

DISASTER PREPAREDNESS OF REGISTERED NURSES IN A CENTRAL HOSPITAL IN JOHANNESBURG

Lorato BaikanneMesse

A research report submitted to the
Faculty of Health Sciences, University of the Witwatersrand, Johannesburg
in partial fulfilment of the requirements for the degree
of
Master of Science in Nursing

Johannesburg, 2017

DECLARATION

I, Lorato BaikanneMesse, declare this report is my own work and is being submitted to the Faculty of Health Sciences, as a requirement for the fulfilment of a Master's degree in Nursing. This report has never previously been submitted or published for any other degree or purpose.

Signature:.....

.....day of.....2017

Protocol no:M160533

ACKNOWLEDGEMENTS

I thank God for the strength he gave me in the past 2 years; it was not a walk in a park. I dedicate my research report to my son Thato Gabonthone, I hope he will always value the gift of knowledge and education as much as I do. My mother taught me that education is a gift no one will ever take from me. This work is also dedicated to my loving, supportive husband, whose constant encouragement and belief in me helped me achieve this. I extend my appreciation to my parents, my brothers and sisters, as they have always believed I am destined to achieve higher and have pushed me thus far. I am very grateful to my supervisor Vivian Herbert. We fought, we laughed, she made me cry, made me frown, made me scream to myself, but all in good faith. If it had not been for her guidance, this work would not have been a success. God, now I put before you, the mastermind behind it all, Dr. Schmollgruber, no words can describe what she is; I just want to say thank you for making it all possible for me. I thank Tebogo Mamalelala, in her I found a sister, a mentor, a colleague and a friend all wrapped in one. She pushed me from the beginning of it all until the last day and through it all, she never lost hope in me. I would like to thank my colleague Tlamelo Direng for her support, advice and encouragement. Lastly, I thank my statistician LeeAnne for all the help she gave me. To the nurses in the medical and surgical wards, thank you for participating in my study, you were all wonderful.

To God be all the Glory

DISASTER PREPAREDNESS OF REGISTERED NURSES IN A CENTRAL HOSPITAL IN JOHANNESBURG

ABSTRACT

Background: Approximately 250 million people per year are affected by disasters (manmade or natural). In South Africa, the types of disasters that occur commonly are road accidents, manmade fires, explosions, storms, river floods and wild fires. The challenges faced in dealing with the complexity of disasters requires each nurse to have a knowledge base and minimum set of skills to enable them to plan for and respond to a disaster in a timely and appropriate manner.

Purpose: To ascertain whether registered nurses, practicing in medical and surgical wards in a central hospital in Johannesburg are prepared for disasters.

Design: A quantitative, descriptive, exploratory survey study design was used in this study.

Method: The study was conducted in a central hospital in Johannesburg. A survey questionnaire, developed by Fung *et al.* (2008) and modified for the South African setting, was used for this study. The population for this study was 192 registered nurses, working in the medical and surgical wards of a central hospital in Johannesburg. A total sample of 192 participants was used. The data was analysed using descriptive statistics, ordinal logistic regression and summative content analysis. Statistical assistance was sought from a statistician.

Results: Four major findings emerged from the data. The data revealed the majority of the nurses (52.45%; n=75) had not previously participated in disaster activities and had limited disaster training and education. Previous participation in disaster activity had influenced nurse's disaster preparedness, however nurses perceived themselves generally prepared.

Conclusion statement: even though nurses have indicated the need and interest in attending educational courses on disaster, the majority have not attended them. Disaster drills have also been found to be an important exercise to assist the nurses in disaster preparedness. Therefore hospitals are urged to be consistent with their disaster drills and regularly update their disaster management protocols.

Clinical significance: An understanding of how prepared registered nurses perceive themselves to be, to respond to a disaster, would help assist in identifying the weaknesses and strengths in disaster preparedness in medical and surgical wards.

TABLE OF CONTENTS

	Page
DECLARATION	i
ACKNOWLEDGEMENTS	ii
ABSTRACT	iii
TABLE OF CONTENTS	v
LIST OF FIGURES	ix
LIST OF TABLES	x

CHAPTER ONE: OVERVIEW OF THE RESEARCH STUDY

1.0	INTRODUCTION	1
1.1	BACKGROUND OF THE STUDY	1
1.2	PROBLEM STATEMENT	4
1.3	PURPOSE OF THE STUDY	5
1.4	RESEARCH OBJECTIVES	5
1.5	SIGNIFICANCE OF THE STUDY	5
1.6	RESEARCHER'S ASSUMPTIONS	6
1.6.1	Theoretical assumptions	6
1.6.2	Operational definitions	7
1.7	OVERVIEW OF RESEARCH METHODOLOGY	9
1.7.1	Research Design	9
1.7.2	Research Methods	9
1.8	ETHICAL CONSIDERATIONS	9

1.9	VALIDITY AND RELIABILITY OF THE STUDY	9
1.10	LAYOUT OF THE STUDY	10
1.11	SUMMARY	10

CHAPTER TWO: LITERATURE REVIEW

2.1	INTRODUCTION	11
2.2	WHAT IS A DISASTER	12
2.3	SOUTH AFRICAN DISASTER MANAGEMENT	12
2.4	HOSPITAL DISASTER MANAGEMENT	12
2.4.1	Hospital Disaster Protocol	13
2.4.2	Hospital Disaster Management Cycle	14
2.4.2.1	Preparedness	15
2.4.2.2	Response	15
2.4.2.3	Recovery	16
2.4.2.4	Development	16
2.4.2.5	Mitigation	16
2.4.2.6	Disaster triage	16
2.5	NURSES DISASTER COMPETENCIES	17
2.6	NURSING PERCEPTIONS OF THEIR ROLES AND WILLINGNESS AND TO ATTEND DISASTERS	18
2.6.1	Perceptions of Nurses Roles in a Disaster	18
2.6.2	Willingness to Work During a Disaster	19
2.6.2.1	Demographic details	20
2.6.2.2	Types of disaster and knowledge on disaster preparedness	20
2.6.2.3	Family	20
2.6.2.4	Hospital disaster management protocols	21
2.6.2.5	Concern for safety	21
2.6.2.6	Sense of professionalism	21
2.6.2.7	Behaviour modelling	22
2.7	NURSES DISASTER TRAINING AND EDUCATION NEEDS	22
2.7.1	Barriers to Nurse's Disaster Training and Education	23
2.8	NURSES PERCEIVED LEVEL OF DISASTER PREPAREDNESS	24

2.9	WHAT CONSTITUTES POOR DISASTER PREPAREDNESS AMONGST REGISTERED NURSES?	24
2.9.1	Limited Education and Training of Nurses on Disaster Preparedness	25
2.9.2	Lack of Exposure and Disaster Drills	25
2.10	STRATEGIES TO IMPROVE DISASTER PREPAREDNESS AMONG REGISTERED NURSES	25
2.11	LEGAL AND ETHICAL ISSUES SURROUNDING NURSE'S DISASTER PREPAREDNESS	26
2.11.1	Safety	26
2.11.2	Ethical Obligations	27
2.11.3	Legal Implications	27
2.12	SUMMARY	28
 CHAPTER THREE: RESEARCH METHODOLOGY		
3.1	INTRODUCTION	29
3.2	OBJECTIVES OF THE STUDY	29
3.3	RESEARCH DESIGNS	29
3.3.1	Quantitative	30
3.3.2	Descriptive	30
3.3.3	Exploratory	30
3.3.4	Survey design	31
3.3.5	Setting	31
3.4	RESEARCH METHOD	31
3.4.1	Population	31
3.4.2	Sampling and sampling	32
3.4.3	Data Collection	32
3.4.4	Data Analysis	36
3.4.5	Variables	37
3.5	ETHICAL CONSIDERATIONS	38
3.5.1	Informed consent	38
3.5.2	Permission to Conduct Research	38
3.5.3	Anonymity and Confidentiality	39

3.6	VALIDITY AND RELIABILITY	39
3.7	SUMMARY	40

CHAPTER FOUR: RESULTS AND DISCUSSION OF FINDINGS

4.1	INTRODUCTION	41
4.2	APPROACH TO DATA ANALYSIS	41
4.3	RESULTS AND FINDINGS	41
4.3.1	Section A: Demographic characteristics	41
4.3.1.1	Number of years worked in the hospital	43
4.3.1.2	Years of nursing experience	43
4.3.1.3	Highest level of nursing qualification	44
4.3.2	Section B: Knowledge of Disaster Preparedness	44
4.3.2.1	Previous disaster situations that happened in South Africa.	45
4.3.2.2	Likelihood of disasters happening in South Africa.	46
4.3.2.3	Agencies considered most involved in disastrous situations in South Africa.	47
4.3.2.4	General public knowledge on disaster preparedness.	48
4.3.2.5	Source of information on disaster management.	48
4.3.2.6	Training on disaster preparedness	49
4.3.2.7	Availability of disaster management protocol at the workplace	50
4.3.2.8	Information pertaining to disaster management protocol at the workplace	51
4.3.2.9	Factors associated with disaster preparedness	53
4.3.2.10	Definition of the word disaster	59
4.4	DISCUSSION OF RESULTS	61
4.5	SUMMARY	67

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS AND LIMITATIONS

5.1	INTRODUCTION	68
5.2	SUMMARY OF THE STUDY	68
5.2.1	Purpose of the Study	68
5.2.3	Research Methodology	68

5.3	SUMMARY OF MAIN FINDINGS	69
5.4	LIMITATIONS OF THE STUDY	70
5.5	RECOMMENDATIONS OF THE STUDY	71
5.5.1	Clinical Nursing Practice	71
5.5.2	Nursing Education	72
5.5.3	Nursing Research	72
5.6	CONCLUSION	72
5.7	SUMMARY	74
REFERENCES		75
APPENDIXES		
APPENDIX A	Survey questionnaire	80
APPENDIX B	Participant information letter	88
APPENDIX C	Permission to conduct research at the hospital	90
APPENDIX D	Clearance from Ethics Committee	91
APPENDIX E	Permission for research from the postgraduate office	91
APPENDIX F	Permission to use the survey questionnaire from the developer	93
APPENDIX G	Proofreading and Language Editing	95

LIST OF FIGURES

Figure		Page
1.0	Conceptual framework	7
2.1	Disaster management cycle	15
4.1	Number of years worked in the hospital	43
4.2	Distribution of number of years worked as a nurse	45
4.3	Distribution of respondents highest level of qualification	45
4.4	Top four situations mostly regarded as disasters	47
4.5	Nurses responses on general public knowledge on disaster preparedness	49
4.6	Availability of disaster protocols in the hospital	51

LIST OF TABLES

Figure		Page
2.0	Disaster codes against disaster patients and disaster severity	15
4.1	Demographic profile of respondents	43
4.2	Situations that occurred in South Africa and considered disasters	46
4.3	Likelihood of disasters happening in South Africa according to respondents	47
4.4	Agencies considered most involved in disastrous situations in SouthAfrica	48
4.5	Source of information on disaster management	50
4.6	Educational courses necessary for disaster preparedness	50
4.7	Information pertaining to disaster management protocol at the workplace and disaster preparedness	51
4.8	Association between nurse's disaster preparedness and demographic details, previous disaster participation and training on disaster preparedness	54

CHAPTER ONE

OVERVIEW OF THE STUDY

1.0 INTRODUCTION

This chapter provides an overview of the study and includes the history, background and a brief literature review on registered nurses' preparedness for disaster. The importance of this study will be clarified by research questions, research objectives, problem statement, purpose and significance of the study. A brief overview of the research assumptions and methodological assumptions are included in this chapter, followed by a description of the research methodology. At the end of the chapter the ethical considerations, validity and reliability of the study are discussed and finally an overview of the research report concludes the chapter.

1.1 BACKGROUND

The background of this study consists of a brief literature review of studies that were conducted on registered nurses' knowledge of disaster preparedness in South Africa, Africa and the world at large, and what international organisations say about disasters and nurses' preparedness.

Disasters (manmade or natural) can have devastating effects especially on developing countries. The challenges and complexities of disasters are many, thus communities and hospitals in South Africa need to be prepared for any disaster that may occur. In a hospital setting, disasters can be classified as internal or external, but for the purpose of this study, only external disasters shall be looked at. When an external disaster occurs, the casualties are brought to hospital and because of their numbers and severity of injuries, additional staff within the hospital are mobilised to assist the trauma staff. In order to mobilise staff, a disaster plan or protocol must be in place and adhered to by all disciplines within the hospital. Research is thus needed to assess how prepared the healthcare professionals are to respond to a disaster, especially the registered nurses.

Nurses are the forefront of the healthcare system, their level of disaster preparedness consequently determines the preparedness of the whole system. There is one study that has been found relating to this topic in South Africa. The study was conducted among hospital management and allied workers who acknowledged that they needed ongoing training on disaster preparedness and regular updating of disaster plans. There is no study that was done specifically among registered nurses in South Africa thus it was important to carry out this research in order to look closely into the registered nurses disaster preparedness.

According to the World Health Organization (2007), a disaster is “any occurrence that causes damage, ecological disruption, loss of human life, deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area.” Disaster preparedness is further defined by the World Health Organization (2007) as “a programme of long-term activities whose goals are to strengthen the overall capacity and capability of a community to manage efficiently all types of disasters and bring about an orderly transition from relief through recovery, and back to sustained development.” During disasters, nurses perform different roles such as triaging and care giving, and they should have the ability to react to disasters and play their roles during all stages of a disaster (preparedness, mitigation, response and recovery). It is therefore important for the nurses to possess the required knowledge and skills necessary for them to respond effectively to a disaster (Hammad, Arbon & Gebbie, 2010).

It has been suggested by the International Council of Nurses and International Nursing Coalition for Mass Casualty Education that no matter the nurse’s experience and area of specialty, they should be equipped with basic knowledge and skills necessary to respond to disasters (Yang, Xiao, Cheng, Zhu & Arbon, 2010). Veenema (2006) revealed that nurses lack knowledge on bioterrorism disaster and large scale disasters, but the majority are well informed on natural disasters.

A study conducted in Hong Kong by Fung, Loke and Lai (2008) reported that almost all the nurses in the study were inadequately prepared for disaster. More than three quarters of the total sample agreed they had a disaster protocol in their workplace and amongst them, more than half said they had read the protocol, whilst less than a quarter of the total sample said they did not have such protocols in their work places. This was consistent with results of a study conducted by Ibrahim (2014), in Saudi Arabia, on the “Nurses knowledge,

attitudes, practices and familiarity regarding disasters and emergency preparedness,” which revealed the nurses level of knowledge of the subject was below average. Perceptions of nurses disaster preparedness was researched amongst Jordanian nurses, whose results were consistent with the findings of the literature. The majority of the respondents (65%) said their disaster preparedness was weak, less than a quarter (18%) described their disaster preparedness as medium, while only 12% regarded their disaster preparedness as good and 5% said it was very good. Less than half (31%) of the respondents reported having had disaster education in their undergraduate programmes, 8% in graduate programmes and less than half reported they attained their disaster education through mock drills. Only 11% of the total sample had been exposed to real disasters. The nurses in this study indicated that they wanted more clarity about what roles to play during a disaster. Thus, the conclusion in this study was that nurses are inadequately prepared for disasters; their knowledge, skills and disaster preparedness needs continual reinforcement to improve self-efficiency for disaster management (Al Khalaileh, Bond & Alasad, 2012)

Hammad *et al.* (2010) did a study in South Australia on knowledge and perceptions of registered nurses roles in a disaster response. With a sample of 152 nurses, it was revealed that South Australian nurses lacked exposure to disaster activities although they had attained disaster education and training, however the relevance and appropriateness of their education was questionable and their level of disaster knowledge was low. The authors therefore concluded that nurses should be given appropriate disaster education and training and further research be made to explore the appropriateness of the nurse’s disaster training and education.

In a study by O’ Sullivan, Dow, Turner, Lemyre, Corneil, Krewski, Phillips and Amaratunga (2008), in Canada, 1543 nurses were surveyed to determine if they felt a sense of preparedness in the event of a large-scale event, and about the availability of programmes and policies in their workplaces on disaster preparedness. Half of the respondents said their workplaces did not have policies and programmes in place and they were not provided with continuing education on disaster preparedness at their workplaces. They also described themselves as unprepared for disasters and not adequately equipped to respond to large-scale disasters.

Nurses perception of disaster preparedness can be influenced by previous disaster experience, as well as education and training on disaster preparedness and management. Although nurses have a personal responsibility to prepare them-selves for disaster, hospital management should provide the means and make it possible for nurses to engage in disaster preparedness activities. Various disasters happening worldwide, resultant death tolls and health consequences for the victims should be an eye-opener to nurses to be prepared at all times (World Health Organization, 2007)

1.2 PROBLEM STATEMENT

Disasters do not happen every day, therefore maintaining preparedness amongst registered nurses is difficult. Insufficient knowledge on disaster preparedness and limited disaster experience are components for lack of disaster preparedness. Registered nurses need to be ready and prepared at all times so that when a disaster occurs they are equipped to activate the disaster plan timeously. Nurses still demonstrate lack of knowledge and skills to respond effectively to disasters despite the many initiatives that have been made by governments and non-governmental organisations, locally and internationally (Fung *et al.*, 2008). The above evidence indicates that a gap exists in the disaster preparedness of registered nurses. Nurses are the forefront of the healthcare system, their level of disaster preparedness consequently determines the preparedness of the whole system. This has been further explained by Brewer (2010), who stated that nurses working in non-emergency wards demonstrate confusion during disaster response. She further explained that registered nurses should be aware of the disaster management protocols in their workplaces in order for them to be aware of what to do if a disaster happens, as they are an important part of the disaster team.

This study attempted to answer the following questions.

1. What are the perceptions of registered nurses working in a medical or surgical ward regarding disasters and disaster preparedness in terms of whether they consider themselves ready to deal with disasters?
2. What are the training needs regarding disaster preparedness of registered nurses working in the medical and surgical wards of a central hospital in Johannesburg?

3. What are the factors associated with registered nurses disaster preparedness?

1.3 PURPOSE OF THE STUDY

The purpose of this study was to ascertain whether registered nurses, practicing in medical and surgical wards in a central hospital in Johannesburg, are prepared for disasters.

1.4 RESEARCH OBJECTIVES

The objectives of this study were:

1. To describe the perceptions of registered nurses working in a medical or surgical ward regarding disasters and disaster preparedness in terms of whether they consider themselves ready to deal with disasters.
2. To describe the training needs regarding disaster preparedness of registered nurses working in the medical and surgical wards.
3. To determine the factors associated with registered nurses disaster preparedness.

1.5 SIGNIFICANCE OF THE STUDY

An understanding of how prepared registered nurses perceive themselves to be, to respond to a disaster, would help assist in identifying the weaknesses and strengths in disaster preparedness in medical and surgical wards. Auerbach, Norris, Menon, Brown, Kuah, Schwieger, Kinyon, Helderma n & Lawry (2010) acknowledged that health professionals face the challenge of organising and implementing a disaster plan for large scale casualties and have significant gaps in disaster preparedness knowledge and skills. Emergency nurses have the first contact with patients during a disaster. Due to the shortage of emergency nurses in the country, registered nurses are expected to assist emergency nurses when a disaster occurs. They take orders from the emergency nurses, who at the time of disaster triage patients and help to stabilise unstable patients in the resuscitation rooms. During this time, registered nurses need to employ their emergency knowledge, skills and disaster competences to help emergency nurses relieve disaster victims. Loke and Fung (2014) stated that medical and surgical nurses make up the largest number in the nursing population, therefore their disaster management competencies need to be adequate for the care of patients in a disaster. Their preparedness indicates the competency of the

nursing workforce at large. There is one study that was done in the South African context on this topic, but the study focused on hospital management and allied workers not on registered nurses. Therefore it is important for this study to be undertaken among registered nurses . This study is significant for registered nurses

1.6 RESEARCHER’S ASSUMPTIONS

1.6.1 Theoretical Assumptions

Lobiondo-Wood and Harber (2010) define theoretical assumptions as the structure of concepts that act as a map for the study, providing the reason behind the development of research questions and hypothesis. They include conceptual frameworks, models used to guide the study and a definition of terms as pertaining to the study.

