HOSPITAL EMERGENCY AND DISASTER PREPAREDNESS: A STUDY OF ONANDJOKWE LUTHERAN HOSPITAL, NORTHERN NAMIBIA

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DECLARATION

I declare that: the dissertation entitled **Hospital Emergency And Disaster Preparedness: A Study Of Onandjokwe Lutheran Hospital** is my own work; that the dissertation has not been previously submitted to another institution of higher learning either by me or by any other person; and that all the sources cited or quoted are indicated and acknowledged by means of a list of references.

GERALD NOEL TOZIVEPI CHIMENYA

DATE:

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ABSTRACT

When disasters occur, hospitals are among the most important institutions as they are viewed as sanctuaries where victims seek solace. This study explored emergency and disaster preparedness at Onandjokwe Lutheran Hospital in Northern Namibia. The focus was on the policies governing emergency and disaster preparedness at Onandjokwe Lutheran Hospital, the Onandjokwe Lutheran Hospital emergency and disaster preparedness plan and the knowledge, attitudes, and practices of healthcare workers regarding emergency and disaster preparedness.

The study utilized both quantitative and qualitative research methods. Data collection was through a self-administered questionnaire, semi-structured key informant interviews and a hospital disaster plan checklist. The study involved all the healthcare workers at Onandjokwe Lutheran Hospital and respondents were stratified according to occupation or current position held at the hospital, and then conveniently selected based on those who were available on the day that the questionnaires were administered. The response rate was 75%.

The results showed that Onandjokwe Lutheran Hospital was moving in the right direction in terms of preparing for emergencies and disasters though it was still in the early stages. The efforts made by the disaster committee of the hospital towards emergency and disaster preparedness were commendable. At the time, the hospital was working on its disaster plan, which was at the draft stage and covered the major components that should be included in a plan. The hospital had a shortage of staff. The majority of the staff members (62.7%) perceived their knowledge on managing mass casualty incidents to be fair to poor. Most of the staff members had a positive attitude towards emergency preparedness, and 95.6% of them would be willing to be called for duty during a mass casualty incident while only 54.9% were willing to work during an infectious disease outbreak. Emergency and disaster preparedness was governed by the disaster risk management policy of 2009, the National Health Emergency Preparedness and Response Plan (NHEPRP) of 2003 and the Emergency Preparedness and Response Plan of 2009.

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LIST OF ACRONYMS AND ABBREVIATIONS

AHRQ	Agency for Healthcare Research and Quality
APIC	Association for Professionals in Infection control and Epidemiology
CDC	Centre for Disease Control and surveillance
DHS	Department of Homeland Security
DHHS	Department of Health and Human Services
GOI	Government of India
GAO	United States General Accounting Office
HAC	Health Action in Crises
IFRC	International Federation of Red Cross and Red Crescent Societies
JCACHO	Joint Commission on Accreditation of Healthcare Organisations
NATO	North Atlantic Treaty Organisation
NCHS	National Centre for Health Statistics
NDRM	National Disaster Risk Management Policy
NHEPRP	National Health Emergency Preparedness and Response Plan
NPS	Naval Postgraduate School
ORC	Oshikoto Regional Council
PAHO	Pan American Health Organisation
UN	United Nations
UNDP	United Nations Development Programme
UNISDR	United Nations International Strategy for Disaster Reduction
USA	United States of America
WHA	World Health Assembly
WHO	World Health Organisation
WHO-AFRO	World Health Organisation African Region
WHO/WPR	World Health Organisation Western Pacific Region

CHAPTER 1

STUDY BACKGROUND AND METHODOLOGY

1.1 Introduction

1.1.1 Overview

On 24 May 2001, during a wedding celebration in Jerusalem, there were 700 guests gathered in a banquet hall on the third floor of a hotel. Unknown to them was that the floor of the suite would collapse and crash through the second and first floors, carrying with it more than 400 people in what is now known as the "Versailles Disaster" (KAMEDO, 2007:80-82). This disaster has been considered as the worst civil mass casualty event in the modern history of Israel in which 310 people were injured and 23 people died (Michel *et al*., 2007:81). While the four responding hospitals received over 300 patients within a period of two hours of which 134 were admitted in one of the receiving hospitals, they were found to be well prepared and managed the patients effectively (Michel *et al.,* 2007:81).

These and other disasters that have occurred throughout the world serve as reminders that we live in a world full of hazards, and we do not know when a disaster will occur, but we do know that:

> *There will be hurricanes, typhoons, tornadoes, earthquakes, mudslides, fires, and blizzards this year. We know people will pick up firearms, make bombs, and inflict pain and suffering on others. We know there will be casualties from train accidents, cars crumbled in chain reactions, building collapses and explosions. We know infectious diseases will do what they do best: spread, sicken and kill. We know terrorists have not given up their violent assaults. We know there will be mental health problems in accident survivors and the caregivers who respond to their needs. It is the hospital, at the heart of the health system, which will receive the injured, infected, bleeding, broken, and terrified from these events. We know the victims will seek life-saving care, comfort, and relief at hospitals…* (Chaffe & Oster, 2006:34).

The expectation is that hospitals will do everything possible to help them and save as many lives as possible. Thus, the importance of hospitals that are available and well prepared during disasters when they are needed the most.

Decision makers are certainly privileged to have knowledge, information and science at their disposal that enables them to gain an understanding of the role and importance of hospitals during disasters, and the measures that can be put in place in order to make sure that hospitals are available to respond effectively and efficiently to save as many lives as possible. It is to this knowledge, information and scientific base that this study aims to contribute.

