be done to improve conditions underground to assist in promoting the health of women underground mineworkers?
- What are your perceptions regarding incorporation of women's health services into the existing services at OHS centre to address the specific women's health concerns?

The researcher followed up on issues as revealed in the interview.



ANNEXURE B3

INTERVIEW GUIDE MINE MANAGEMENT

- What are your perceptions regarding incorporation of women's health services into the existing services at the OHS Centre to address the specific women's health concerns of women underground mineworkers?
- What are the specific women's health problems women underground mineworkers present with in this specific coalmine?
- What services are provided at the OHS Centre for women underground mineworkers? Why these specific services?
- What can be done to improve conditions underground to assist in promoting the health of women underground mineworkers?

The researcher probe on issues as revealed in the interview.



ANNEXURE C

APPROVAL FROM THE SELECTED COALMINE TO CONDUCT A STUDY

FHS APPLICATION FOR REVIEW FORM
(UPDATED 10 JUNE 2010)

SECTION 12

SIGNATURES:

PERMISSION FROM THE HEAD OF DEPARTMENT / INSTITUTE WHERE THE STUDY WILL BE CONDUCTED

Name of Head of Department	Signature	Department
Dr. Colin Muzombane		

I/We, the undersigned

- have submitted all requested and required documentation, and have disclosed all information that may influence the approval of this application.
- agree to ensure that if the above-said study is approved, it will be conducted according to the submitted protocol and South African legal, ethical and regulatory requirements, and at no additional unauthorised expense whatsoever.
- agree to make available without delay all the results of this study to all relevant regulatory and provincial authorities.

Name of Researcher / Student	Signature	Date
Princess Nelisiwe Msibi	<i>P. Msibi</i>	15/11/12

A signature below indicates that the signing party has approved this protocol for submission to the Faculty of Health Sciences, Research Ethics Committee, University of Pretoria.

Name of Researcher / Student	Signature	Date
Princess Nelisiwe Msibi		

Supervisor must mark all the relevant boxes below, before signing:

1. Protocol contents and methodology YES NO
 2. Budget YES NO
 3. Informed consent YES NO
 4. The student has completed a TNM 800 course YES NO
- The student has completed another appropriate research methodology course(s) YES N/A

If "YES", specify:

Name of Supervisor (if applicable - for students)	Signature	Date
Dr Ronell Leech		

ANNEXURE D

PARTICIPANT INFORMATION LEAFLET DELPHI TECHNIQUE

TITLE OF STUDY:

THE FORMULATION OF GUIDELINES FOR AN OCCUPATIONAL HEALTH AND SAFETY PROGRAMME TO ADDRESS WOMEN'S HEALTH CONCERNS OF MINeworkERS AT A SELECTED COALMINE IN MPUMALANGA, SOUTH AFRICA

Dear Participant

1) INTRODUCTION

I invite you to participate as an expert in your field in my PhD research study. This information leaflet will help you to decide if you want to participate. Before you agree to take part, you should fully understand what is involved. If you have any questions that this leaflet does not fully explain, please do not hesitate to contact the investigator, Mrs P Msibi.

2) THE NATURE AND PURPOSE OF THIS STUDY

The purpose of this research is to develop guidelines to address the women's health concerns of women underground coalmine workers across the lifespan. The researcher compiled the guidelines after she conducted interviews with women underground mineworkers, the professional nurses at the occupational, health and safety centre, and mine managers at a specific coalmine in Mpumalanga, South Africa.

3) EXPLANATION OF PROCEDURES TO BE FOLLOWED

You will be required to participate, together with other experts in the field of women's health in a couple of e-mail rounds to assist with refining the guidelines to address the women's health concerns of women underground coalmine workers across the lifespan. Once you have decided to participate and indicated your consent, I will send you a copy of the draft guidelines together with the criteria to evaluate the quality of the guidelines. The researcher will communicate via email with panel members and your identity will remain anonymous. After the researcher receives feedback from the panel members she will revise the guidelines and resend it to all panel members who will then again review the guidelines. This process will be repeated until consensus is reached about the content of the guidelines and each of the guidelines has been evaluated against the set of criteria provided.

4) RISK AND DISCOMFORT INVOLVED

There are no risks in participating in the study. To time required per round will be approximately 30 minutes.

5) POSSIBLE BENEFITS OF THIS STUDY

Although you will not benefit directly from the study, the refined guidelines will enable the professional nurses, at the occupational, health and safety centre at the mine to address women's health concerns within the existing health care services they are currently providing to the underground mine workers. In addition, the researcher will provide the findings of the study to the mine management.

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 without giving any reason. Your withdrawal will not be held against you.

7) HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received written approval from the Research Ethics Committee of the Faculty of Health Sciences at the University of Pretoria, telephone numbers 012 3541677 / 012 3541330.

8) INFORMATION AND CONTACT PERSON

The contact person for the study is Mrs P Msibi. If you have any questions about the study please contact her at the following cell phone number 082 468 1217 or e-mail address - masiphileni@vodamail.co.za. Alternatively, you may contact my supervisor at Shirley.mogale@up.ac.za.

9) COMPENSATION

Your participation is voluntary and you will receive no compensation for participating.

10) CONFIDENTIALITY

All information that you give will be kept strictly confidential. Once I have analysed the information no one will be able to identify you. Research reports and articles in scientific journals will not include any information that could identify you.

CONSENT TO PARTICIPATE IN THIS STUDY:

I confirm that the person asking my consent to take part in this study has told me about nature, process, risks, discomforts and benefits of the study. I have also received, read and understood the above written information (Information Leaflet and Informed Consent) regarding the study. I am aware that the results of the study, including personal details, will be anonymously processed into research reports. I am participating willingly. I have had time to ask questions and have no objection to participate in the study. I understand that there is no penalty should I wish to discontinue with the study and my withdrawal will not affect me in any way.