The conceptual framework for disaster preparedness states that previous participation in disaster activities in the hospital, training on disaster management and preparedness and demographic characteristics of the respondents would have an effect on the registered nurses disaster preparedness. (Ref to figure: 1.0)

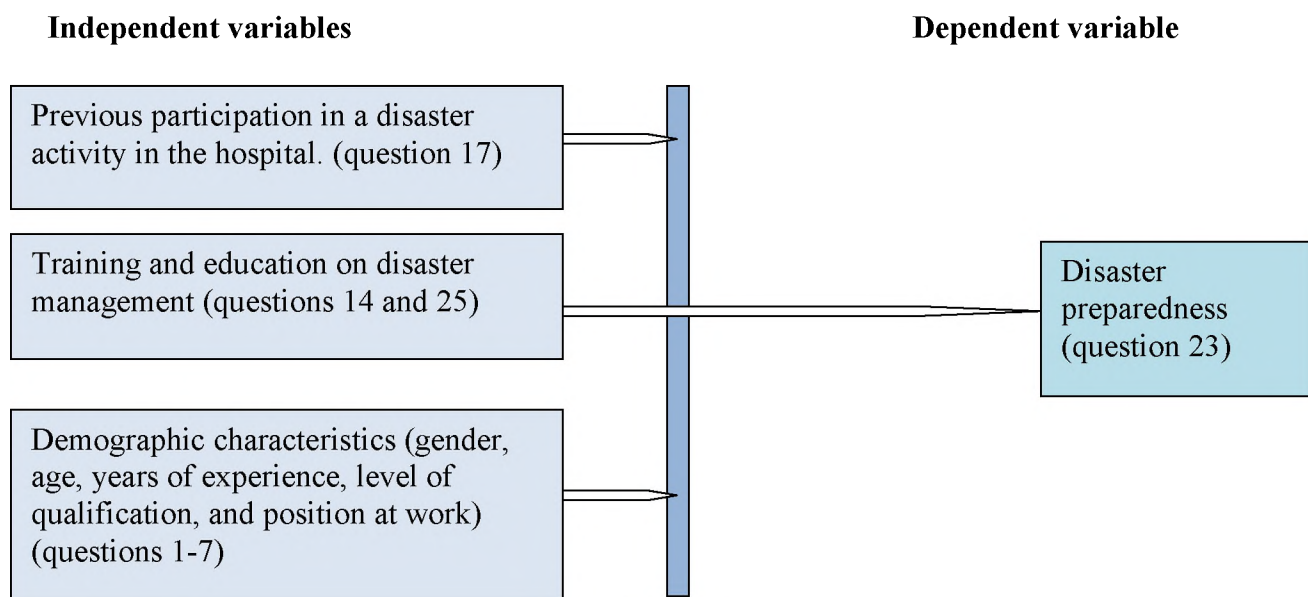


Figure 1.0: Conceptual framework of disaster preparedness

Source: Adopted and adjusted from Miles, Miles and Huberman (1994)

1.6.2 Operational definitions

Definitions for the purpose of this study

- Disaster preparedness

In this study, disaster preparedness refers to all registered nurses working in the medical and surgical wards having the appropriate knowledge and skills for disaster management before disaster strikes, regardless of type of disaster.

- Hospital disaster protocol

A systematic plan that states the procedure to be followed when a disaster occurs stating the roles and responsibilities of each hospital staff member.

- Registered nurse

A registered nurse is an individual who has received educational training at a SANC approved nursing education institution and has successfully completed the requirements for registration with the South African Nursing Council (South Africa Nursing Council, 2005). For this study, a registered nurse is an individual, who received training at a SANC approved institution and registered as such, working in the medical and surgical wards, who comes to the trauma unit to assist the emergency nurse in caring for injured patients when a disaster (mass external casualty) has occurred. The reason for this is there are more injured patients than the number of emergency nurse working on the specific day on which the disaster occurs.

- Disaster Education

In this study, the term education refers to any didactical formal education on disaster preparedness that is suitable for preparing the nurses for a disaster.

Disaster training

Training is defined as practical hands-on approach to disaster education, in the form of in-service lectures, disaster drills and real disaster participation.

- Knowledge

The amount of reliable nursing content and skill related to emergency and disaster preparedness to be able to practice safely.

- Disaster management

Disaster management is “a multi-sectorial coordination system based on utilisation of daily procedures managed by skilled, experienced and knowledgeable personnel to maximise use of available resources in providing effective and prompt care to disaster victims, ensuring that the hospital returns to normal daily operations as soon as possible” (Veenema, 2011). For the purpose of this study, this definition is adopted as it is.

- Competency

Competency refers to the level of nurse’s performance demonstrating the effective application of disaster knowledge, skill and judgment in a disaster event (Beer *et al.*, 2011).

- External disaster

This is a disaster that occurs outside the hospital and multiple casualties are taken to the hospital emergency department by a team of pre-hospital emergency staff.

- Internal disaster

This is a disaster that occurs within the hospital setting, such as a water leak inside the hospital that results in pooling of water in the buildings.

1.7 OVERVIEW OF METHODOLOGY

This section provides a brief overview of the study research methodology. Detailed description of the methodology will follow in Chapter Three.

1.7.1 Research Design

A quantitative, descriptive, exploratory, survey study design was used for this study. The setting of the study was Medical and Surgical wards of a central hospital in Johannesburg.

1.7.2 Research Methods

A survey questionnaire developed by Fung *et al.* (2008) was used to gather data for this study. The population in this study was all registered nurses practicing in the Medical and Surgical wards of a central hospital in Johannesburg. The total sample (n=192) was used. Data was analysed using descriptive statistics, inferential statistics and open-ended questions were analysed using summative content analysis.

1.8 ETHICAL CONSIDERATIONS

A brief overview of the Ethical considerations is provided, with details presented in Chapter Three. The Human Research Ethics Committee of the University of the Witwatersrand granted ethical clearance to conduct the study. The respondents were invited to participate after the researcher explained the purpose of the research to them. Raw data was accessible to the researcher and the supervisor.

1.9 VALIDITY AND RELIABILITY OF THE STUDY

An overview of the reliability and the validity of the study are provided. A detailed discussion follows in Chapter Three. In order to ensure the feasibility of the study, a pre-test was done to help detect if there were errors in the original survey questionnaire. Reliability was maintained by accurate and consistent data recording. Only the principal

researcher was responsible for data collection; the supervisor and the principal researcher were the only ones who had access to raw data.

1.10 THE OUTLAY OF THIS STUDY

The layout of this study is as follows:

Chapter One: Overview of the study

Chapter Two: literature review: Literature review relevant to this study.

Chapter Three: Research Methodology

Chapter Four: Data analysis and discussion of results.

Chapter Five: Summary, conclusions, limitations and recommendations

1.11 SUMMARY

This chapter provided an overview of the study. A background on nurse's disaster preparedness was given. Also included were the problem statement, purpose of the study, its significance, research questions, research objectives and problem statement, an overview of the research assumptions and the research methodology. The chapter concluded with validity and reliability of the study, ethical considerations and the outlay of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

A literature review was done to explore thoroughly the topic of disaster preparedness of registered nurses with the view of describing their perceptions regarding disasters and disaster preparedness, in terms of whether they consider themselves ready to deal with disasters and to describe their training needs. The literature review for this study was obtained from the University of the Witwatersrand's Health Science Library using the following online databases: PubMed, Cumulative Index of Nursing and Allied Health Literature (CINHAL) Plus, Ebscohost and Google scholar. The following keywords were used to search: disaster preparedness, emergency preparedness, nurses disaster preparedness and hospital disaster management. Literature was reviewed from journal articles from 2004-2016. The review was organised in the following manner:

- What is a disaster?
- South African disaster management.
- Hospital disaster management.
- Nurses disaster competencies.
- Nurses perceptions of their roles and willingness to attend disasters.
- Nurses disaster education and training needs.
- Nurses perceived level of their disaster preparedness (readiness).
- What constitutes poor disaster preparedness among registered nurses?
 - Limited education and training of staff on disaster preparedness.
 - Lack of exposure and disaster drills.
- Strategies to improve disaster preparedness among registered nurses.
- Ethical issues surrounding nurse's disaster preparedness.

2.2 WHAT IS A DISASTER?

Disaster has no single agreed definition and there are numerous definitions by different international organisations in the literature. Regardless of the different definitions, they all have common concepts, which amongst the different definitions of a disaster are environmental destruction, loss of life and overwhelming the affected community's ability cope with its own resources (World Health Organization and International Council of Nurses, 2009). This study adopted the World Health Organization (2007) definition, which says a disaster is "a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources."

2.3 SOUTH AFRICAN DISASTER MANAGEMENT

Disasters are an unavoidable part of life globally and South Africa is no exception. Even though South Africa has only been affected by small scale disasters, which are regarded as minor, the impact of these are significant and exacerbated by the vulnerability of poverty-stricken people who live in informal settlements (Bean, Viljoen, Ittmann & Kekana, 2011). Severe floods in Cape Town in June 1994 stimulated the development of a white paper on disaster management in South Africa. This white paper resulted in the development of a Disaster Management Act, 2002 (Act No.57 of 2002), which was endorsed on 15 January 2003 (South African National Disaster Management Framework, 2005).

The act provided for the following:

- An integrated and coordinated disaster risk management policy, focusing on the prevention and reduction of disaster risks, mitigation of severe disasters, preparedness, timely and effective response to a disaster and post-disaster recovery.
- The establishment of disaster management centres.
- Disaster volunteers.

2.4 HOSPITAL DISASTER MANAGEMENT

Disaster management is a multi-sectorial coordination system based on utilisation of daily procedures managed by skilled, experienced and knowledgeable personnel to maximise

use of available resources in providing effective and prompt care to disaster victims, ensuring that the hospital returns to normal daily operations as soon as possible (International Strategy for Disaster Reduction, 2009). A disaster is not just a large scale occurrence, it has a significant impact on the community, population, infrastructure and the available resources required for effective response, producing long term consequences pertaining to recovery and rehabilitation and has a tendency of overwhelming the hospital surge capacity (World Health Organization, 2007). The ultimate goal of hospital disaster management is the reduction of the impact on human wellbeing, by providing effective emergency interventions and providing ongoing services during and after a disaster (Zhong, Clark, Zang & FitzGeralt, 2014)

2.4.1 Hospital Disaster Protocol

The South Africa Disaster Management Amendment Act (2015) calls for all health organisations to have a documented disaster management protocol in place that indicates the potential disasters in the environment within which the institution is located and state clearly the responsibilities of all health professionals when a disaster occurs. The hospital disaster protocol helps in defining the command structure and job cards to avoid everyone being the commander when a disaster strikes (International Strategy for Disaster Reduction, 2009). The hospital in which the research was conducted has a disaster management protocol, which indicates what to do in case of disasters (bomb threat, floods, and biohazard cytotoxic spills). It also includes the job cards, which are numbered from one to six, stating the responsibility of each healthcare worker during a disaster.

Job card number one is the coordinator. The duty of the coordinator is to facilitate evacuation from the hospital, allocates second in charge, runner communicator, person in charge of drugs and documentation. The coordinator also triages patients and identifies the emergency exit. Job card number two is the second in charge, who helps with decision making, fetches the fire extinguishers in case of a fire, ensures that all patients have resuscitation bags and prepares to disconnect patients from ventilators. They also await evacuation instructions from the coordinator, and allocate nurses to bag and stay with patients. Job card number three is third in charge. The duty of the third in charge is to compile a list of all the staff and patients, do a visitor head count and assembles patients

files and records. Job card number four is the communicator whose role is to receive incoming calls and disseminate information to coordinators. The fifth job card is the runner, whose purpose is to open fire escape exits, monitor disabled patients and ensure that lifts are not used during evacuation. The last job card number is six, is the drug controller who collects the emergency box and ensures all emergency drugs and fluids are in the box.

The hospital disaster protocol for the hospital of study also has codes that are used to indicate the severity of the disaster and that of patients.

Table 2.1: Disaster codes against disaster patients and disaster severity

Disaster Code	Disaster Patients		Disaster Severity
	Priorities	Type of patient	
Code red	Priority one	Resuscitation case, attended immediately.	Severe disasters. Multiple casualties brought. A call out is made to bring in more healthcare workers.
Code yellow	Priority two	Direct admissions to high care areas.	Managed in casualty, no extra staffing from other wards is needed.
Code green	Priority three	Walking but wounded patients.	A minor disaster
Code black	Priority four	Dead patients	Last offices

2.4.2 Hospital Disaster Management Cycle

Disaster management is described in different phases: preparedness, response, recovery, development and mitigation.



Figure 2.1 Disaster management cycle

Source: International Strategy for Disaster Reduction (2009)

2.4.2.1 Preparedness

This phase evaluates the facility's readiness or vulnerability to disasters. Zhong *et al.* (2014) conducted a study on the progress and challenges of disaster health management in China, with the aim of providing an overview of challenges of hospital disaster management. Findings from their study indicated that an effective disaster response is preceded by sufficient disaster preparedness; a lack of disaster preparedness was noted by poor coordination during a disaster, lack of emergency training, disaster drills and lack of knowledge on how to operate emergency equipment. They further indicated that lack of emergency portable equipment is a sign of poor preparedness and concluded that a well-prepared institution should have portable equipment, such as radiography or ultrasonography machines, thus making onsite triaging more simple and improving patient care.

2.4.2.2 Response

The response phase entails the implementation of the immediate actions taken when a disaster occurs; it utilises the incident command system, should be simple and modified whenever improvements are deemed necessary (Zhong *et al.*, (2014). All the response

activities should continually be monitored and adjusted to adapt to the changing situations of a disaster (International Strategy for Disaster Reduction, 2009). Zhong *et al.* (2014) reported that a rapid and effective response is critical, as it offsets a field triage and increases patient survival if interventions are made timeously.

2.4.2.3 Recovery

The institution and the healthcare staff need to recover once the disaster incident is over. During a disaster, services are disrupted and it takes time for them to return to normal, but recovery becomes easy if during the response phase, staff members are assigned to the disaster and others to maintain services in the organisation (International Strategy for Disaster Reduction, 2009). Zhong *et al.* (2014) added that during the recovery phase of a disaster, psychological interventions are sort for the victims, as well as their families and friends.

2.4.2.4 Development

This phase of disaster management cycle often receives the least attention. A formal evaluation is done to determine if the disaster plan worked, and any problems encountered (International Strategy for Disaster Reduction, 2009).

2.4.2.5 Mitigation

The mitigation phase involves the steps taken to lessen the impact of a disaster. Examples of mitigation activities include installation and maintenance of backup generators in cases of power failures and training staff members on disaster preparedness to maintain service delivery during disaster (International Strategy for Disaster Reduction, 2009)

2.4.2.6 Disaster triage

Triage is a process that prioritizes patients by their needs, placing the right patients in the right place at the right time to receive the right level of care (International Strategy for Disaster Reduction, 2009). An effective triage protocol is based on the severity of the disaster together with the availability of resources and is central to improving care capacity

during a disaster (Zhong et al., 2014). In their study, Zhong et al. (2014) discovered the nurses were found to have inadequate skills on triaging and this was attributed mainly to lack of appropriate disaster education and training.

2.5 NURSES DISASTER COMPETENCIES

Competency is a combination of abilities, knowledge, skills and behaviour needed to carry out a specific task successfully (Loke and Fung 2014). The International Council of Nurses recognised the importance of registered nurses involvement in disaster preparedness and management, and developed a framework of registered nurses competencies from which disaster nursing competencies were developed (World Health Organization and International Council of Nurses, 2009). This framework covers competencies during disaster prevention/ mitigation, disaster preparedness, disaster response and recovery/rehabilitation. As registered nurses represent the largest group of healthcare professionals, they play a significant role in planning for, responding to and mitigating serious disasters (World Health Organization and International Council of Nurses, 2009). It was advised by the International Council that countries derive and use this framework as a guide within which they can modify and apply competencies for their communities and make it culturally relevant to the served community (Fung & Loke, 2014). The 10 domains of competencies listed under this framework are risk reduction, disease prevention and health promotion, policy development and planning, ethical practice, legal practice and accountability, communication and information sharing, education and preparedness, care of communities, care of individuals and families, psychological care and care of vulnerable populations (special needs populations) (World Health Organization and International Council of Nurses, 2009). However, in a report by the Red Cross and Red Crescent Societies (2011) it has been noted that nurse's competencies are not fully utilised during disaster preparation and response.

Loke and Fung (2014) conducted a study on nurses perceived disaster competencies in accordance with the 10 domains of nurse's disaster competences, as set by the International Council of Nurses in each stage of disaster. They revealed in their study that nurses across all specialties (medical, surgical, ICU, trauma and community) considered risk assessment and management, planning for specific incident management, provision of appropriate

protective materials and development and planning of organisational guidelines or protocol for disaster management as the most important competences during the disaster prevention and mitigation phase. However, the results of their study indicated that the medical and surgical nurses did not find adhering to infection control principles and the need for contingency plans for disasters important in disaster prevention and mitigation, while the Critical Care and community health nurses felt they were very important. Instead, the medical and surgical nurses expressed concern about manpower deployment and believed legal liability and professional code of conducts should be reinforced in all stages of disaster preparedness.

The World Health Organization and International Council of Nurses (2009) stated that, being the largest group in the health sector and first responders during times of disasters, nurses play a vital role and often find themselves working under unfavourable conditions, with very limited resources. However all these roles can only be accomplished successfully if the nurses have the required basic disaster competencies.

Chapman and Arbon (2008) shared the same view with the World Health Organization and added that during a disaster, nurses are entrusted with the lives of disaster victims therefore should possess a minimum set of competencies that will enable them to carry out their roles, for example, safely transferring a patient from the acute care setting to a disaster ward where minor to moderate injury victims are admitted, triaging and disseminating information. However, in a study conducted by Baack and Alfred (2013) it was reported that nurses' disaster competency was low, with the majority demonstrating unpreparedness and lack of confidence in the ability to respond effectively to a disaster and they concluded that the nurses' disaster competence was largely influenced by previous participation in major disasters, self-regulation and willingness to be involved in nursing disaster.

2.6 NURSING PERCEPTIONS OF THEIR ROLES AND WILLINGNESS AND TO ATTEND DISASTERS

2.6.1 Perceptions of Nurses Roles in a Disaster

Clarifying and clearly communicating the roles played by nurses during a disaster helps department managers to allocate nurses in their specific roles and avoid confusion

(Whetzel, Walker-Cillo, Chan, Trivett, Hamiton & Morristown, 2013). Labrague, Yboa, Petite, Lobrino, Brennma (2015) conducted a study to explore nurses' perceptions of disaster preparedness and the evidence from their study suggested that nurses perceived themselves as frontline caregivers during a disaster, providing immediate care to victims, educating the public on disasters and disaster preparedness. They further stated other nurse's roles to be on site triaging, supporting and protecting others from potential disasters. Yang *et al.*(2010), Baack and Alfred (2013) and Magnaye, Munoz, Munoz, Munoz and Muro (2011) concurred with this and continued to say that apart from perceiving themselves as immediate care providers, nurses also perceive themselves to be the cornerstone of problem solving during a disaster and coordinating the activities of the day. These findings are supported in the study conducted by Ranse and Lenson (2012), who indicated that in addition to giving direct care, nurses see themselves as also giving psychological support to disaster victims and their families, coordinate care and resources and being problem solvers. Ayuba, Danjuma, Nassa, Joseph, Mathew and Micheal (2015) conducted a study where a random sample of 120 nurses were given a self-administered questionnaire to explore the roles of nurses in emergency preparedness and the findings indicated that more than half of the participants, (53%) perceived the nurses' role during disaster as community health care providers. Less than half (43%) strongly believed that nurses facilitate communication and coordinate care amongst multi-disciplinary healthcare teams. More than 55% believed that a nurse's role was to collaborate with members of the multidisciplinary team in providing care to patients.

2.6.2. Willingness to Work During a Disaster

An understanding of the factors that influence the nurse's ability and willingness to respond to a disaster call is vital to ensuring an adequate workforce during a disaster (Arbon, Cusack, Ranse, Shaban, Considine, Kako, Woodman, Mitchell, Bahanisch & Hammad, 2013). Evidence-based research findings have identified factors that influence nurses willingness to attend disasters. These factors, although they may enhance nurse's willingness to work in disasters, they may also be barriers.

2.6.2.1 Demographic characteristics

Arbon *et al.* (2013) reported that males are more willing to offer their services when a disaster occurs than females. This is contrary to what Ogedegbe, Nyireuda, DelMoro, Yamin and Feldman (2012) revealed, as their findings indicated that gender has no influence on nurses' willingness to work during a disaster, but a difference was seen in age where older nurses were seen to be more willing to work disasters than their younger counterparts.

2.6.2.2 Types of disaster and knowledge on disaster preparedness

Arbon *et al.* (2013) and Adams and Berry (2012) conducted studies on exploring staff willingness to attend work during a disaster. They argued that being uncertain about the type of disaster and lack of knowledge on disaster preparedness acted as a barrier to the nurse's willingness. They added that the type of disaster greatly influenced nurse's willingness to attend disasters; where a building had collapsed or a plane crash, nurses would attend the disaster in large numbers but in the case of a biohazard, chemical terrorism event or smallpox epidemic they think twice, consider the risk, their own safety and wellbeing and have fear of threatening their own lives. Arbon *et al.* (2013) found that nurses with little knowledge on disaster preparedness have shown a reluctance in working during disasters over those with knowledge and previous experience.

2.6.2.3 Family

Nurses regarded themselves as household caretakers therefore reporting to duty during a disaster was a challenge to them, because their responsibilities at home remained and the inability to contact their families for a long time (Arbon *et al.*, 2013). This is constant with the findings from Adams and Berry (2012), Ogedegbe *et al.* (2012) and Spain, Clements, DeRanieri and Holt (2012), whose findings indicated that the perceived inability to communicate with friends and family while at work during times of disaster acts as a barrier to nurses willingness to commit to work when a disaster occurs. Arbon *et al.* (2013) reported that willingness to work in a disaster was increased when nurses were able to stay in touch with family members. Therefore, they suggested that creating a good

communication channel during times of disasters would enhance nurse's willingness to work in this instance.

2.6.2.4 Hospital disaster management protocols

Arbon *et al.* (2013) and Adams and Berry (2012) highlighted that due to inadequate hospital disaster management protocols, the staff end up with a lack of confidence in disaster preparedness, not knowing what they should do, which leads to a negative influence on their willingness to work during disasters. Nurses reported that their willingness to work could be enhanced if there was a detailed hospital disaster management protocol that they could easily implement when a disaster strikes. They also added that they needed a sense of security and confidence that the hospital management would not put them under risk and knowing what plan the management had for them during times of disasters (Ogedegbe *et al.*, 2012 & Spain *et al.*, 2012).

2.6.2.5 Concern for safety

The potential risks placed on the nurse also reduced the nurse's willingness to work in a disaster. Nurses have a fear of contracting communicable diseases, being injured or even worse, death (Arbon *et al.*, 2013). Lack of protective clothing, infection control measures and appropriate treatment further reduces the nurse's willingness to attend disasters (Spain *et al.*, 2012). Conversely, Ogedegbe *et al.* (2012) reported that the availability of protective clothing, prophylaxis, appropriate treatments and infection control measures greatly enhanced the nurse's willingness to attend disasters.

2.6.2.6 Sense of professionalism

In most instances nurses reported to duty because they felt it was their professional responsibility to report to work during a disaster (Arbon *et al.*, 2013). Hammad, Arbon, Gebbie and Hutton (2012) assert that a sense of professionalism increased the nurse's willingness to work in a disaster, as they felt obligated to work stating they had no choice but to answer the call of duty.

2.6.2.7 Behaviour modelling

Hammad *et al.* (2012) found in their study that junior nurses relied on the attitude and judgment of senior nurses to indicate whether there was a cause for concern or they were free to attend the disaster. The senior nurses provided leadership and strengthened a positive collegial relationship, which greatly enhanced the junior nurse's willingness to respond to a disaster.

2.7 NURSES DISASTER TRAINING AND EDUCATION NEEDS

The World Health Organization (2007) has recommended that all nations should have their healthcare workers prepared for disasters, no matter the frequency of occurrences in their country. Nevertheless, literature indicates that nurses are still inadequately prepared for disasters (Fung *et al.*, 2008). Education and training are the key to equip nurses with the necessary knowledge, skills and competencies for disaster response (Diab & Mabrouk, 2015; Labrague *et al.*, 2015; Loke & Fung, 2014).

Duong (2009) conducted a study on disaster education and training of emergency nurses in South Australia, with the aim, amongst others, to determine the extent of the nurses' disaster training and education. The findings of their study indicated that more than half (54%) of the nurses had attended a course which had minimal disaster component, 34% of the respondents had never attended training and education on disasters and only 14% indicated they had attended disaster specific courses. Duong (2009) added that appropriate and specific disaster courses are important ingredients in enhancing nurse's disaster preparedness and assists in making nurses feel more confident when a disaster occurs.

Baack and Alfred, (2013) conducted a study on nurses' preparedness and perceived competence in managing disasters. Findings from their study indicated that nurse's competency in disaster preparedness was increased when they had had hands on training, education and had participated in actual disaster events. Therefore they recommended that education must not only include basic disaster preparedness content but must be comprehensive, incorporating the application of knowledge, contingency planning and mass casualty care, and the nurses encouraged to participate and utilise training opportunities in disaster drills as well as actual disaster events.

Magnaye *et al.* 2011 conducted a research study on the role, preparedness and management of nurses during disasters. They aimed at determining the role and preparedness of nurses during a disaster. They revealed in their study that one of the greatest challenges nurses face, in their efforts to prepare themselves for disasters, was lack of training and education on disaster preparedness as well as the little time spent on disaster education at nursing schools. Their findings indicated the need for continued education on disasters and nurses' disaster preparedness, including in-service training and medical seminars. Loke and Fung (2014) studied nurses' competencies in disaster nursing. Their aim was to identify nurses' perceived disaster competencies with the view of making recommendations to nursing education. Their study focused in the medical/surgical nurse, critical care and community health nurses. They indicated in their study that in order for the nurses to be adequately prepared and competent during disasters, they should be equipped with the necessary knowledge and skills through continued education and trainings. They added that it is a global demand to add disaster care component in the education programme of nurses and their findings provided nurse educators with a guideline to tailor-make disaster education programmes for nurses.

2.7.1 Barriers to Nurse's Disaster Training and Education

Transition from the daily nursing activities to disaster activities can be very challenging, but it can be more difficult for nurses without disaster training or education (Peoples, Gebbie & Hutton, 2016). Schultz, Koenig, Whiteside and Murray (2012) conducted the study, Development of National Standardized All-Hazard Disaster Core Competencies for Acute Care Physicians, Nurses, and EMS Professionals, and one of their aims was to determine the barriers to and solutions for attaining the necessary knowledge and skills on disaster preparedness through education and training. Factors these researchers identified as barriers limiting the nurse's access to disaster training and education included lack of time and space in current training programmes to accommodate an expanded disaster curriculum, limited time for professionals to attend training courses and lack of funding to support disaster course development and professional training. Therefore, they suggested that focusing on competency-based training and education, providing short module course designs and online education, giving incentives for continuing education and ongoing disaster workshops, in-service lectures and conferences would enhance nurse's disaster training and education.

2.8 NURSES' PERCEIVED LEVEL OF DISASTER PREPAREDNESS

In the past decade, there has been a dramatic increase in the intensity and frequency of disasters of all kinds (Hay, 2012). Nurses represent the largest portion of the healthcare sector and consequently, the effectiveness of the healthcare system to respond to a disaster largely depends on level of preparedness of the nursing workforce (National Advisory Council on Nurse Education and Practice, 2009). It is important therefore that nurses are sufficiently prepared to respond to disasters of any kind (Veenema *et al.*, 2016).

Fung *et al.* (2008) conducted a study titled Disaster Preparedness among Hong Kong nurses, with the aim of exploring this phenomenon. A convenience sample of 174 Masters student nurses were selected for the study. The findings revealed that almost all respondents (97%) acknowledged they were inadequately prepared for a disaster. A study surveying 620 rural nurses, working in various specialties, in Texas found similar results regarding nurses' perceptions of their disaster preparedness. These results verified that nurse's competence levels with regard to disaster preparedness was very low and further, that they are not adequately prepared to respond to large scale disasters. They reckoned the nurses who demonstrated to be sufficiently prepared were those who had been involved in a disaster before, or had a disaster drill (Baack & Alfred, 2013). Evidence from the current literature adds more to the above statement, which states that despite the global call to all health workers to be prepared for disasters, the majority of the nurses remain unprepared (Yan, Turale, Stone & Petrini, 2015). Nurses lack the knowledge and skills to enable them to respond effectively to a disaster (Ibrahim, 2014; Lim, Lim & Vasu, 2013; Natan, Yevdayev, Qadan & Dudkiewicz, 2014).

2.9 WHAT CONSTITUTES POOR DISASTER PREPAREDNESS AMONG REGISTERED NURSES?

Research evidence suggests that awareness in disaster preparation amongst global healthcare workers has grown tremendously in the past decade, but the majority of nurses remain inadequately prepared to respond to disasters (Baack & Alfred, 2013; Duong, 2009; Fung *et al.*, 2008; Ibrahim, 2014). The factors listed below have been identified as contributors to the poor disaster preparedness of nurses.

2.9.1 Limited Education and Training of Nurses on Disaster Preparedness

Most countries have included disaster preparedness education in basic nurse's curricula, targeting basic disaster knowledge and skills to help prepare nurses for disasters (Labrague *et al.*, 2015). However, these authors indicated that the need for ongoing disaster education whilst at work has not been addressed and to date, no evidence has been provided to show the effectiveness of the disaster education that has been added to the basic nursing curricula. Conversely, Hammad *et al.* (2010) explained that hospital disaster education differs from one hospital to another, rendering it inconsistent amongst the nurse population. They added that to date, it is unclear on the content it entails, how evidence based it is, who runs the education sessions, their qualifications and the frequency of the sessions

2.9.2 Lack of Exposure and Disaster Drills

Due to lack of exposure on disaster events and disaster drills, nurses have unrealistic expectations of disaster response and demonstrate confusion during times of disaster (Hammad *et al.*, 2010), resulting in increased stress and poor patient outcome.

2.10 STRATEGIES TO IMPROVE DISASTER PREPAREDNESS AMONG REGISTERED NURSES

Previous exposure to disaster events and disaster drills create a better-prepared and more confident nursing workforce. Evidence has proved that nurses who have been previously involved in a disaster response have an advantage, because they have experience and knowledge, which results in diminished feelings of inadequacy and fear (Hammad *et al.*, 2010). Baack and Alfred (2013) added that nurses need opportunities to engage in disaster planning, mock drills and actual events, when possible, to increase competence in disaster situations, confidence in abilities and familiarity with disaster preparedness.

2.11 LEGAL AND ETHICAL ISSUES SURROUNDING NURSE'S DISASTER PREPAREDNESS

Registered nurses have been reliable responders to disasters, reaching out to help even when the situation compromises their own safety and wellbeing (Veenema 2011). The questions are therefore: Are registered nurses obliged to answer to call for duty when a disaster strikes? Is there an ethical obligation that forces them to respond to duty, and does the low willingness and their scope of practice require them to respond to disasters? Nurse's struggle with responding to disasters when they feel there is inadequate support to meet their family needs during disaster periods and when they are unsure of their professional ethical and legal protection (Brewer, 2010). These challenges represent a gap in nurse's disaster preparedness hence there is a need to explore the ethical issues nurses face during a disaster. The International Council of Nurses (2012) strongly urges nurses to recognise and respect fundamental human rights as well as ethical principles such as dignity, fairness and justice, taking into account the individual's customs and values. During a disaster, nurses are expected to be sensitive to these ethical principles and if need be, modify their practice in an acceptable manner to meet the needs of disaster victims (World Health Organization, 2009). Brewer (2010) gave insight to ethical issues surrounding the nurse's response to disasters.

2.11.1 Safety

During hurricane rages that destroy buildings and power lines and fells trees, nurses are expected to make their way through to the hospital forgetting that they also might be victims of the hurricane (Brewer, 2010). It was stated that nurses care for disaster victims with contagious diseases, such as AHIN1, and those that have been exposed to chemicals such as organophosphate poisoning, yet nurses are not immune to any of these and there is a societal expectation for them to respond and save the lives of people, forgetting that theirs is also at risk. Nurses face a lot of violence at a disaster scene when the families and friends of the victims feel the nurses are not doing enough to help, but the nurses are still expected to work even though their own security is compromised (Aliakbari, Hammad, Bahrami & Aein, 2015). It was further stated that nurses find it difficult when their own family members are involved in disaster, they have to take care of their family member and

at the same time, they have to help others who equally need their help. How can a nurse balance this obligation with that of other patients? World Health Organization and International Council of Nurses (2009) added that while still expected to respond to a disaster, nurses have a lack of preparedness and inadequate training on disasters and find it difficult to effectively employ their knowledge and skills; they endanger themselves in an effort to relieve disaster victims and end up becoming a burden to other health professionals. The World Health Organization and International Council of Nurses (2009) explained that even though nurses respond to disasters with best intentions, the outcome often leads to more chaos in an already chaotic situation.

2.11.2 Ethical Obligations

Nurses have an ethical obligation to ‘always put patients first’ (Brink *et al.*, 2012). During times of disaster, where even the nurse is in danger, how can they balance the ethical obligation to protect self and to provide services to disaster victims? Nurses work with very limited resources and find themselves having to make very difficult decisions on how to share resources equally amongst victims (Brewer, 2010).

2.11.3 Legal Implications

Nurses are expected to respond to a disaster even when they are worried about their own security and safety (Arbon *et al.*, 2013). In the chaotic event of disaster, nurses end up doing more than what their scope of practice allows them to do, they improvise a lot because of lack of resources, some may not respond to disasters because of security reasons, while some may not know what to do and end up exposed to lawsuits because of malpractice and negligence (Brewer, 2010). The International Federation of Red Cross and Red Crescent Societies (2011) added that the lack of a comprehensive disaster management act makes it difficult to guarantee security and disaster preparedness and therefore reduces motivation to respond to a disaster.

2.12 SUMMARY

Disasters are an unavoidable part of life globally and South Africa is no exception. The South African National Disaster Management Framework of 2005 provides that health institutions should have an integrated and coordinated disaster risk management policy focusing on the prevention and reduction of disaster risks, mitigation of severe disasters, preparedness, timely and effective response to a disaster and post disaster recovery. The South Africa Disaster Management Amendment Act of 2015 calls for all health organisations to have a documented disaster management protocol in place, which indicates the potential disasters in the environment within which the institution is located and state clearly the responsibilities of all health professionals when a disaster occurs. The hospital in which the study was conducted has a disaster management protocol.

A study was conducted by Moabi (2009) in South Africa which involved hospital management and allied workers only. The results of the study found out that although these participants had a positive attitude towards disaster preparedness, there still remained a deficiency in training and practicing for when a disaster occurs. From the latter findings, the researcher found the need to explore the registered nurses disaster preparedness.

The International Council of Nurses recognised the importance of registered nurses involvement in disaster preparedness and management and developed a framework of registered nurses competencies from which disaster nursing competencies were developed (World Health Organization and International Council of Nurses, 2009).

Nurses perceived roles during a disaster include frontline caregivers, providing immediate care to victims and educating the public on disasters and disaster preparedness. Factors such as demographic details, type of disaster, and knowledge of disaster preparedness, family, hospital disaster management protocols and concern for safety, all influence a nurses' willingness to work during a disaster. Education and training are key to equip nurses with the necessary knowledge, skills and competencies for disaster response (Diab & Mabrouk, 2015). Evidence from literature indicates that nurses are not adequately prepared for disasters (Fung *et al.*, 2008). Limited disaster training and education, and lack of disaster drills constitute poor disaster preparedness. The International Council of Nurses (2006) strongly urges nurses to recognise and respect fundamental human rights as well as ethical principles, such as dignity, fairness and justice, taking into account the individual's customs and values.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Research methodology is defined as a technique used to provide the study with a structure, and to gather and systematically analyse data in a logical fashion (Polit & Beck, 2012). This chapter includes a detailed description of the research design and research population, sample and sampling criteria, research setting, data collection procedure followed and details of the survey questionnaire validity and reliability.

3.2 OBJECTIVES OF THE STUDY

For consistency in this research study, the objectives are repeated.

The objectives of this study were:

- 1 To describe the perceptions of registered nurses working in a medical or surgical ward regarding disasters and disaster preparedness in terms of whether they consider themselves ready to deal with disasters.
- 2 To describe the training needs regarding disaster preparedness of registered nurses working in the medical and surgical wards.
- 3 To determine the factors associated with registered nurses disaster preparedness.

3.3 RESEARCH DESIGN

Polit and Beck (2012) define research design as “the overall plan the researcher uses to address the research question and specifications that enhance the integrity of the study”. A quantitative, descriptive, and exploratory, survey study design was used for this study.

3.3.1 Quantitative

A quantitative design is a systematic process that emphasises objective measurements of variables, examining correlations and testing relationships between variables (Burns & Grove, 2011). The researcher used this design because of the interest in objectively exploring how prepared registered nurses were for disasters, and to test the correlation between nurse's disaster preparedness and their demographic characteristics and, their previous participation in disasters and training on disaster preparedness.

3.3.2 Descriptive

Descriptive study design is used in order to gain more information about the characteristics of a particular phenomenon. Its purpose is to provide understanding of the situation as it naturally appears (Grove, Burns & Gray, 2013). This design was considered most suitable for the study because it helped in exploring the perception of disaster preparedness amongst nurses practising in the medical and surgical wards and interventional studies will be recommended after the situation has been described.

3.3.3 Exploratory

An exploratory study is an initial research into a hypothesis (Grove *et al.*, 2013), and the purpose of using this was because the researcher had observed that registered nurses lack knowledge on disaster preparedness and sought in-depth knowledge and understanding on this matter. An exploratory research design helps to determine if what is being observed might be explained and recommends interventional studies regarding the matter. According to Burns and Grove (2011) exploratory studies are used when there is limited knowledge on the field of interest, therefore the researcher wanted to gain more information and insight into the registered nurses preparedness with regards to disasters, as there is no study to date on this subject in South Africa.