I have received a signed copy of this informed consent agreement.

Participant's name (Please print)

Participant's signature: Date.....

Investigator's name (Please print)

Investigator's signature Date.....

Witness's name (Please print)

Witness's signature Date.....

ANNEXURE E

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 22/04/2014 and Expires 22/04/2017.



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Health Sciences Research Ethics Committee

28/05/2015

**Approval Certificate
New Application**

Ethics Reference No.: 206/2015

Title: THE FORMULATION OF GUIDELINES FOR AN OCCUPATIONAL HEALTH AND SAFETY PROGRAM TO ADDRESS WOMEN'S HEALTH CONCERNS OF MINeworkERS AT A SELECTED COALMINE IN MPUMALANGA, SOUTH AFRICA

Dear Mrs Princess Msibi

The **New Application** as supported by documents specified in your cover letter dated 25/05/2015 for your research received on the 26/05/2015, was approved by the Faculty of Health Sciences Research Ethics Committee on its quorate meeting of 27/05/2015.

Please note the following about your ethics approval:

- Ethics Approval is valid for 1 year
- Please remember to use your protocol number (**206/2015**) 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:

- 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.

We wish you the best with your research.

Yours sincerely

Dr R Sommers; MBChB; MMed (Int); MPharMed.

Deputy Chairperson of the Faculty of Health Sciences Research Ethics Committee, University of Pretoria

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).

☎ 012 354 1677 ☎ 0866516047 ✉ deepeka.behari@up.ac.za 🌐 <http://www.healthethics-up.co.za>
✉ Private Bag X323, Arcadia, 0007 - 31 Bophelo Road, HW Snyman South Building, Level 2, Room 2.33, Gezina, Pretoria

ANNEXURE F1



Faculty of Health Sciences

TITLE: The formulation of guidelines for the Occupational Health and Safety Program to address women's health concerns of mineworkers at a selected coalmine in Mpumalanga, South Africa.

As experts, you are requested to read the guideline and complete the rating scale using the described criteria by using an 'X' in the columns provided. Space is provided at the bottom of the table for comments and/or suggestions to improve the statement you disagree with

ROUND 1																													
You are requested to read the guideline and complete the rating scale using the described criteria by using an 'X' in the columns provided. Space is provided at the bottom of the table for comments and or suggestions to improve the statement you disagree or agree with.																													
CRITERIA																													
Rating scale 1=Strongly disagree 2=Disagree 3=Disagree some what 4=Undecided 5=Agree some what 6=Agree 7= Strongly agree		Credibility: The guideline is clear, simple and understood.							Dependability: The guideline is reliable and evident for consideration							Confirmability: The guideline is neutral (not biased) and is according to the participant's intent.							Transferability: The guideline is valid and applicable to be considered						
DOMAIN 3 (item 7-14): RIGOUR OF DEVELOPMENT																													
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Guideline 1-change management								X							X							X							X
Guideline 2-hazardous environment								X							X							X							X
Guideline3-psychosocial work environment								X							X							X							X

Total score																													
	Comment:																												

ANNEXURE F2



Faculty of Health Sciences

TITLE: The formulation of guidelines for the Occupational Health and Safety Program to address women's health concerns of mineworkers at a selected coalmine in Mpumalanga, South Africa.

ROUND 2																													
<p>You are requested to read the guideline and complete the rating scale using the described criteria by using an 'X' in the columns provided. Space is provided at the bottom of the table for comments and or suggestions to improve the statement you disagree or agree with.</p>																													
CRITERIA																													
Rating scale 1=Strongly disagree 2=Disagree 3=Disagree somewhat 4=Undecided 5=Agree somewhat 6=Agree 7= Strongly agree	Credibility: The guideline is clear, simple and understood.	Dependability: The guideline is reliable and evident for consideration	Confirmability: The guideline is neutral (not biased) and is according to the participant's intent.	Transferability: The guideline is valid and applicable to be considered																									
DOMAIN 3 (item 7-14): RIGOUR OF DEVELOPMENT																													
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	

DOMAIN 4 (item 15-17): CLARITY OF PRESENTATION																												
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Guideline 1- change management							X							X								X						X
Guideline 2- hazardous environment							X							X								X						X
Guideline3- psychosocial work environment							X							X								X						X
Guideline 4- health care							X							X								X						X
Guideline 5- human dignity							X							X								X						X
Guideline 6- safety participation compliance							X							X								X						X
Guideline 7- health care service access							X							X								X						X
Guideline 8- inspiring hope and resilience							X							X								X						X

ANNEXURE G

AGREE II TOOL

DOMAIN 1. SCOPE AND PURPOSE

1. The overall objective(s) of the guideline is (are) specifically described.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

2. The health question(s) covered by the guideline is (are) specifically described.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

DOMAIN 2. STAKEHOLDER INVOLVEMENT

4. The guideline development group includes individuals from all relevant professional groups.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

5. The views and preferences of the target population (patients, public, etc.) have been sought.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

6. The target users of the guideline are clearly defined.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

DOMAIN 3. RIGOUR OF DEVELOPMENT continued

10. The methods for formulating the recommendations are clearly described.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

11. The health benefits, side effects, and risks have been considered in formulating the recommendations.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

12. There is an explicit link between the recommendations and the supporting evidence.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

DOMAIN 4. CLARITY OF PRESENTATION

15. The recommendations are specific and unambiguous.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

16. The different options for management of the condition or health issue are clearly presented.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments

17. Key recommendations are easily identifiable.

1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
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Comments