3.3.4 Survey Design

A survey study is a method of collecting data as reported by participants by means of survey questionnaires administered to the respondents who then answer the questions themselves (Burns & Grove, 2011). Survey studies help in relating one variable to the other, assessing their differences, but do not determine causation. This design was chosen as a design of choice because it helps in obtaining large information from a relatively large population in a more economical way, as cited by Lobiondo-Wood and Haber (2010).

3.3.5 Setting

The study was conducted in an accredited central hospital in Johannesburg, which operates as a tertiary level hospital offering highly specialised services. The hospital has a bed capacity of 1088 and provides both in and outpatient services. In the hospital, the study was conducted specifically in the surgical and medical wards, all of which are 24 bedded. There were 16 medical wards and 15 surgical wards.

3.4 RESEARCH METHODS

This section consists of a detailed description of the study population sample, data collection procedures as well as how the data was analysed. The population in this study was all registered nurses practicing in the medical and surgical wards of a central hospital in Johannesburg. The total sample was used. A survey questionnaire developed by Fung *et al.* (2008) was used to gather data for this study. Descriptive statistics, ordinal logistic regression and summative content analysis were used to analyse data.

3.4.1 Population

Population is the entire group of people the researcher is interested in and meets the selection criteria as determined by the researcher (Brink *et al.*, 2012 and Burns & Grove, 2011). The population in this study was 192 (n=192) registered nurses practicing in the medical and surgical wards, 102 and 90 respectively, of a central hospital in Johannesburg. The registered nurses were of interest to the researcher because during times of disaster,

they assist the emergency nurses and they receive patients from these nurses in the triage area; therefore, they need to have accurate and adequate disaster knowledge and skills.

3.4.2 Sample and Sampling

A sample is referred to as a subset of the whole population that the researcher selected to participate in the study (Brink *et al.*, 2012). Given the uncertainty of the response rate by the respondents, the entire sample of 192 was used. Inclusion criteria for the study was as all registered nurses, 22 years and older, practicing in medical and surgical wards of a central hospital in Johannesburg.

3.4.3 Data Collection

Data collection is the systematic gathering of information to answer the research question, meet research objectives and the purpose of the study (Grove *et al.*, 2013).

- Survey Questionnaire

According to Burns and Groove (2011), a questionnaire is a printed self-report form used to gather data in which respondents write their responses. Data was collected using a survey questionnaire (**Appendix A**) developed by Fung *et al.* (2008), with written permission (**Appendix G**) obtained from the authors. This survey questionnaire was modified in 2013 for use in the South African context by a panel of South African trauma experts. The modified questionnaire consisted of 26 questions divided into two sections. Section A was the demographic details and Section B was the knowledge on disaster preparedness. Additional questions, pertaining to hospital disaster protocols (Items: 16-21) were added to the survey questionnaire for this study by the researcher with written permission from the South African trauma panel. The survey questionnaire still consisted of 26 questions, with two open-ended questions.

According to Brink *et al.* (2012), a survey questionnaire has strengths and weaknesses.

Strengths associated with a survey questionnaire are:

- Data is collected quickly from a large group of people.

- It is time efficient and less expensive
- It is easy to test its validity and reliability.
- It gives respondents a sense of anonymity and increases the chances of providing honest information.
- It is not dependent on the mood of the researcher and therefore objective.

Weaknesses associated with using a survey questionnaire are:

- Low response rate because of laziness in answering the questions by respondents.
- Respondents may not understand some questions and fail to answer them.
- Does not give the researcher opportunity to clarify questions to the respondents.
- Only applicable on literate respondents.

In an attempt to eliminate the weaknesses associated with a survey questionnaire, as mentioned above, certain steps were taken. The researcher personally delivered and collected the survey questionnaires to the respondents and availed her telephone number and email address throughout the period of data collection for respondents to reach her if need be.

The survey questionnaire consisted of two sections. Section A was the demographic details and Section B was the disaster preparedness of registered nurses. These sections are described in details.

Section A: Demographic details

This section had seven questions, which gathered information on demographic details of the respondents as well as professional data.

The following characteristics of respondents were described.

- Gender.
- Age.
- How long respondents had been working in this institution.
- Years of nursing experience.
- Level of qualification in nursing.

- Current nursing position.
- Ward in which participant was working (medical or surgical).

These characteristics helped to describe the respondents and differentiate between different subgroups of nurses and determined whether age, gender, years of nursing experience, nursing position and level of qualification had any influence on their disaster preparedness.

Section B: Knowledge on disaster preparedness

This section consisted of 19 questions, which elicited information on registered nurses' general knowledge on disaster preparedness. The registered nurses defined, in their own words, what a disaster was and were asked to select events that had happened in South Africa that they personally considered were a disaster. They were asked to identify the likelihood of disasters that can occur in the community to which their hospital would have to assist. Knowledge of hospital disaster protocols was included in this section. Nurses were asked whether they were aware of the availability of hospital disaster protocols in their hospital, whether they have read the disaster protocol and if they had previously participated in a disaster activity. They were also asked about their first action regarding a bomb threat; the nurse's roles in a disaster; whether they are allocated job cards every day at handover; their emergency assembly and the emergency number to call in case they are unable to evacuate during a disaster. The nurses were asked to grade how prepared they felt personally for disasters. Finally, this section elicited information on the training needs of the nurses with regard to disaster preparedness. They were given a list of courses, which they felt were necessary to prepare them sufficiently for a disaster, and to choose activities necessary to prepare them for disasters.

- **Validity and Reliability of the Survey Questionnaire**

Polit and Beck (2012) defined validity as the degree to which an instrument measures what it intended to measure. They further defined content validity as “the degree to which an instrument has an appropriate sample of items for the contrast being measured and adequately covering the contrast domain”. Content validity is important in determining that the instrument covers all the contents of the domain. There is no objective method to ensure the instrument content validity is adequate, but it has become common to use a panel of experts in that field to evaluate it (Polit & Berk, 2012).

The original survey questionnaire, by Fung *et al.* (2008), was used in a published study in China. A convenience sample of practising registered nurses, enrolled for a Master's degree programme at Hong Kong University, was used to test the instrument by the authors (Fung *et al.*, 2008); the response rate was 94.4%.

According to Fung *et al.* (2008), face and content validity was achieved using a panel of seven experienced nurses with expertise in Emergency Care (two), Intensive Care (two), Community Health (one) and Nurse Training (two). The Content Validity Index was 0.94, suggesting a high degree of validity (Fung *et al.*, 2008). As the questions were intended to solicit factual information, the authors reported that reliability testing was not conducted.

The modified questionnaire for use in the South African content was validated by four trauma experts (one trauma consultant, one specialised trauma nurse, one nurse educator and one registered nurse). After adding some questions for this study, the survey questionnaire was validated using a sample of 10% of the total population as a pre-test.

- **Pre-testing Procedure**

A pre-testing procedure is a test of the survey questionnaire on a small number of the population in order to refine the methodology and measure the effectiveness of the questions (Burns and Grove, 2011). For this study, the re-modelled South African tool was validated using a 10% sample of the total population of this study.

Total population n=192

Sample (n) = 10% of 192

Giving n =20

The pre-test was carried out on 20 nurses who were not included in the study. Its purpose was to test whether the survey question was clear and applicable. The modification that was done was to indicate on Question 14 that they could tick more than one option, as most of the respondents were confused as to how to respond to the questionnaire. On average, it would take a respondent 15 to 20 minutes to complete the survey questionnaire.

- **Data collection procedure**

Before recruitment and data collection could begin, permission was sought from the Chief Executive Officer (CEO) (**Annexure C**) to conduct this study in the hospital. Once permission had been granted to conduct this study in the hospital, permission was then sought from the Nursing Services Manager followed by permission from the Unit Managers. The researcher then visited the wards to introduce herself and invite nurses to participate in the study. An information letter (**Annexure B**), explaining the purpose of the study, was given to respondents and verbal consent to participate was obtained. The survey questionnaire (**Annexure A**) was distributed to respondents who agreed to participate.

Completed survey questionnaires were put in a sealed envelope, then into a box in the Operational Manager's office. After data collection was finished, the researcher collected the completed survey questionnaires; only the researcher and the supervisor had access to the completed survey questionnaires. No follow up questions were presented to the respondents after completing the survey questionnaires. No personal or ward identification marks were made on the questionnaire, thus participant confidentiality and anonymity were maintained.

The researcher availed her telephone number and email address to the respondents during data collection to enhance communication should any participant have queries relating to the study. Respondents were given four weeks to complete the questionnaires on their own, after which they were collected by the researcher.

3.4.4 Data Analysis

Data analysis is the categorisation, ordering and summarising of the collected data into a meaningful way (Brink *et al.*, 2012). Descriptive statistics, ordinal logistic regression and summative content analysis were used to analyse the data in this study. The statistical software STATA version 13.1 was used to group and analyse the data. Descriptive statistics are used to measure the spread of a sample in a wider range of variables (De Vos, Fouche, Strydom & Delpont, 2011). Objectives 1 and 2 were analysed using descriptive statistics. Frequency tables, bar graphs and pie charts were computed.

Objective 3 was analysed using ordinal logistic regression, because the outcome variable (nurse's disaster preparedness) was ordinal. Ordinal logistic regression models were fitted to check the factors associated with nurse's disaster preparedness. In order to fit the ordinal logistic regression model the assumption of proportionality of odds was tested using the Brant test. However, not all the independent variables in the ordered model were retained in all the implied binary models, hence the ordinal logistic regression model was fitted under the assumption of proportionality of odds and the univariate and multivariate analysis tables were made.

Two open-ended questions were added into the questionnaire in an effort to gain in-depth exploration of whether the nurses have an understanding of the word disaster, and to add any comment they would have wanted to say that was not included. An open-ended question allows respondents to provide a deeper understanding of the phenomenon using their own words, something that cannot be achieved using a quantitative approach (Arbon *et al.*, 2013). These open-ended questions "Please state in your own words what a disaster means to you" (question 8) and "Do you have any other comments about disaster management in your situation" (question 26) were analysed using summative content analyses, which involves identifying and quantifying themes or words in the responses then interpreting them for meaning (Hsieh & Shannon, 2005).

3.4.5 Variables

Grove *et al.* (2013) defined variables as qualities that characterise situations or people in the study and are subject to change.

- **Independent variable**

An independent variable is one the researcher can manipulate in order to make an effect on the dependent variable (Grove *et al.*, 2013). The independent variables in this study were previous participation in a disaster activity, training and education on disaster preparedness and demographic characteristics of respondents (gender, age, years of experience, level of qualification, and position at work).

- **Dependent variable**

The dependent variable is the presumed effect the researcher wants to explain (Grove *et al.*, 2013), which for this study was disaster preparedness of registered nurses.

3.5 ETHICAL CONSIDERATIONS

In as much as the researcher has the right to search for the truth in any way they find suitable, it should never be at the expense of the rights of individuals or the community, (Brink *et al.*, 2012). DENOSA's ethical standards of research were adhered to in order to protect the rights of the respondents. According to Hegner, Acello and Caldwell (2004), ethical standards are defined "as a form of philosophic inquiry used to investigate morality. It is based on scientific ethical principles that are used to justify actions and assist in the resolution of moral dilemmas." There are sets of fundamental principles that the researcher took into consideration when conducting this study in order to preserve human dignity.

The following fundamental ethical principles were taken into consideration:

3.5.1 Informed Consent

Informed consent refers to the legal principle governing the respondent's ability to accept or reject participation in a research study (Lobiondo-Wood & Haber, 2010).

- The researcher invited the respondents to participate in the study and verbal consent was obtained from the prospective respondents where they demonstrated the willingness to participate in the study.
- Respondents had the liberty to withdraw from participating in the study at anytime without fear of intimidation.

3.5.2 Permission to Conduct the Study

According to (Lobiondo-Wood and Haber, 2010), every research institution ought to have institutional review boards that review proposed research studies to assess their feasibility and whether they meet ethical standards in order to protect the rights of human subjects.

- Permission to conduct the study was obtained from the Postgraduate Committee (Faculty of Health Sciences) of the University of the Witwatersrand.
- A clearance certificate was issued after the research proposal was submitted to the Committee for Medical Research on Human Subjects of the University of the Witwatersrand to ensure the study complied with ethical standards
- The hospital management granted permission to conduct the study in the hospital.

3.5.3 Anonymity and Confidentiality

According to Brink *et al.* (2012), anonymity refers to keeping the patient's identity and any information that could be linked to the participant a secret, while confidentiality is not sharing respondents' information with any unauthorised person.

- Names were not used during data collection to ensure anonymity.
- The raw data of the study was kept in a locked cupboard, which could only be accessed by the researcher and the supervisor.
- To ensure anonymity and confidentiality of respondents, raw data was accessible to the researcher and the supervisor only.

3.6 VALIDITY AND RELIABILITY OF THE STUDY

Reliability was achieved by maintaining consistency and accuracy in data recording using a standardised data collection questionnaire. To prevent threats to internal validity, variables were not manipulated in any manner. Due to anticipation that respondents might be lost during the course of the research, the total sample was used hence ensuring internal validity. A large sample was selected to ensure external validity and was obtained from registered nurses practising in the surgical and medical units; this ensured the sample was a true representation of the entire population thus enhancing generalisation of the results (Polit & Beck, 2012).

3.7 SUMMARY

This chapter included a detailed description of the research methodology. The research design, population sample, sampling technique and the inclusion criteria were explained. The survey questionnaire, data collection procedure, validity and reliability of the instrument, as well as data analysis were discussed and the validity and reliability of the study and ethical issues considered were explained in depth.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 INTRODUCTION

This chapter includes data presentation, interpretation, analysis as well as a description of the results. The findings of the study were analysed using descriptive statistics, ordinal logistic regression and summative content analysis.

4.2 APPROACH TO DATA ANALYSIS

Descriptive statistics were used to describe the demographic characteristics of the respondents, the respondent's perception of their disaster preparedness and their training needs regarding disaster preparedness. Data was presented in the form of frequency distribution tables, pie charts and bar graphs. Ordinal logistic regression was fitted to determine the association between nurse's disaster preparedness, demographic characteristics, training on disaster preparedness and previous participation in a disaster activity. Summative content analysis was used to analyse the two open-ended questions in the questionnaire (questions 8 and 26). Responses were studied and arising themes were manually extracted then categorised. The frequency of occurrence of the themes was counted then they were interpreted for meaning and association of idea. Of the 192 survey questionnaires distributed, 143 were returned making a response rate of 74.5%, which is three quarters of the total population.

4.3 RESULTS AND FINDINGS

4.3.1 Section A

The first section of the survey questionnaire gathered information on the respondent's demographic characteristics. The characteristics were as follows: gender, age, number of years worked in the hospital, number of years of nursing experience, highest level of qualification, current nursing position as well as the ward in which the respondent was working.

The majority of the respondents were females (81.82%: n=117), compared to their male counterparts (18.18%: n=26). More than half of the respondents (62.23%: n=89) were aged between 26 and 45 years. The registered nurses made the largest number of the respondents (93.01%: n=133), while only one respondent was a nurse educator (0.70%: n=1). More than half of the respondents (57.34%: n=82) were from the medical wards, while 42.66% (n=61) were from surgical wards. Refer to **Table 4.1** for the results.

Table 4.1: Demographic profile of respondents

Characteristics	Frequency	Percentage
Gender		
Male	26	18.18%
Female	117	81.62%
Age		
18 to 25 years	22	15.38%
26 to 35 years	53	37.06%
36 to 45 years	26	25.17%
45 to 60 years	32	22.38%
Years worked at the hospital		
<1 year	30	20.98%
1 to 10 years	79	55.24%
>10 years	34	23.78%
Highest nursing qualification		
Certificate	1	0.70%
Higher diploma	121	84.62%
Bachelor's degree	20	13.99%
Master's degree	1	0.70%
Number of years as a nurse		
<1 year	10	6.99%
1 to 5 years	39	27.27%
6 to 10 years	52	36.36%
11 to 15 years	13	9.09%
>15 years	29	20.28%
Current nursing position		

Registered nurse	133	93.01%
Unit manager	9	6.21%
Nursing educator	1	0.70%
Ward		
Medical	82	57.34%
Surgical	61	42.66%

4.3.1.1 Respondents number of years worked in the hospital

The results of the study revealed that over half (55.24%: n=79) of the respondents had worked in the hospital between 1 and 10 years, and respondents with less than a year represented the least number (21.0%: n=30).

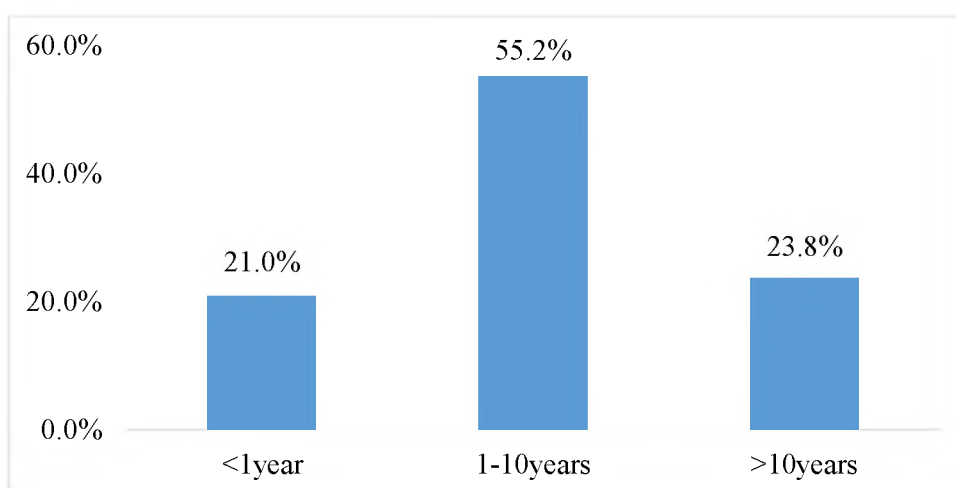


Figure 4.1: Number of years worked in the hospital.

4.3.1.2 Years of nursing experience

Of the total sample (n=143), more than one third (36.4%: n=52) had nursing experience of between 6 and 10 years, while only 7% (n=29) had a nursing experience of less than a year. Refer to Figure 4.2 for the results.

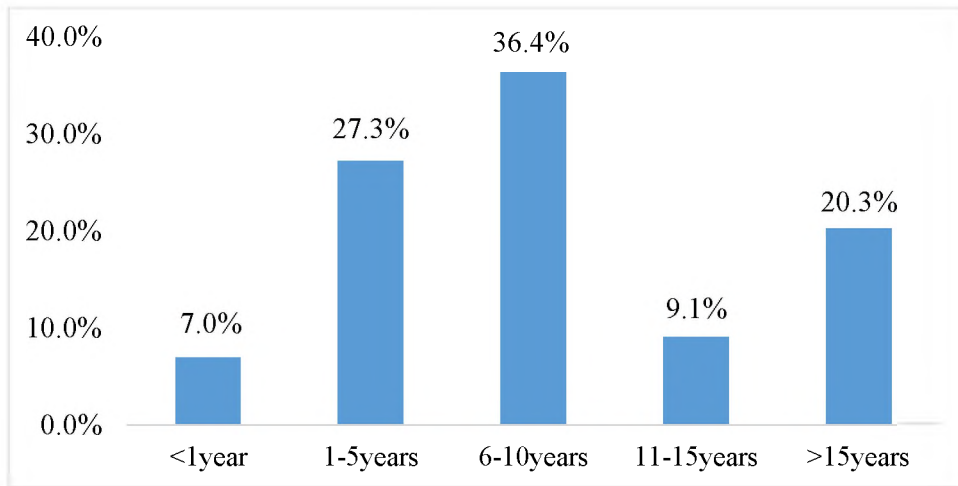


Figure 4.2: Distribution of number of years worked as a nurse

4.3.1.3 Highest level of nursing qualification

More than three quarters of the respondents (85.31%: n=122) had a higher diploma as their highest level of qualification, while one nurse (0.70%: n=1) was a nurse specialist.

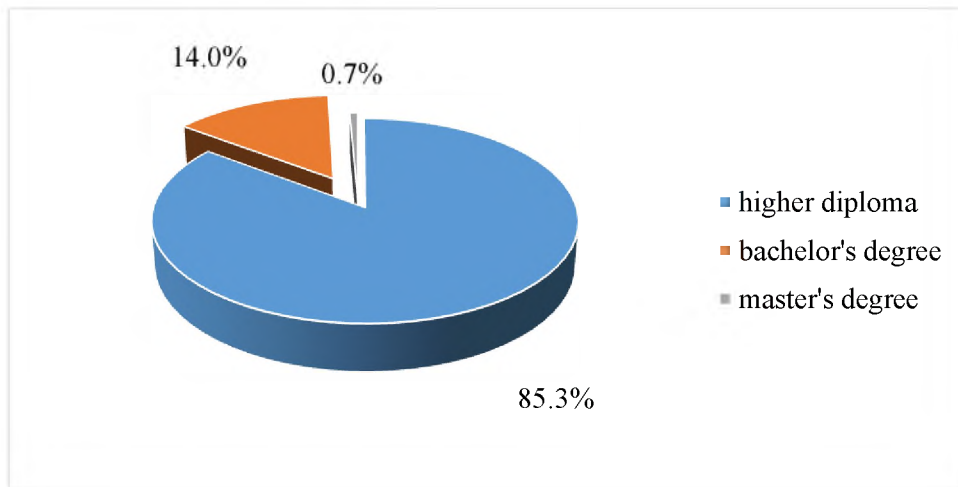


Figure 4.3: Distribution of respondent's highest level of qualification.

4.3.2 Section B: Knowledge of Disaster Preparedness

The second section of the survey questionnaire, which consisted of 19 questions, gathered information on the respondent's knowledge on disaster preparedness as well as their training needs regarding disaster preparedness. They started by defining what a disaster is

in their own words and selected some past events that they considered disasters. They were asked to rate the likelihood of disasters occurring in South Africa, the agencies that would be involved if a disaster occurred, public awareness on disaster preparedness and questions on their hospital disaster protocol. Respondents were also asked on their training needs regarding disaster preparedness, which educational courses they felt were important to prepare them enough for a disaster and activities necessary for nurse's disaster preparedness.

4.3.2.1 Previous disaster situations that happened in South Africa.

Respondents were given a list of situations that had previously occurred in South Africa and asked whether they agreed it was a disaster. The majority of the respondents (83.92%: n=120) regarded Ellis Park Stampede and Marikana Miners' Strike (80.42%: n=115) as disasters compared to other disaster incidents that were given. Table 4.2 displays the results.

Table 4.2: Situations that occurred in South Africa and considered disasters

Statement	Responses			
	Agree		Disagree	
	f	%	f	%
Marikana Miners' Strike	115	80.42%	28	19.58%
Sharpeville Massacre	99	69.23%	44	30.77%
Soweto Uprising	99	69.23%	44	30.77%
Table Mountain Fire	86	60.14%	57	39.86%
Westdene Dam Disaster	99	69.23%	44	30.77%
Bethlehem Bus Crash	85	59.44%	58	40.56%
Blackheath Train Accident	85	59.44%	58	40.56%
Hectorspruit Level Crossing Accident	82	57.34%	61	42.66%
Ellis Park Stadium Stampede disaster	120	83.92%	23	16.08%

Following the Ellis Park Stampede and Marikana Miners' Strike, the Soweto Uprising and Westdene Dam Disaster were also regarded by a large number of the respondents, both at

69.23% (n=99), as disasters. Refer to Figure 4.4 for top four situations that were regarded as disasters.

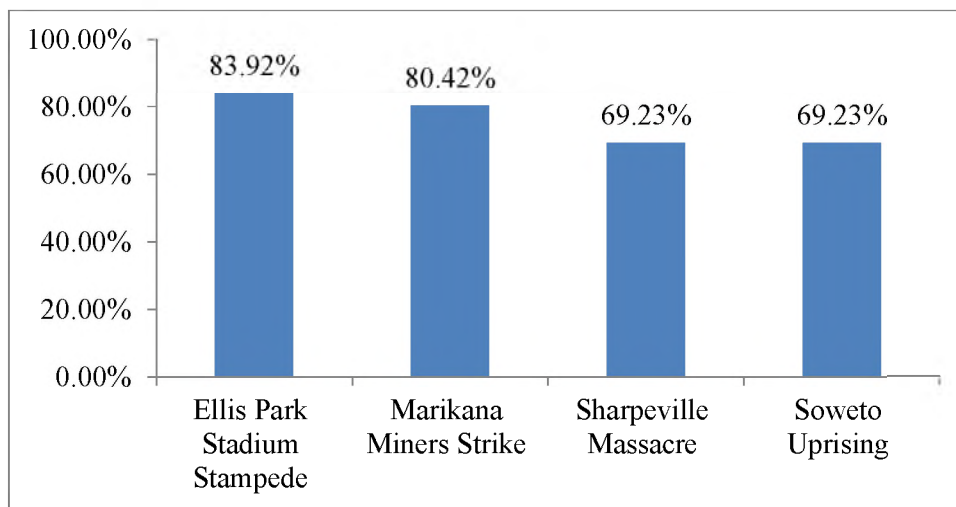


Figure 4.4: Top four situations mostly regarded as disasters

4.3.2.2 Likelihood of disasters happening in South Africa.

Respondents were asked to rate the likelihood of disasters occurring in South Africa. The question was in the form of a Likert scale. Options given were absolutely not, very unlikely, unlikely, likely and very likely. For the purpose of analysis, the options were compressed into two groups, agree and disagree. Those who rated absolutely not, very unlikely and unlikely were grouped into disagree, whilst those who rated likely and very likely were grouped into agree. More than three quarters (89%: n=127) of the total sample (n=143) agreed to mining accidents being the most likely disaster to occur in South Africa, whilst extensive landslides were regarded as the least likely to occur (22%: n=32). Ref to Table: 4.3.

Table 4.3: Likelihood of disasters happening in South Africa according to respondents

Statement	Responses			
	agree		disagree	
	n	%	n	%
Chemical spills	61	43%	82	57%
Earthquakes	37	26%	106	74%
Severe flooding	89	62%	54	38%

Extensive landslides	32	22%	111	78%
Major fire incidents	123	86%	16	14%
Major transport incidents	122	85%	21	15%
Nuclear incidents/radioactive substances	42	29%	101	71%
Extreme weather	102	71%	41	29%
Terrorist attack	65	45%	78	55%
Infectious diseases	121	85%	22	15%
Widespread strikes/demonstrations	125	87%	18	13%
Mining accidents	127	89%	16	11%
Refugee migration	108	76%	35	24%
Overcrowding incidences	124	87%	19	13%

4.3.2.3 Agencies considered most involved in disastrous situations in South Africa.

The respondents were asked to select the organisations they thought would be involved if a disaster occurred. Of the total sample (n=143), an overwhelming majority of 95.80% (n=137) agreed that the Department of Health is involved when a disaster occurs, whilst a large number (77.62%: n=111) did not regard the Department of Constitutional Development as an agency involved in disaster. Refer to Table 4.4 for the results.

Table 4.4: Agencies considered most involved in disastrous situations in South Africa

Agencies	Responses			
	Agree		Disagree	
	n	%	n	%
Department of Health	137	95.80%	6	4.20%
Department of Constitutional Development	32	22.38%	111	77.62%
The South African Weather Bureau	55	38.46%	88	61.54%
The SANDF and SAPS	116	81.12%	27	18.88%
Department of Welfare and Population Development	61	42.66%	82	57.34%
Department of Housing	58	40.56%	85	59.44%

Department of Education	36	25.17%	107	74.83%
Department of Public Works	54	37.76%	89	62.24%
Department of Home Affairs	58	40.56%	85	59.44%
Agencies	Responses			
	Agree		Disagree	
	n	%	n	%
Department of Water Affairs	68	47.55%	75	52.45%
Department of Fire Services	126	88.11%	17	11.89%

4.3.2.4 General public knowledge on disaster preparedness.

The majority of the respondents (53.9%: n=77) agreed there was a need for the public to be aware of disaster preparedness. The responses of whether the public need to be aware of disaster preparedness are presented in Figure 4.5.

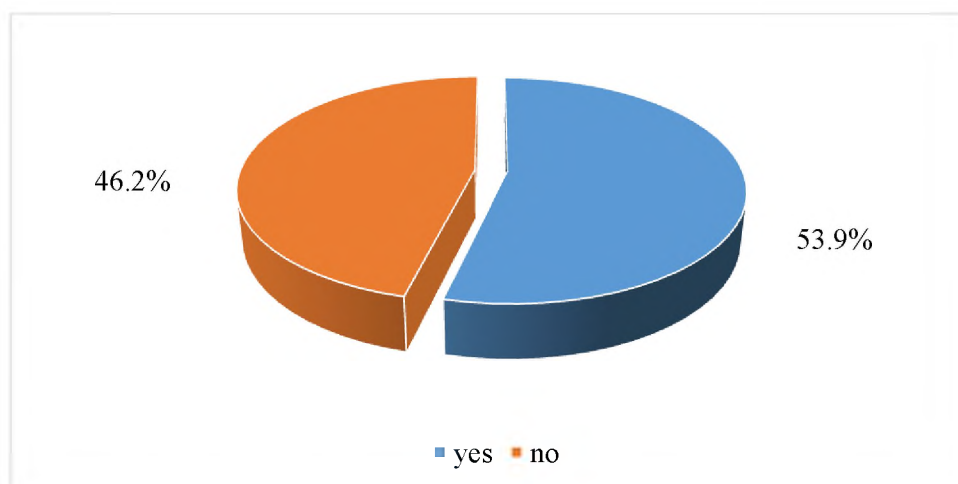


Figure 4.5: Nurses responses on general public knowledge on disaster preparedness.

4.3.2.5 Source of information on disaster management.

The respondents were asked to indicate which source they considered to be mostly used to obtain information on disaster management. More than three quarters of the respondents (85.31%: n=122) agreed with the Internet being the main source. (Ref to: table 4.5).

Table 4.5: Source of information on disaster management

Source of information	Responses			
	Agree		Disagree	
	n	%	n	%
By word of mouth	91	63.64%	52	36.36%
Hospital/school notice	100	69.93%	43	30.07%
Internet	122	85.31%	21	14.61%
Newspapers	117	81.82%	26	18.18%
Television	40	27.97%	103	72.03%
Radio	64	44.75%	79	55.24%
Email	58	40.56%	85	59.44%
Telecommunication	67	46.85%	76	53.15%

4.3.2.6 Training on disaster preparedness

A list of courses related to disaster preparedness were given for the respondents to rate whether they agreed it was necessary for preparation, they had attended or would be attending soon and if they had not attended, whether they were interested in doing so. The results indicated that the least number of respondents had attended or would be attending all the given courses. Less than half of the respondents indicated interest in attending all the given courses and all (100%: n=100) agreed that the post-traumatic psychological care course was necessary for disaster preparedness. Table 4.6 displays the results.

Table 4.6: Educational courses necessary for disaster preparedness

Educational Courses	Responses					
	Necessary for preparedness		Attended or will be attending		Interested in attending the course	
	n	%	n	%	n	%
First aid level 3	74	51.75%	13	9.09%	56	39.13%
Basic life support (BLS)	77	53.85%	10	6.99%	56	39.16%

Advanced cardiovascular life support (ACLS)	69	48.25%	10	6.99%	64	44.76%
Pre-trauma/trauma life support (TLS)	68	47.55%	30	20.98%	45	31.47%
Educational Courses	Responses					
	Necessary for preparedness		Attended or will be attending		Interested in attending the course	
	n	%	n	%	n	%
International trauma life support (ITLS)	71	49.65%	14	9.79%	58	40.56%
Infection control (IC)	71	49.65%	11	7.69%	61	42.66%
Pre-trauma counselling (PTC)	75	52.44%	21	14.69%	47	32.87%
Post-traumatic psychological care(PTPC)	143	100%	-	-	-	-
Disaster management (DM)	107	74.83%	36	25.17%	-	-

4.3.2.7 Availability of disaster management protocol at the workplace

The respondents were asked about the availability of disaster management protocol in their workplace. The largest amount of respondents (95.80%: n=137) agreed to having a disaster management protocol in their workplace. The results are presented in Figure 4.6

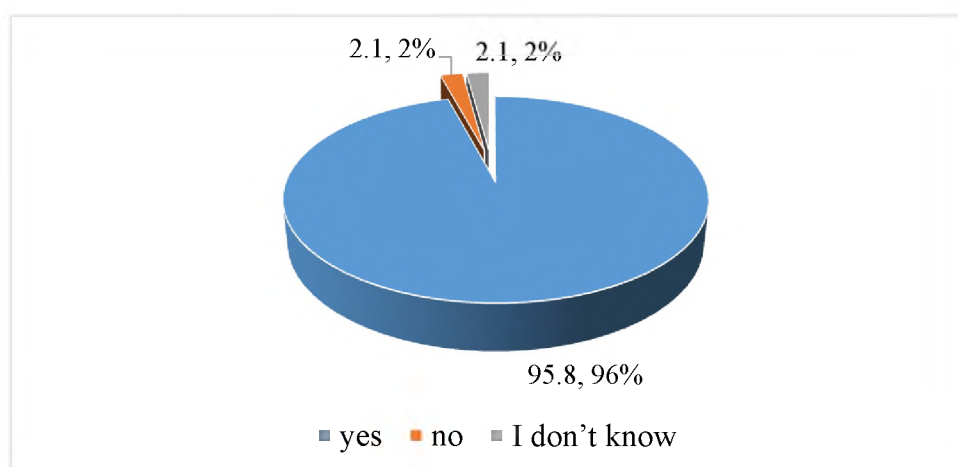


Figure 4.6: Availability of disaster protocols in the hospital.

4.3.2.8 Information pertaining to disaster management protocol at the workplace

Nurses were asked questions that demonstrated their understanding of their hospital disaster protocol and their disaster preparedness. The responses are presented in **Table 4.7**.

Table 4.7: Information pertaining to disaster management protocol at the workplace and disaster preparedness

Variable	Response			
	Agree		Disagree	
	n	%	n	%
Have you read the disaster protocol in your workplace?	122	85.31%	21	14.68%
Immediate action if a disaster occurs:				
• Escape as soon as possible	36	25.17	107	74.83%
• Evacuate patients as soon as possible	70	48.95	73	51.05%
• Follow instructions from immediate supervisor at scene	41	28.67	102	71.33%
• Alarm others before escape	29	20.28	114	79.72%
• Follow hospital protocol to manage the situation	83	58.04	60	41.96%
Participated in disaster activity at your workplace.	68	47.55%	75	52.45%
Allocation of disaster job cards everyday.	119	83.21%	24	16.78%
Do you know the number to call if you can't evacuate from your workplace during disaster?	103	72.03%	40	27.97%
Do you know where your assembly point is?	97	67.83%	46	32.16%
What is your first action if there is a bomb threat in your hospital?				
• Call the police and bomb disposal unit	31	21.67%	112	78.32%
• Remove yourself and others from the ward	37	25.87%	106	74.12%

<ul style="list-style-type: none"> • Phone and contact your supervisors 	35	25.47%	108	75.52%
<ul style="list-style-type: none"> • Open all windows and doors 	20	13.99%	123	82.01%
<ul style="list-style-type: none"> • Don't touch any suspicious object 	20	13.99%	123	82.01%
As a nurse please grade how prepared you personally are for a disaster:				
<ul style="list-style-type: none"> • Totally unprepared 	16	11.18%	127	88.81%
<ul style="list-style-type: none"> • Somewhat unprepared 	22	15.38%	121	84.61%
<ul style="list-style-type: none"> • Somewhat prepared 	67	46.85%	76	53.14%
<ul style="list-style-type: none"> • Fully prepared 	38	26.57%	105	73.42%
Roles of nurses in disaster preparedness:				
<ul style="list-style-type: none"> • Caregiver 	94	65.73%	49	34.27%
<ul style="list-style-type: none"> • Educator 	75	52.45%	68	47.55%
<ul style="list-style-type: none"> • Researcher 	34	23.78%	109	76.22%
<ul style="list-style-type: none"> • Coordinator 	100	69.93%	43	30.07%
<ul style="list-style-type: none"> • Manager 	78	54.55%	65	45.45%
<ul style="list-style-type: none"> • Counsellor 	68	47.55%	75	52.45%
Activities useful to prepare for a disaster:				
<ul style="list-style-type: none"> • Disaster drills 	108	75.52%	35	24.48%
<ul style="list-style-type: none"> • Disaster management course 	95	66.43%	48	33.57%
<ul style="list-style-type: none"> • Disaster management protocols 	92	64.34%	51	35.66%
<ul style="list-style-type: none"> • Information pamphlets 	69	48.25%	74	51.75%
<ul style="list-style-type: none"> • Information websites about disaster 	51	35.66	92	64.34%

The majority of the respondents (85.31%: n=122) had read the disaster management protocol in their workplace. When asked about the immediate action they would take when a disaster occurred at the workplace, over half of the respondents (58.04%: n=83) said they would follow the hospital disaster management protocol in order to manage the situation. Of the total sample (n=143), the majority of the respondents (52.45%: n=75) had not previously participated in a disaster activity, as opposed to the 47.55% (n=68) that had.

When asked about the allocation of disaster job cards every day at their workplace during handover, more than three quarters of the respondents (83.21%: n=119) agreed they do get allocated disaster job cards every day during handover.

The majority of the respondents (72.03%: n=103) agreed they knew the emergency number to call if they were unable to evacuate from the workplace during a disaster. Asked about their assembly point, a large number of the respondents (67.83%: n=97) knew where their assembly point was. One quarter (25.87%: n=37) of the total sample (n =143) said they would remove themselves and others from the unit as their first action if there was a bomb threat in the hospital.

The nurses were asked to grade how, personally, they felt they were prepared for a disaster, and less than half of the respondents (46.85%: n=67) graded themselves somewhat prepared for a disaster. The rating was in the form of a Likert scale ranging from 1 to 4, totally unprepared, somewhat unprepared, somewhat prepared and fully prepared. They were compressed to two options, prepared (made of somewhat prepared 46.85% and fully prepared 26.57%) and unprepared (made of unprepared 11.18% and somewhat unprepared 15.38%). Therefore the nurses in this study perceived themselves prepared (73.42%) for disasters. Three quarters of respondents (75.52%: n=108) considered disaster drills as a useful activity in disaster preparedness.

When asked about the activities that were useful to prepare nurses for disasters, three quarters of the respondents (75.52%: n=35) agreed that disaster drills are important in preparation for disasters.

4.3.2.9 Factors associated with disaster preparedness

Three variables of interest were selected to test their association with nurse's disaster preparedness: demographic details, previous participation in a disaster activity and training on disaster preparedness. The Logistic Regression model was used to test the influence these variables have on nurse's disaster preparedness. Refer to Table 4.8 for the results.

Table 4.8: Association between nurse’s disaster preparedness and demographic details, previous disaster participation and training

Factor / characteristic	Univariate analysis			Multivariate analysis		
	OR	p-value	CI	OR	p-value	CI
Previous participation in disaster preparedness activity: (base=yes) • No	0.22	0.000*	-8.04 to -3.98	0.09	0.000*	0.04 to 0.24
Training on disaster preparedness: First aid level 3 (Base=necessary for preparedness) • attended or will be attending course • interested in attending course	1.75 1.17	0.220 0.661	0.72 to 4.26 0.57 to 2.40	6.46 2.69	0.049* 0.206	1.10 to 41.36 0.58 to 12.41
Basic life support (Base=necessary for preparedness) • attended or will be attending course • interested in attending course	1.12	0.785	0.50 to 2.48	0.25	0.172	0.03 to 1.83
Advanced cardiovascular life support (Base=necessary for preparedness) • attended or will be attending course • interested in attending course	1.07 1.65	0.905 0.644	0.37 to 3.12 0.61 to 2.23	0.25 2.85	0.175 0.277	0.03 to 1.86 0.43 to 18.86
Pre-trauma/trauma life support (Base=necessary for preparedness) • attended or will be attending course • interested in attending course	2.07 0.94	0.248 0.855	0.60 to 7.13 0.50 to 1.78	1.30 0.14	0.820 0.051	0.14 to 12.33 0.02-1.01
International trauma life support Base=necessary for preparedness) • attended or will be attending course • interested in attending course	3.22 1.37	0.057 0.334	0.96 to 10.74 0.72 to 2.59	32.75 2.31	0.006* 0.333	2.67 to 401.32 0.42 to 12.68

Key: *= statistical significance

Table 4.8 continued

Factor / characteristic	Univariate analysis			Multivariate analysis		
	OR	p-value	CI	OR	p-value	CI
Infection control (Base=necessary for preparedness)						
• attended or will be attending course	1.95	0.099	0.88 to 4.29	3.69	0.150	0.62 to 21.84
• interested in attending course	1.18	0.648	0.58 to 2.40	0.774	0.732	0.13 to 4.18
Pre-trauma counselling (Base= necessary for preparedness)						
• attended or will be attending course	1.17	0.764	0.42 to 3.29	0.38	0.295	0.06 to 2.35
• interested in attending course	1.35	0.364	0.71 to 2.58	0.98	0.982	0.16 to 5.97
Post-traumatic psychological care (Base=necessary for preparedness)						
• attended or will be attending course	1.47	0.518	0.46 to 471	0.48	0.491	0.06 to 3.80
• interested in attending course	1.38	0.322	0.73 to 2.61	1.14	0.889	0.18 to 7.45
Disaster management (Base= necessary for preparedness)						
• attended or will be attending course	1.26	0.889	0.05 to 31.86	0.18	0.471	0.0 to 18.44
• interested in attending course	1.11	0.950	0.46 to 26.77	0.57	0.816	0.00 to 61.56
Previous participation in disaster preparedness activity: (base=yes)						
• No	0.22	0.000*	-8.04 to -3.98	0.09	0.000*	0.04 to 0.24
Demographic details						
Gender (base=male)						
• female	1.46	0.334	0.68 to 3.16	1.19	0.719	0.46 to 3.09

Key: *= statistical significance

Table 4.8 continued

Factor / characteristic	Univariate analysis			Multivariate analysis		
	OR	p-value	CI	OR	p-value	CI
Age group (base= 18-25)						
• 26-35 years	2.29	0.085	0.89 to 5.86	1.09	0.904	0.27 to 4.40
• 36-45 years	2.41	0.087	0.88 to 6.57	1.10	0.909	0.22 to 5.42
• 45-60 years	3.95	0.012*	1.35 to 11.55	11.72	0.026*	1.35 to 101.80
Number of years working in the hospital (base: < 1 year)						
• 1 -10 years	0.70	0.384	0.32 to 1.56	0.30	0.076	0.08 to 1.13
• >10 years	1.44	0.444	0.57 to 3.76	0.42	0.354	0.07 to 2.63
Number of years as a nurse (base: < 1 year)						
• 1-5 years	1.19	0.810	0.30 to 4.77	2.20	0.430	0.31 to 15.69
• 6-10 years	1.71	0.439	0.44 to 6.64	2.88	0.379	0.27 to 30.28
• 11-15 years	2.41	0.294	0.47 to 12.41	1.25	0.873	0.08 to 18.54
• > 15 years	1.83	0.413	0.43 to 7.84	0.23	0.305	0.01 to 3.87
Highest qualification in nursing (base: certificate)						
• Diploma	1.16	0.927	0.05 to 28.22	3.31	0.636	0.02 to 469.24
• Bachelor degree	0.38	0.565	0.01 to 10.05	2.87	0.681	0.02 to 438.80
• Master's degree	-	0.991	0-0	-	0.989	-
Current nursing position (base: registered nurse)						
• Unit manager	2.21	0.193	0.67 to 7.27	1.23	0.803	0.24 to 6.18
• Nursing educator	0.22	0.303	0.01 to 3.96	0.27	0.547	0.00 to 18.97
Ward nurse works in (base: medical ward)						
• Surgical ward	2.09	0.023*	1.11 to 3.96	0.09	0.000*	0.36 to 0.24

Univariate analysis

- Previous participation in a disaster activity.

The univariate ordinal logistic regression model showed there was **statistical significance (p=0.000)** that nurses who had not previously participated in any disaster preparedness activity are **0.22 times likely to feel totally unprepared** for a disaster as opposed to being 'somewhat unprepared,' 'somewhat prepared' or 'fully prepared' compared to those who had previously participated.

- Demographic details

There was a **statistical significance (p=0.012)** in nurses of the age group **45 to 60 years were 3.95 times likely to feel totally unprepared for a disaster** as opposed to being 'somewhat unprepared,' 'somewhat prepared' or 'fully prepared' compared to those in the 18 to 25 age group. In all other age groups (26 to 35 years and 36 to 45 years), there was no statistical significance in the nurse's perception of disaster preparedness.

There was no statistical significance in the difference in nurse's perception of disaster preparedness among the following demographic details: gender, number of years as a nurse, number of years worked in the hospital, highest qualification and current nursing position.

- Ward

The univariate ordinal logistic regression model showed there was **statistical significance (p=0.023)** in nurses working in the medical wards were **2.09 times likely to feel totally unprepared for a disaster** as opposed to being 'somewhat unprepared,' 'somewhat prepared' or 'fully prepared' compared to those working in the surgical wards.

- Training on disaster preparedness

There was no statistical significance in the difference in nurse's perception of disaster preparedness between nurses trained on disaster preparedness and those not trained in the univariate ordinal logistic regression model.

Multivariate analysis

- Previous participation in a disaster activity

The multivariate ordinal logistic regression model indicated that when **adjusting for all other factors** (training needs on disaster preparedness and respondents demographic details), **nurses who had not previously participated in disaster preparedness activities were 0.09 times likely to feel totally unprepared for a disaster** as opposed to being ‘somewhat unprepared,’ ‘somewhat prepared’ or ‘fully prepared’ compared to those who had previously participated, **at a 5% significance level (p=0.000).**

- Training needs on disaster preparedness

The analysis revealed that **nurses who attended or would be attending a First Aid level 3 course are 6.46 times likely to feel totally unprepared** for a disaster as opposed to being ‘somewhat unprepared,’ ‘somewhat prepared’ or ‘fully prepared’ compared to those who had not or would not be attending the course when adjusted for all other factors (demographic details and previous participation in disaster activities) **at the 5% significance level (p=0.049).**

Nurses who attended or would be attending the International Trauma Life Support course were 32.75 times likely to feel totally unprepared for a disaster as opposed to being ‘somewhat unprepared,’ ‘somewhat prepared’ or ‘fully prepared’ compared to those who had not or would not be attending the course when adjusted for all other factors (demographic details and previous participation in disaster activities) **at the 5% significance level (p=0.006).**

The multivariate ordinal logistic regression model illustrated there was no statistical significance in the difference in nurse’s perception of disaster preparedness between nurses who were trained on all other remaining courses (basic life support, advanced cardiovascular life support, pre trauma life support, infection control, pre-trauma counselling, post-traumatic psychological care and disaster management) and those who were not trained when adjusted for all other factors (demographic details and previous participation in disaster activities).

- Demographic details

When adjusted for all other factors (training on disaster preparedness and previous participation in disaster activities), **nurses in the age group 45 to 60 years were 11.72 times likely to feel totally unprepared for a disaster** as opposed to being ‘somewhat unprepared,’ ‘somewhat prepared’ or ‘fully prepared’ compared to those in the age group 18 to 25 years at the **5% significance level (p=0.020)**. In all other age groups (26 to 35 years and 36 to 45 years), there was no statistical significance in the nurse’s perception of disaster preparedness.

- Ward

The multivariate ordinal logistic regression model indicated that **when adjusting for all other factors** (training needs on disaster preparedness and respondents demographic details), **nurses who work in the medical wards are 0.09 times likely to feel totally unprepared for a disaster** as opposed to being ‘somewhat unprepared,’ ‘somewhat prepared’ or ‘fully prepared’ **compared to nurses working in the surgical wards at the 5% significance level (p=0.000)**.

4.3.2.10: Definition of the word disaster.

Nurses were asked to define disaster in their own words. Summative content analysis was used to analyse their responses. The responses were studied and themes extracted, and those that arose from the data were, a sudden event that is not prepared for, loss of life, damage to property and impact on hospital normal functioning.

- Theme one

A sudden event that is not prepared for.

This theme occurred 67 times. Other words used that were found to relate to this theme were an unforeseen even not prepared for, an unexpected situation and accidental event that was not planned. Respondents believed a disaster to be a sudden event that happens unexpectedly and not planned. Some of the responses given were:

“A disaster is an unplanned accident that results in loss of people’s lives, injury and suffering.”

“Anything that happened unexpectedly that leaves people dead, buildings destroyed and needs urgent attention.”

“An unforeseen event such as building collapse that results in loss of life and is usually not planned for.”

- Theme two

Loss of life

The theme loss of life was found to occur 61 times. The respondents regarded a disaster as a situation that will result in loss of people's lives. Some of the responses given were:

“An uncontrolled situation that leaves people dead like the Marikana Miners' strike.”

“A sudden catastrophe that results in loss of life and damage to the buildings, e.g. earthquakes.”

- Theme three

Damage to property

Respondents believed that a disaster is a situation that causes destruction to property. This theme was counted 65 times.

“An occurrence that was not planned for, that results in loss of human life and destroys buildings like the Tsunamis.”

“An event involving bloodshed, destruction of building, injuries and sufferings.”

- Theme four

Impact on hospital normal functioning

The respondents believed a disaster is an event that overwhelms the hospital capacity to provide care. This theme was counted 104 times.

“A manmade or natural situation that leaves a lot of people dead and hospitals not being able to accommodate the large number of patients.”

“A disaster is when multiple casualties are brought to the hospital, staff that is off duty is called to work and there is loss of life.”

Other themes that arose, but whose frequencies were small, were a harmful, unavoidable, dangerous situation that keeps people's lives at risk, causes confusion and involves many

people. At the end of the questionnaire, respondents were asked to add any other comments. The comments the respondents made were that they needed staffing to be increased, increased in-service lectures and disaster drills in order for them to be adequately prepared for disasters.

4.4 DISCUSSION OF RESULTS

The purpose of this study was to ascertain whether registered nurses, practicing in medical and surgical wards in a central hospital in Johannesburg, were prepared for disasters.

The first seven questions of the survey questionnaire gathered information on the nurse's demographic details. The findings of the study indicated that nursing in the central hospital where the study was conducted was female dominated. These results are consistent with statistics from other countries, such as Canada, where only 5.8% of their registered nurses are males, and despite a global shortage of nurses, men remain reluctant to enter into the profession (Meadus & Twomey, 2011). In 2012, male nurses in the United States of America accounted for approximately 7% of the nursing workforce. The majority of the nurses in this study were aged between 26 and 45 years, suggesting a young nursing population in the hospital. Over half of the respondents had worked for quite a long time in the hospital (1 to 10 years), with the majority having a higher diploma as the highest level of qualification and being registered nurses as opposed to unit managers and educators.

The questionnaire then assessed the respondent's knowledge on disasters and disaster preparedness. Respondents were asked to choose situations that happened in South Africa that they considered to be disasters, rate the likelihood of disasters occurring in South Africa, choose agencies they felt would be involved if a disaster occurred and answer questions pertaining to their hospital disaster management protocol. Four major findings emerged from the data: the majority of the nurses 52.45% (n=75) had not previously participated in disaster activities, had limited disaster training and education, previous participation in disaster activity influenced nurses disaster preparedness, but nevertheless, nurses perceived themselves generally prepared for disasters.

The first question the study attempted to answer was, '**What are the perceptions of registered nurses working in medical and surgical wards regarding disasters and**

disaster preparedness, in terms of whether they consider themselves ready to deal with disasters?’

An overwhelming majority of respondents believed the Department of Health was the organisation mostly involved when a disaster occurs. Nevertheless, they recognised the need for a collaborative approach to disaster management, citing the involvement of the SANDF, SAPS and Fire Department in disaster management. The same view was echoed by Natan *et al.* (2014), who emphasised the need for a multidisciplinary approach to disaster management with national organisations such as Fire Departments and Law Enforcement agencies.

According to Lambrague *et al.* (2015), it is necessary for hospitals to have well-documented and tested disaster management protocols in place. It is evident from the findings of this study that nurses acknowledge the existence of and have read the disaster protocol in their workplace, results that are consistent with findings from other research studies. In a study conducted in Hong Kong, amongst registered nurses studying for a Master’s degree, the majority of the respondents knew of the existing protocol in their workplace and over half of them reported to have read it (Fung *et al.*, 2008). The results from Duong’s (2009) study indicated that more than three quarters of the Australian nurses were aware of the existence of a disaster protocol at their workplace but when asked if they had read it, less than half reported not to have read it at all. However, a study conducted amongst Jordanian nurses revealed that over half of them were not familiar with disaster management protocols in their workplace. Of those who were aware of the disaster plan in their workplace, the majority reported lack of confidence in implementing it (Al Khalaileh *et al.*, 2012).

In this study, nurses appeared to understand their immediate action if a disaster occurred in accordance with the hospital disaster management protocol, which is further emphasised by the large number of the nurses who have read their disaster management protocol. A significant number of nurses agreed they would follow the hospital disaster protocol to manage the situation, although the questionnaire did not ask the nurses to indicate how exactly the disaster protocol says the situation should be managed. The World Health Organization and International Council of Nurses (2009) calls for all nurses to actively participate and assist with the development of disaster preparedness protocols and

programmes, and play their roles in raising community awareness with regard to disasters and disaster management. In the present study, nurses recognised the need for public awareness of disasters and disaster management and acknowledged the importance of the internet and newspapers as major sources of information regarding disasters. The public needs to recognise the vulnerable population during a disaster, such as the young, old and pregnant women (World Health Organization, 2007). This study further explored nurses' perceptions of their roles during disasters, and they believed that coordinating was their primary role during disaster. Some of the roles nurses agreed they played were giving direct care to disaster victims, educators, managers and counsellors. The results are consistent with findings from other studies, which found that nurses are aware of their roles during disasters and perceived themselves as frontline caregivers, educators and counsellors (Labrague *et al.*, 2015). Another study by Baack and Alfred (2013) added that in addition to care giving, educating and counselling nurses also play the role of coordinating and giving psychological care. Contrary to this, Melnikov, Itzhaki and Kagan (2014) conducted a study amongst Israeli nurses and found they had little knowledge on the roles to play during disasters. Nevertheless, nurses in the present study did not perceive themselves as researchers during a disaster and perhaps this area needs further studies to explore the reason why nurses seem reluctant to engage in research.

Exposure to disaster activities provides the nurses with insight regarding realities of disasters and disaster preparedness (Duong, 2009). The findings of the study, which are comparable with existing literature, demonstrated that the majority of the nurses in the hospital had not previously participated in disaster preparedness activities. A study conducted by Hammad *et al.* (2010) indicated that nurses lacked involvement in previous disaster events. Those in Hammad *et al.*'s (2010) study who indicated they had previously participated in a disaster activity cited events that were not declared as disasters. Of the few nurses in this study who had previously participated in a disaster activity, it is not known whether the event was declared a disaster since the questionnaire did not provide for them to explain.

The findings of this study indicate that South Africa is at greater risk of environmental disasters. Due to increased rural urban migration in South Africa, large numbers of people live in congested, underserved, unhygienic and ecologically fragile, informal settlements with chronic disaster vulnerabilities and rapid population growth (South African National

Disaster Management Framework, 2005). These areas are prone to fires, infectious diseases and overcrowding stampedes as already indicated by nurses in the present day study. The Marikana miners' strike that happened in Rustenburg, September 2012, and the Ellis Park Stampede disaster in Johannesburg 2001 are the most popular disasters according to the nurses in the present study, emphasising that the country is at risk of manmade disasters as opposed to natural disasters. Meanwhile in other parts of the world, Asia is the region considered to be the most often hit by natural disasters, accounting for 90.13% of worldwide disaster victims (Guha-Sapir, Vos, & Below, 2013). These authors cited the Philippines and China having experienced earthquakes, flash floods typhoons and volcanic eruptions. History bears witness to a tsunami in South East Asia, in December 2004, and Indonesia, in the past decade, has suffered from earthquakes, floods, hurricanes, landslides and abrasions as opposed to manmade disasters (Putra, Petpichetchian & Maneewat, 2011). Conversely, the United States of America has suffered from nuclear/radioactive disasters and terrorist attacks, such as that of September 11 2001 (Fung *et al.*, 2008).

The World Health Organization (2007)(WHO) defined a disaster as “a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.” The nurses in this study demonstrated a clear understanding of the word disaster and the themes that arose from the definitions were a sudden event that is not prepared for, loss of life, damage to property and impact on hospital normal functioning. These themes in particular are related to the World Health Organization's (2007) definition of a disaster, except the WHO does not acknowledge disasters to be an unprepared event.

It is worth noting that a significant number of nurses in the present study were prepared for a disaster and those that are, appear to have a sense of empowerment and increased confidence when responding to disasters (Chapman *et al.*, 2008). These findings differ to those from other studies around the world. Fung *et al.* (2008) conducted a study among Chinese registered nurses studying for a Master's degree and found that the vast majority of them (94%) were not adequately prepared for disasters. Al Khalaileh *et al.* (2012) conducted a study among Jordanian nurses and their results indicated 65% were unprepared for disasters, specifically citing they do not know their roles during a disaster.

Another study, by Jiang, He, Zhou, Shi, Yin and Kong (2015), revealed nurses lack disaster preparedness and they suggested that continuous education and training on disaster management would increase their disaster preparedness. It can be extrapolated that disaster preparedness is increasing amongst nurses and if the research could be repeated by these researchers, would find different results.

The second question the study attempted to answer was **‘What are the training needs regarding disaster preparedness of registered nurses working in the medical and surgical wards of a central hospital in Johannesburg?’**

To improve disaster preparedness, nurses should be provided with training and disaster education to equip them with the necessary skills, knowledge and attitude to provide a better disaster response (Hammad *et al.*, (2010). Nurses in the present study acknowledged disaster management courses as important for their preparedness, and of the educational courses that would enhance this, they cited post-traumatic psychological care, basic life support and first aid as necessary. According to Yan *et al.* (2015), during a disaster first aid and advanced cardiac life support knowledge helps increase patient survival. A significant number of nurses in this study have not attended courses necessary for disaster preparedness. Similarly, Diab and Mabrouk (2015) found the majority of the nurses have never attended training or educational courses related to disaster management, they focus on their work and neglect updating their knowledge and skills. They concluded that to enhance the nurse’s preparedness, it is important to provide them with continued training and education on disaster management. It is important to engage the nurses in activities, such as disaster drills, to provide them with insight into the realities of disaster response and preparedness (Baack & Alfred, 2013). In the present study, the majority of the nurses acknowledged disaster drills as an important activity to prepare them for disasters. Disaster drills present realistic expectations of a disaster and give the nurses, plus the hospital at large, the opportunity to test the disaster protocols they will use in a real disaster situation (Hammad *et al.*, 2010). Hammad *et al.* (2010) further stated that hospitals should be consistent with their disaster drill schedules to help keep staff prepared. The hospital where this study was conducted has a published disaster management protocol and guidelines on disaster preparedness and disaster management. They set expectations regarding disaster planning and minimum numbers of drill exercises annually. The protocol stipulates that the hospital should make two disaster drills each year however, the last one was done in 2013,

which suggests that nurses who have been working in the hospital for the past three years have not been exposed to disaster drills.

The third question the study attempted to answer was ‘**What are the factors associated with registered nurse’s disaster preparedness?**’

Three variables of interest were identified to influence disaster preparedness: the respondent’s demographic details, previous participation in disaster activity and training, and education on disaster management.

Demographic characteristics of nurses

In this study, gender did not influence the nurse’s disaster preparedness. Additionally, nurse’s disaster preparedness was not influenced by the number of years they worked in the hospital, number of years as a registered nurse, qualification and current position. However, age was found to have an influence on disaster preparedness of registered nurses, as the results of the study indicated that an older population of registered nurses are more likely to feel unprepared for disaster. It is difficult to find an explanation for this factor and therefore, it requires further investigation. The ward in which the registered nurses work was also found to have an influence on their disaster preparedness. It was revealed that nurses in the surgical wards are more likely to feel unprepared for disasters than those working in the medical wards. It is difficult to explain this and further research is recommended to explore further. These results are in line with the conceptual framework of disaster preparedness provided in chapter 1. The model stated that demographic characteristics of respondents have an effect on their disaster preparedness. Even though not all demographic characteristics were statistically significant, the results proved that age of the respondents and the ward in which the respondent works at has an effect on their disaster preparedness just as the framework hypothesised.

Previous participation in a disaster activity

According to Hammad *et al.* (2012), and the conceptual framework of disaster preparedness, ‘previous participation’ in a disaster does have an influence on nurse’s disaster preparedness. From this study, this was apparent as the univariate ordinal logistic regression model showed there was statistical significance ($p=0.000$) that nurses who had not previously participated in any disaster preparedness activity were 0.22 times likely to

feel totally unprepared for a disaster as opposed to being ‘somewhat unprepared,’ ‘somewhat prepared’ or ‘fully prepared’ compared to those who had previously participated. These results proved the study conceptual framework to be true, that stated that previous participation in disaster activity has an effect on nurse’s disaster preparedness. Duong (2009) added that nurses that have limited exposure in disaster response have low confidence and demonstrate confusion during the response phase of a disaster.

Training and education on disaster management

Interestingly, the results of this study revealed that registered nurses who had been trained on basic life support and International Trauma Life Support felt were totally unprepared for a disaster as opposed to those that have not been trained, while the rest of the educational courses remained statistically insignificant ($p < 0.05$). The study conceptual framework of disaster preparedness stated that training and education on disaster preparedness and management would have an effect on the nurse’s disaster preparedness. One would agree with the model and expect nurses who went for training and education on disaster preparedness to be better prepared for disasters than those who have not. Perhaps further research could be done to look into the contents on the disaster education courses and to establish the effectiveness of the trainings offered on disasters. In literature, it has been documented that nurses who have undergone training and education on disaster management and any course related to disasters are better prepared for disasters than those not trained (Diab & Mabrouk, 2015; Labrague *et al.* , 2015; Loke & Fung, 2014). Baack and Alfred (2013) asserted as much and continued to say hands-on training and short educational courses related to disaster management increases nurses competency and sense of disaster preparedness.

4.5 SUMMARY

This chapter presented the study’s findings and discussed the results. The registered nurses perception of disaster preparedness, their training needs regarding disaster preparedness as well as factors associated with disaster preparedness were discussed.

CHAPTER FIVE

SUMMARY OF THE STUDY, MAIN RESULTS, LIMITATIONS AND CONCLUSIONS

5.1 INTRODUCTION

This chapter presents the summary of the study, main research findings, limitations and conclusion, and ends with the researcher's recommendations to clinical nursing practice, nursing education as well as nursing research.

5.2 SUMMARY OF THE STUDY

5.2.1 Purpose of the study

The purpose of this study was to ascertain whether registered nurses, practicing in medical and surgical wards in a central hospital in Johannesburg, are prepared for disasters.

The objectives of this study were:

1. To describe the perceptions of registered nurses, working in a medical or surgical ward, regarding disasters and disaster preparedness in terms of whether they consider themselves ready to deal with disasters.
2. To describe the training needs regarding disaster preparedness of registered nurses working in the medical and surgical wards.
3. To determine the factors associated with registered nurses' disaster preparedness.

5.2.2 Research Methodology

The face and content validity of the original questionnaire was achieved by using a panel of seven experienced nurses with expertise in Emergency Care (two), Intensive Care (two), community health (one) and nurse training (two). The Content Validity Index was 0.94. The modified questionnaire for use in the South African content was validated by four

trauma experts (one trauma consultant, one specialised trauma nurse, one nurse educator and one registered nurse. The survey questionnaire comprised 26 questions divided into two sections: Section 1 gathered demographic characteristics of the respondents, while Section 2 gathered information on nurse's disaster preparedness and their training needs with regard to disaster preparedness. Two open-ended questions were added in order to obtain in-depth understanding. A quantitative, descriptive, exploratory, survey study design was used.

Data was collected from 1 July 2016 to 1 September 2016. The study comprised a population of 191 nurses (N=191) and the total sample was used. Of the 191 survey questionnaires distributed, 143 were received back. The study was conducted in an accredited central hospital in Johannesburg, in the medical and surgical wards. Data was collected using a survey questionnaire developed by Fung *et al.* (2008) and analysed using descriptive statistics and ordinal logistic regression. The open-ended questions were analysed, with statistical help, using the summative content analysis.

Prior to commencement of the main study, a pre-test was conducted to test the survey questionnaire for feasibility. The pre-test was conducted on 20 respondents whose findings were not included in the main study. The modification that was done was to indicate on Question 14 that they could tick more than one option, as most of the respondents were confused as to how to respond to the questionnaire.

Before commencement of the study, ethical clearance (Appendix E) was obtained from the Committee for Research on Human Subjects (Medical) of the University of the Witwatersrand (protocol number M160533) and permission to conduct the study was granted by the Faculty of Health Science Post Graduate Committee (Appendix F) and the Chief Nursing Officer of Charlotte Maxeke Academic Hospital (Appendix D).

5.3 SUMMARY OF MAIN FINDINGS

The purpose of the study was to ascertain whether registered nurses, practicing in medical and surgical wards in a central hospital in Johannesburg, were prepared for disasters.

Nurses have limited previous disaster experience.

Exposure to disaster activities provides the nurses with insight regarding realities of disasters and disaster preparedness. The findings of the study demonstrated that nurses in the hospital have had minimal previous participation in disaster preparedness activities. These findings are not unique to South African nurses, as a study conducted by Hammad *et al.* (2010), among South Australian nurses, indicated that nurses lacked involvement in previous disaster response.

Nurses have limited disaster training and education.

A significant number of nurses have not attended courses necessary for disaster preparedness, therefore are not adequately trained for disasters. These findings are consistent with the results of a study conducted by Diab and Mabrouk (2015), who also found the majority of nurses have never attended training or educational courses related to disaster management, they focus on their work and neglect updating their knowledge and skills.

Previous participation in a disaster activity influenced nurse's disaster preparedness.

The results of this study indicated that nurses who had not previously participated in a disaster activity were found to be extremely unprepared compared to those who had. Duong (2009) added that nurses who have limited exposure in disaster response have low confidence and demonstrate confusion during the response phase of a disaster.

Generally, the nurses in the study perceived themselves to be prepared for disasters.

The nurses in the present study perceived themselves as ready for a disaster, but these findings are contrary to other studies in literature, which found nurses were not adequately prepared (Fung *et al.*, 2008; Al Khalaileh *et al.*, 2012 and Jiang *et al.*, 2015).

5.4 LIMITATIONS OF THE STUDY

All studies have limitations, and those in this study are discussed.

Methodological limitations

Although the sample size was large enough for statistical power, it represented a small number of the total population in the hospital.

The study focused on non-specialised registered nurses, therefore results may not be generalised to other nurses.

Context limitations

Since this study was only conducted in one hospital, it is difficult to generalise to all nurses in South Africa.

Most of the reviewed literature was from developed countries, with nothing from the African context.

Survey Questionnaire limitations

From the researcher's observation, the survey question had too many questions and the nurses were reluctant to fill all of them.

The survey questionnaire asks about nurse's previous disaster response, but does not ask them to state whether it was a real disaster or a mock drill.

5.5 RECOMMENDATIONS OF THE STUDY

Recommendations were made to the nursing practice, nursing education as well as nursing research.

5.6.1 Clinical Nursing Practice

The following were recommended to clinical practice:

Orientation of newly graduated nurses on hospital disaster management protocols to keep them prepared for when disasters might happen.

Regular disaster drills and in-service training to update both the nursing skills and knowledge on disaster preparedness.

Regular update of hospital disaster management protocols to be current with international standards.

Hospitals should make nurses' development a priority, i.e. include in the hospital budget money for training and educating nurses on disaster preparedness and management.

Discussion of evidence based research articles at ward levels as part of ongoing disaster education.

Nurses are advised to further their studies and engage in courses that increase their disaster knowledge and preparedness.

5.6.2 Nursing Education

The following were recommended to nursing education:

Nurses are encouraged to engage in research on disaster management and preparedness in order to familiarise themselves with current best practices.

Nursing education should include disaster preparedness and management at undergraduate level.

Ongoing seminars and workshops on disaster preparedness and management to help keep nurses knowledge current and up to date.

5.6.3 Nursing Research

The following were recommended to nursing research:

In order to enhance generalisation of study findings, the study should be repeated in other South African hospitals with a larger population.

Further research is recommended to explore why nurses in medical wards, compared to nurses in surgical wards, are more prepared for disasters.

5.6 CONCLUSION

The first objective of this study was to describe the perceptions of registered nurses, working in a medical or surgical ward, regarding disasters and disaster preparedness in terms of whether they consider themselves ready to deal with disasters. The objective was met. Nurses were able to demonstrate understanding of disasters and disaster preparedness. The majority of the nurses in this study had read the disaster management protocols at their workplace, were familiar with the aspects of disaster management protocols, such as assembly points, emergency numbers, and were allocated disaster job cards every day during handover. Generally, the nurses perceived themselves ready to deal with disasters. This suggests that the nursing population in the hospital of study would respond better to disasters since they perceive themselves ready and are familiar with the disaster protocols in their workplace.

The second objective was to describe the training needs regarding disaster preparedness of registered nurses working in the medical and surgical wards. The objective was met. It is apparent from the findings of the study that nurses lack disaster education and training. The majority of the nurses indicated they have not previously participated in disaster activities and stated disaster drills are an important exercise to assist in disaster preparedness. Of the educational courses, nurses have not attended the courses necessary for disaster preparedness but have indicated the need and interest in attending such courses. Hospital management should see the need to budget for ongoing training and education on disaster preparedness because education and training is the key to a well informed nursing profession. It is important to have a well informed nursing profession on the different types of disasters and strategies to approach each kind of disaster. Nurses should make continuous professional development a priority for personal growth and for the growth of the profession at large.

Finally, the study met its third objective, which was to determine factors associated with registered nurses disaster preparedness. The factors of interest were previous participation in a disaster activity, demographic details and training on disaster preparedness.

Demographic details

The study found that of all the demographic details (gender, age, number of years worked in the hospital, number of years as a nurse, highest level of nursing qualification, current nursing position and ward) only age and ward was found to have an influence on the nurses disaster preparedness. Registered nurses aged 45 to 60 years were found to be unprepared for disasters, whilst registered nurses working in the medical wards were unprepared for disasters compared to those in the surgical wards. Even though not all demographical characteristics had an effect on the nurse's disaster preparedness, it was in line with the conceptual framework of disaster preparedness which stated that demographical details have an effect on nurses disaster preparedness. It can be expected that older nurses be better prepared for disasters than their younger counterparts because of the wealth of experience they have accumulated in the profession. The results revealed that older nurses are less prepared for disasters than the younger ones. It can be concluded from the results that older nurses are not interested in continued education and training on disaster preparedness but rather focus on their everyday work while the younger nurses keep

educating and training themselves on disaster preparedness because they still have a long way into the profession and are energetic to run around when a disaster occurs.

Previous participation in a disaster

The findings of the study indicated that nurses who have not previously participated in a disaster activity are likely to feel unprepared compared to those who have. Experience remains the best teacher. Nurses who have experience in disaster activities are better prepared for disasters because they learn from each disaster they participate in. Nurses should make it a personal call to respond when ever a disaster is declared, in that way they gain experience that no one can ever take from them.

Training on disaster preparedness

The study findings indicated that nurses who are trained in International Trauma Life Support and first aid level 3 are more likely to feel unprepared than the nurses who are not trained. The rest of the educational courses indicated no statistical significance in the difference in disaster preparedness between trained and untrained nurses. From these findings, it can be concluded that the training and education offered on disaster preparedness is ineffective and need to be reviewed. Hospital management should make disaster committees which are responsible for scheduling hospital disaster drills and in service lectures on disaster preparedness to increase nurse's awareness on disaster preparedness.

5.7 SUMMARY

This chapter was a summary of the study. It included the main findings from the study, limitations and the conclusion.

REFERENCES

- Adams, L. & Berry, D. 2012. Who will show up? Estimating ability and willingness of essential hospital personnel to report to work in response to a disaster. *Online Journal of Issues in Nursing*, 17(2): J1.
- Al Khalaileh, M., Bond, E. & Alasad, J. 2012. Jordanian nurses' perceptions of their preparedness for disaster management. *International Emergency Nursing*, 20(1); 14-23.
- Aliakbari, F., Hammond, K., Bahrami, M. & Aein, F. 2015. Ethical and legal challenges associated with disaster nursing. *Nursing Ethics*, 22(4): 493-503.
- Arbon, P., Cusack, L., Ranse, J., Shaban, R., Considine, J., Kako, M., Woodman, R., Mitchell, B., Bahnisch, L. & Hammad, K. 2013. Exploring staff willingness to attend work during a disaster. A study of nurses employed in four Australian emergency departments. *Australasian Emergency Nursing Journal*, 16(3): 103-109.
- Auerbach, P., Norris, R., Menon, A., Brown, L., Kuah, S., Schwieger, J., Kinyon, J., Helderma, T. & Lawry, L. 2010. Civil-military collaboration in the initial medical response to the earthquake in Haiti. *New England Journal of Medicine*, 362(10): e32.
- Ayuba, S., Danjuma, A., Nassa, Y., Joseph, I., Mathew, A. & Micheal, S. 2015. Role of the nurse in emergency preparedness: A survey of secondary health Facilities in Northern Nigeria. *World Journal of Preventive Medicine*, 3(3): 54-60.
- Baack, S. & Alfred, D. 2013. Nurses' preparedness and perceived competence in managing disasters. *Journal of Nursing Scholarship*, 45(3): 281-287.
- Bean, W., Viljoen, N., Ittmann, H. & Kekana, E. 2011. Disaster management and humanitarian logistics – A South African perspective. *Journal of Transport and Supply Chain Management*, 5(1): 39-52.
- Brewer, K. 2010. Who will be there? Ethics, the law and a nurse's duty to respond in a disaster. *American Nurses Association*.
Available from: <http://nursingworld.org/mainmenucategories-advocacy/positions-and-resolutions/issue-briefs/disasterpreparedness.pdf>
- Brink, H., van Rensburg, G., van der Walt, C. 2012. *Fundamentals of research methodology for healthcare professionals*. 3rd ed. Cape Town: Juta & Co.
- Burns, N. & Grove, S. 2011. *Understanding nursing research: building an evidence based research*. 5th ed. USA: Saunders/Elsevier.
- Burns, N., Grove, S. & Gray, R. 2013. *Practice of nursing research: appraisal, synthesis and generation of evidence*. 7th ed. USA: Saunders/Elsevier.

Chapman, K. & Arbon, P. 2008. Are nurses ready? Disaster preparedness in the acute setting. *Australasian Emergency Nursing Journal*, 11(3): 135-144.

De Vos, A., Fouche, C., Strydom, H. & Delpont, C. 2011. *Research at grass roots for the social sciences and human service profession*. 3rd ed. Pretoria: Van Schaik's Publisher.

Diab, G. & Mabrouk, S. 2015. The effect of guidance booklet on knowledge and attitudes of nurses regarding disaster preparedness at hospitals. *Journal of Nursing Education and Practice*, 5(9):17.

Duong, K. 2009. Disaster education and training of emergency nurses in South Australia. *Australasian Emergency Nursing Journal*, 12(3): 86-92.

Fung, O., Loke, A. & Lai, C. 2008. Disaster preparedness among Hong Kong nurses. *Journal of Advanced Nursing*, 62(6): 698-703.

Disaster Management Amendment Act. 2015. *Government Gazette*. Act No. 16 of 2015. Cape Town, South Africa.

Guha-Sapir, D., Vos, F., Below, R. & Ponslerre, S. 2013. Annual disaster statistical review 2011: the numbers and trends. WHO Centre for Research on the Epidemiology of Disasters (CRED)

Hammad, K., Arbon, P. & Gebbie, K. 2010. Emergency nurses and disaster response: An exploration of South Australian emergency nurses' knowledge and perceptions of their roles in disaster response. *Australasian Emergency Nursing Journal*, 14(2): 87-94.

Hammad, K., Arbon, P. & Gebbie, K. 2012. Emergency nurses and disaster response: An exploration of South Australian emergency nurses' knowledge and perceptions of their roles in disaster response. *Australasian Emergency Nursing Journal*, 14(2): 87-94

Hay, J. 2012. Disaster risk reduction and climate change adaptation in the Pacific: An institutional and policy analysis. UNISDR, UNDP.

Hegner, B., Acello, B. & Caldwell, E. 2004. *Issues and ethics in the helping profession*. 9th ed. New York: Thomson Delmar Learning.

Hsieh, H. & Shannon, S. 2005. Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9): 1277-1288.

Ibrahim, F. 2014. Nurses knowledge, attitudes, practices and familiarity regarding disaster and emergency preparedness – Saud Arabia. *American Journal of Nursing Science*, 3(2): 18-25.

International Council of Nurses (ICN). 2012. *The ICN Code of Ethics for Nurses*. Geneva, Switzerland.

International Council of Nurses (ICN). 2006. *The ICN Code of Ethics for Nurses*. Geneva, Switzerland.

International Federation of Red Cross and Red Crescent Societies. 2011. *Disasters in Africa: The case for legal preparedness*. Geneva, Switzerland.

International Strategy for Disaster Reduction. 2009. Disaster Risk Management.

Jiang, L., He, H., Zhou, W., Shi, S., Yin, T. & Kong, Y. 2015. Knowledge, attitudes and competence in nursing practice of typhoon disaster relief work among Chinese nurses: A questionnaire survey. *International Journal of Nursing Practice*, 21(1): 60-69.

Labrague, J., Yboa, B., Petite, M., Lobrino, R. & Brenna, B. 2015. Disaster preparedness in Philippine Nurses, *Journal of Nursing Scholarship*, 48(1): 98-105.

Lim, G., Lim, B. & Vasu, A. 2013. Survey of factors affecting health care workers' perception towards institutional and individual disaster preparedness. *Prehospital and Disaster Management*, 28(4): 353.

Lobiondo-Wood L. & Haber, J. 2010. *Nursing research: methods and critical appraisal for evidence based practice*. 7th ed. China: St Louis Mosby.

Loke, A. & Fung, O. 2014. Nurses' competencies in disaster nursing: implications for curriculum development and public health. *International Journal of Environmental Research and Public Health*, 11(3): 3289-3303.

Magnaye, R., Munoz, M., Munoz, M., Munoz, R. & Munro, J. 2011. The role, preparedness and management of nurses during disasters. *E-International Scientific Research Journal*, 3(4): 269-294.

Meadus, R. & Twomey, J. 2011. Men student nurses: The nursing education experience. In *Nursing Forum*, 46(4): 269-279.

Meleis, A. 2005. The case against the DNP: History, timing, substance and marginalization.

Melnikov, S., Itzhaki, M. & Kagan, I. 2014. Israeli Nurses' intention to report for work in an emergency or disaster. *Journal of Nursing Scholarship*, 46(2): 134-142.

Miles, M. & Huberman, A. 1994. *An expanded sourcebook qualitative data analysis*. California: SAGE.

Moabi, R.M., 2009. Knowledge, attitudes and practices of health care workers regarding disaster preparedness at Johannesburg hospital in Gauteng Province, *South Africa*.

Nagase, M. 2012. Does a multi-dimensional concept of health include spirituality? Analysis of Japan Health Science Council's discussions on WHO's definition of health (1998). *International Journal of Applied Scholarship*, 2(6): 71-77.

Natan, M., Nigel, S., Yevdayev, L., Qadan, M. & Dudkiewicz, M. 2014. Nurse willingness to report for work in the event of an earthquake in Israel. *Journal of Nursing Management*, 22(7): 931-939.

National Advisory Council on Nurse Education and Practice. 2009. *12th Annual Report to the Secretary of the United States Department of Health and Human Services and the Congress of the United States*. Washington, DC: US Government Printing Office.

O'Sullivan, T., Dow, D., Turner, M., Lemyre, L., Corneil, W., Krewski, D., Phillips, K. & Amaratunga, C. 2008. Disaster and emergency management: Canadian nurses' perceptions of preparedness on hospital front lines. *Prehospital and Disaster Medicine*, 23(3): S11-S18.

Ogedegbe, C., Nyrienda, T., DelMoro, G., Yamin, E. & Feldman, J. 2012. Health care workers and disaster preparedness: barriers to and facilitators of willingness to respond. *International Journal of Emergency Medicine*, 5(1): 1.

Peoples, K., Gebbie, K. & Hutton, A. 2016. An exploration of perceptions of disaster nursing and disaster preparedness among Australian nursing undergraduates. *Health Emergency and Disaster Nursing*, 3: 28-35.

Polit D. & Beck, C. 2012. *Nursing research: Generating and assessing evidence for nursing practice*. 10th ed. USA: Lippincott Williams & Wilkins.

Putra, A., Petpichetchian, W. & Maneewat, K. 2011. Perceived ability to practice in disaster management among public health nurses in Aceh, Indonesia. *Nurse Media Journal of Nursing*, 1(2): 169-186.

Ranse, J. & Lenson, S. 2012. Beyond a clinical role: nurses were psychosocial supporters, coordinators and problem solvers in the Black Saturday and Victorian bushfires in 2009. *Australasian Emergency Nursing Journal*, 15(3): 156-163.

Schultz, C., Koenig, K., Whiteside, M., Murray, R. & National Standardised All-Hazard Disaster Core Competencies Task Force. 2012. Development of national standardised all-hazard disaster core competencies for acute care physicians, nurses and EMS professionals. *Annals of Emergency Medicine*, 59(3): 196-208.

South African National Disaster Management Framework. 2005. Introduction: a policy framework for disaster risk management in South Africa. Pretoria: South Africa.

South African Nursing Council (SANC). 1997. Regulations for a course in clinical nursing science leading to registration of an additional qualification. Regulation R212 of February 1993 as amended by Regulation 74 of January 1997. Pretoria: South African Nursing Council.

Spain, K., Clements, P., DeRanieri, J. & Holt, K. 2012. When disaster happens: Emergency preparedness for nurse practitioners. *The Journal for Nurse Practitioner*, 8(1): 38-44.

Veenema, T. 2006. Expanding educational opportunities in disaster response and emergency preparedness for nurses. *Nursing Education Perspectives*, 27(2): 93-99.

- Veenema, T. 2011. *Disaster nursing and emergency preparedness for chemical, biological, and radiological terrorism and other hazards*. Springer Publishing Company.
- Veenema, T., Griffin, A., Gable, A., MacIntyre, L., Simons, R., Couig, M., Walsh, J., Lavin, R., Dobalian, A. & Larson, E. 2016. Nurses as leaders in disaster preparedness and response – A call to action. *Journal of Nursing Scholarship*, 48(2): 187-200.
- Whetzel, E., Walker-Cillo, G., Chan, G. & Trivett, J. 2013. Emergency nurse perceptions of individual and facility emergency preparedness. *Journal of Emergency Nursing*, 39(1): 46-52.
- World Health Organization (WHO) and International Council of Nurses (ICN). 2009. *International Council of Nurses framework of disaster nursing competencies*. Geneva: Switzerland.
- World Health Organization (WHO). 2007. *Risk reduction and emergency preparedness: WHO six-year strategy for the health sector and community capacity development*. Geneva: Switzerland.
- Yan, Y., Turale, S., Stone, T. & Petrini, M. 2015. Disaster nursing skills, knowledge and attitudes required in earthquake relief: Implications for nursing education. *International Nursing Review*, 62(3): 351-359.
- Yang, Y., Xiao, L., Cheng, H., Zhu, J. & Arbon, P. 2010. Chinese nurses' experience in the Wenchuan earthquake relief. *International Nursing Review*, 57(2): 217-223.
- Zhong, S., Clark, M., Hou, X., Zang, Y. & Fitzgerald, G. 2014. Progress and challenges of disaster management in China: A scoping review. *Global Health Action*, 7(1): 1-14.

**DISASTER PREPAREDNESS OF REGISTERED NURSES IN A CENTRAL
IN JOHANNESBURG**

DATA COLLECTION INSTRUMENT

Demographic Data

1. What sex are you?
 - Male
 - Female

2. What is your age?
 - 18-25
 - 26-35
 - 36-45
 - 45-60

3. How long have you been working in the CMJAH?
 - <1year
 - 1- 10years
 - > 10years

4. How long have you been nursing?
 - <1year
 - 1-5years
 - 6-10years
 - 11-15years
 - >15years

5. What is your highest-level qualification in nursing?
 - Certificate
 - Higher Diploma
 - Bachelor Degree
 - Master's Degree

6. What is your current nursing position?

- Professional Nurse
- Unit manager
- Area manager
- Nursing Services Manager
- Nursing Educator
- Others (Please specify _____)

7. Which ward do you work in?

- Medical Ward
- Surgical Ward

SECTION: B Knowledge on Disaster preparedness

8. Please state, in your own words, what a disaster means to you.

9. Which of the following situation(s), which occurred in South Africa, would you consider a disaster? (You can tick more than one option)

- Marikana Miners' Strike, Rustenburg (10-20 September 2012, numerous miners involved, 44 deaths).
- Sharpeville Massacre (21 March 1960, 5000-7000 protesters, 69 killed in shoot out).
- Soweto Uprising, Johannesburg (16 June 1976, 20000 participants, 176 died with estimates up to 700 in shoot out).
- Table Mountain Fire (17 March 2009, one death and seven injuries. Large amount of hectares were destroyed).

- Westdene Dam Disaster, Johannesburg (Bus driver lost control and plunged into the dam with school children on board, 27 March 1985, 39 students died).
- Bethlehem Bus Crash, FreeState (Coach plunged into reservoir, 1 May 2003, 80 killed).
- Blackheath Train Accident, Cape Town (25 August 2010, Train crashed into minibus, 10 schoolchildren killed).
- Hectorspruit Level Crossing Accident, Mpumalanga (13 July 2012, Train collided with truck, 26 fatalities).
- Ellis Park Stadium Stampede Disaster, Johannesburg (11 April 2001, 120000 attendees, 43 people were crushed to death).

10. How would you rate the likelihood of the following disasters occurring in South Africa?

*Please tick the box you choose and indicate your chosen rating.

DISASTERS THAT COULD OCCUR IN R.S.A	Absolutely No	Very unlikely	Unlikely	Likely	Very likely
Chemical Spills					
Earthquakes					
Severe flooding					
Extensive landslides					
Major Fire Incidents					
Major Transport Accidents					
Nuclear Incidents/Radioactive substances					
Extreme weather					
Terrorist attacks					
Infectious Disease(s)					
Widespread strike/Demonstration					
Mining accidents					
Refugee migration					

Overcrowding incidences (e.g. sport)					
--------------------------------------	--	--	--	--	--

11. Which one of the following agencies will be involved if a disaster occurs in South Africa?

(You can tick more than one option)

- Department of Health
- Department of Constitutional Development
- The South African Weather Bureau
- The SANDF and SAPS
- Department of Welfare and Population Development
- Department of Housing
- Department of Education
- Department of Public Works
- Department of Home Affairs
- Department of Water Affairs
- Department of Fire Services

12. Do you think the general public needs to be aware of disaster preparedness?

- Yes
- No

13. Please indicate, by ticking, which of the following are used in obtaining information on disaster management.

- Word of mouth
- Hospital/ School notice
- Internet
- Newspapers
- Television
- Radio
- Emailing
- Telecommunication

14. As a nurse, which of the following course(s) do you think is/are necessary for disaster preparedness? *Please tick and indicate whether you have attended or are intending to attend a course(s), and if no, whether you are interested in attending.

Table 1 Attendance and interest in attending courses

COURSES	NECESSARY FOR PREPAREDNESS	ATTENDED OR WILL BE ATTENDING A COURSE	INTERESTED IN ATTENDING A COURSE
First Aid level 3 (III)			
Basic Life Support			
Advanced Cardiovascular Life Support			
Pre-Trauma Trauma Life Support			
International Trauma Life Support			
Infection Control			
Peri-Trauma Counseling			
Post-traumatic Psychological care			
Disaster Management			
Others, please specify			

15. If a disaster occurs and **MAY ENDANGER YOUR LIFE** in your workplace, which of the following will be your **IMMEDIATE ACTION**?

- Escape as soon as possible
- Evacuate patients as soon as possible
- Follow instructions from immediate supervisor at scene
- Warn others before escape

Follow hospital protocol to manage the situation

16. Is there any protocol for disaster management at your workplace?

- Yes
- No
- Don't know

a) If yes, have you read it yet?

- Yes
- No

17. Have you participated in any activity in accordance with disaster management at your workplace?

- Yes
- No

a) If yes, when? _____

18. Are you allocated a disaster job card each day in your ward at handover?

- Yes
- No.

19. If yes, what number is yours today? _____

20. Do you know what number you call if you cannot evacuate from your workplace (according to the disaster plan) during a disaster?

- Yes
- No.

21. Do you know where your assembly point is according to the disaster protocol in your workplace?

- Yes
- No.

a) If yes, where? _____

22. What is your first **action** if there is a bomb threat in your hospital? (Tick one only)

- Call the police and bomb disposal unit
- Remove yourself and others from the ward
- Phone and contact your supervisors
- Open all windows and doors
- Don't touch any suspicious object

23. As a nurse, please grade how prepared you personally are for a disaster.

- 1 (Totally unprepared)
- 2 (somewhat unprepared)
- 3 (Somewhat prepared)
- 4 (Fully prepared)

24. Which of the following do you think is/are the role(s) of nurses in disaster preparedness?

(You may tick more than one option)

- Caregiver
- Educator
- Researcher
- Coordinator
- Manager
- Counsellor
- Others (Please specify) _____

25. Which of the following will be useful to prepare you to deal with a disaster? (You may tick more than one option).

- Disaster Drills
- Disaster management course
- Disaster management protocols

- Information pamphlets
- Information web sites about disasters management
- Others (please specify) _____

26. Do you have any other comments?

Thank you for completing the questionnaire

APPENDIX B

DISASTER PREPAREDNESS OF REGISTERED NURSES IN A CENTRAL HOSPITAL IN JOHANNESBURG

INFORMATION LETTER

Dear Colleague,

My name is Lorato Baikanne Messe and I am a second year student at the University of the Witwatersrand, in the Department of Nursing Education, doing the degree of Master of Science in Nursing (Trauma and Emergency Nursing). I am hoping to conduct a research project to explore the disaster preparedness of registered nurses because it is crucial to have a nursing workforce that is prepared to respond to disasters.

Large-scale disasters can change the face of a developing nation in seconds. Although South Africa has only had small-scaled disasters recently, compared to other countries, disaster preparedness remains a key responsibility for all its citizens. The challenges and complexities of disasters are many and thus research is needed to assess the preparedness of healthcare professionals, especially nurses regarding disasters.

Participation in the study is voluntary. Respondents are expected to fill in the survey questionnaire and put it in a box inside the sister's office. By filling in the survey questionnaire, you consent to participate in the study. You may withdraw from the study anytime you wish to. I assure you your personal information will not be given in the writing of this research report to ensure confidentiality.

Please note there is no personal benefit attached to participating in this study. An understanding of staff knowledge deficit would help in identifying weaknesses and strengths in disaster preparedness of registered nurses and help with planning future education for nurses.

The appropriate authorities and research committees of the University of the Witwatersrand, Gauteng Department of Health and Johannesburg Hospital have approved the study and its procedures.

Thank you for taking the time to read this information letter. For further information regarding the study, or your rights as a study participant, please contact me in the Department of Nursing Education, or on the telephone number 0799135824, or email me using the following address: luvmessel@gmail.com

Contact details of Human Research Ethics Committee chairperson

If you want any information regarding your rights as a research respondents, or complaints regarding this research study, you may contact Prof. Cleaton-Jones, Chairperson of the University of the Witwatersrand, Human Research Ethics Committee (HREC), which is an

independent committee established to help protect the rights of research respondents at
(011) 717 2301.

Yours faithfully

Lorato Baikanne Messe

Date_____

HOSPITAL PERMISSION



GAUTENG PROVINCE

HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL

Enquiries:
Ms. G. Ngwenya
Office of the Nursing Director
Toll: (011) 488-4558
Fax: (011) 488-3786
23 November 2016

Ms. Lorato Baikanne Messe
Department of Nursing Education
Faculty of Health Sciences
University of Witwatersrand

Dear. Lorato Baikanne Messe

RE: "Disaster preparedness of registered nurses in a central hospital in Johannesburg"


Permission is granted for you to conduct the above recruitment activities as described in your request provided:

1. Charlotte Maxeke Johannesburg Academic hospital will not in anyway incur or inherit costs as a result of the said study.
2. Your study shall not disrupt services at the study sites.
3. Strict confidentiality shall be observed at all times.
4. Informed consent shall be solicited from patients participating in your study.
- 5.

Please liaise with the Head of Department and Unit Manager or Sister in Charge to agree on the dates and time that would suit all parties.

Kindly forward this office with the results of your study on completion of the research.


Supported / not supported



Ms. M.M Pule
Nursing Director

Date: 23/11/2016

Approved/ not approved



Ms. G. Bogoshi
Chief Executive Officer

23.11.2016



R14/49 Ms Lorato Baikanne Messe

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160533

NAME: Ms Lorato Baikanne Messe
(Principal Investigator)
DEPARTMENT: Nursing Education
 Charlotte Maxeke Johannesburg Academic Hospital

PROJECT TITLE: Disaster Preparedness of Registered Nurses Working in
 a Central Hospital in Johannesburg

DATE CONSIDERED: 27/05/2016

DECISION: Approved unconditionally

CONDITIONS: Title Change (13/07/2016)

SUPERVISOR: Vivien Herbert

APPROVED BY: 
 Professor P. Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 13/07/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/2nd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit to the Committee. I **agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. in this case, the study was initially review in May and will therefore be due in the month May each year.

Principal Investigator Signature _____

Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

PERMISSION TO USE INSTRUMENT

From: Shelley Schmollgruber [<mailto:schmoll@iafrica.com>]
Sent: Saturday, April 06, 2013 1:52 AM
To: Yuen LOKE, Alice [SN]
Subject: RE: request for permission to conduct research

Dear Professor Loke,

We appreciate your fast response and thank you for agreeing to allow us to use and modify your instrument. Once we have made our modification we will copy you the details to see if you are in agreement. The adaptations are rightly as you have indicated to contextualize it for the South African setting. I will be meeting with a medical colleague who is an expert in disaster management to discuss the modifications that will be made. We are truly excited about the study and will keep you informed on our progress.

Kind regards

Shelley Schmollgruber

From: Yuen LOKE, Alice [SN] [<mailto:alice.yuen.loke@polyu.edu.hk>]
Sent: 03 April 2013 05:09
To: Shelley Schmollgruber
Cc: Olivia Fung
Subject: RE: request for permission to conduct research

Dear Shelley,

Thank you for showing your interest in our study.

I hereby attach the questionnaire that the research team used for our study. However, you will find that you need to modify the items in the questionnaire to suit your local context, since we have included the scenarios that are only applicable to the Hong Kong context.

On behalf of Dr. Fung and myself, you have our permission to modify our questionnaire for your research use.

Alice yuen Loke

From: Shelley Schmollgruber [<mailto:schmoll@iafrica.com>]
Sent: Wednesday, April 03, 2013 1:01 AM
To: Yuen LOKE, Alice [SN]
Subject: FW: request for permission to conduct research
Importance: High

Dear Professor Loke,

My name is Shelley Schmollgruber. I am the postgraduate coordinator in the Department of Nursing Education of the University of the Witwatersrand in Johannesburg, South Africa. I am currently supervising a research study and my MSc student has expressed particular interest in your work entitled Fung, Loke & Lai "Disaster preparedness among Hong Kong Nurses Journal of Advanced Nursing, vol 62, issue 6, pp. 698-703.

On behalf of my student I would like to request your permission to use the instrument as we are conducting a similar study in our South African context. Would it be possible to send us a copy of the instrument along with your permission to use the instrument. If you are in agreement we can forward a copy of the proposal to you once our ethics committee has approved the study. We anticipate that the study will be completed by early 2014.

I am looking forward to your response.

Kind regards

Shelley Schmollgruber

Senior Lecturer Intensive and Critical Care Nursing

Department of Nursing Education

Faculty of Health Sciences

University of the Witwatersrand

Gill Smithies

Proofreading & Language Editing Services

59, Lewis Drive, Amanzimtoti, 4126, Kwazulu Natal

Cell: 071 352 5410 Email: moramist@vodamail.co.za

Work Certificate

To	Dr Shelley Schmollgruber
Address	Wits Dept of Nursing Education
Date	22/12/2016
Subject	MSc: Forward and Chapters 1 to 5 -Disaster preparedness of registered nurses in a central hospital in Johannesburg, by Lorato B Messe
Ref	SS/GS/17

I, Gill Smithies, certify that I have proofed and language edited,
 the Forward and Chapters 1 to 5 by Lorato B. Messe: Disaster preparedness
 of registered nurses in a central hospital in Johannesburg
 to the standard as required by Wits Dept. of Nursing Education.

Gill Smithies

22/12/2016