Recognizing the importance of the hospitals during disasters, the World Health Organisation (WHO) and the United Nations International Strategy for Disaster Reduction (UN/ISDR), with support from the World Bank dedicated the World Disaster Reduction Campaign 2008-2009 to the theme *"Hospitals Safe from Disasters: Reduce Risk, Protect Health Facilities, Save lives"*. In this initiative the (UNISDR, 2008:8) describes a safe hospital as a hospital that:

- Will not collapse in disasters, killing patients and staff.
- Can continue to function and provide its services as a critical community facility when it is most needed.
- Is organized, with contingency plans in place and health workforce trained to keep the network operational.

The Hyogo Framework for Action 2005-2015 also recognises the importance of healthcare facilities during disasters, and it calls for the integration of disaster risk reduction planning into the health sector, with the promotion of the goal of hospitals safe from disasters (United Nations International Strategy for Disaster Reduction (UNISDR), 2005:11). This can be achieved by having emergency and disaster preparedness plans in place to ensure an effective and efficient disaster response.

With this in mind, the study explored emergency and a disaster preparedness process at Onandjokwe Lutheran Hospital. It explored the policies and plans that governed disaster preparedness at the hospital as well as the knowledge, attitudes and practices of the healthcare

workers at the hospital. This chapter provides a background of the study, the objectives, description of study area, the study problem, and the methodology used for the study.

1.1.2 Description of study setting

The study was conducted at Onandjokwe Lutheran Hospital, which is situated in Onandjokwe district in Oshikoto Region of Northern Namibia. Oshikoto Region is situated in the North Central part of Namibia as shown in Figure 1.

Figure 1: Map of Namibia (showing location of Oshikoto Region).
(Source: Oshikoto Regional Council, 2007:2)

The region has a population of 161 007 according to the 2001 census with a projected growth of 2.2% per annum (Oshikoto Regional Council (ORC), 2009:4). The majority of the population (about 91%) is rural. The region is divided into two districts namely Tsumeb and Onandjokwe. Onandjokwe Lutheran Hospital is in Onandjokwe district as shown in the Figure 2.

Figure 2: Map of Oshikoto Region (Showing location of Onandjokwe Hospital)
(Source:http://www.healthnet.org.na/directorates/regional/maps/oshikoto.jpg)

The map in Figure 2 shows the two districts of Oshikoto Region and the distribution of healthcare centres in the region. The red rectangle on the map demarcates the study area, Onandjokwe Lutheran Hospital in Onandjokwe District. Onandjokwe District has one hospital, three health centres, twelve clinics and fifty-nine outreach points catering for a population of 159 621 (Onandjokwe Health District, 2008:2) and these also provide psychosocial and emergency services during disasters (ORC, 2009:5). The main hazards affecting the district include floods, droughts, veldt fires and epidemics. Floods have been of particular concern, with the 2008-09 floods being described as the worst floods in 42 years (ORC, 2009:4).

Onandjokwe Lutheran Hospital was established in 1908 by Finnish Missionaries and was the first hospital in the North of Namibia (Lutheran medical service, 2008:1). The hospital has a bed capacity of 470, which is set to increase as it is undergoing renovations in line with its new status of being a referral hospital under the Hospitals and Health facilities Act (Onandjokwe Health District, 2008:56). The hospital has ten wards and six departments, namely Internal medicine, General Surgery, Obstetrics and Gynaecology, Paediatrics, Anaesthesiology and Emergency medicine (Lutheran medical services, 2008:2). The catchment area of the hospital includes four district hospitals (two in Oshikoto region, and two in the neighbouring region of Ohangwena), three health centres, seventeen clinics, and fifty-nine outreach points that refer patients to the hospital.

In terms of emergency services, the hospital has an accident and emergency department (also called the casualty department) which is operational 24 hours a day and has a resident doctor between 0800hrs and 1700hrs after which doctors on call from different departments are called when there are cases to be attended to (Onandjokwe Health District, 2009:54). The majority of the emergency cases, which are seen in the department are as a result of motor vehicle accidents, and these can cause a sudden surge of patients to be taken care of in the department with the potential of causing a strain on the hospital resources.

In terms of emergency preparedness, the hospital has an emergency preparedness committee, which is currently working on the emergency preparedness and response plan (Onandjokwe Health District, 2009:56)

1.1.3 Problem statement

Hospital statistics published in the Onandjokwe Health District Annual Reports (2008-09:55 & 2009-10:55) showed that in the recent past there had been an increase in the number of emergencies attended to at Onandjokwe Lutheran Hospital, and most of these emergencies had been as a result of motor vehicle accidents. Furthermore, Oshikoto Region has been one the regions which experienced severe flooding in the past four years, which in 2009 led to the closure of one of the wards at the hospital for two months (Report on the 2009 flood Disaster, July 2009:17). Despite all this, the hospital's disaster plan is still at the draft stage (Onandjokwe Health District Annual Reports 2008-09:55 and 2009-10:55). Thus, this prompted the researcher to assess the emergency and disaster preparedness of Onandjokwe Lutheran Hospital.

This study focused on the emergency and disaster preparedness of Onandjokwe Lutheran Hospital. It evaluated the hospital disaster plan and assessed the knowledge, attitudes and practices of the healthcare workers regarding disaster preparedness. The study will widen the evidence-base guiding the disaster and emergency preparedness policy and practices at Onandjokwe Hospital and other hospitals in Namibia.

1.2 Research Objectives

The purpose of this study was to assess hospital emergency and disaster preparedness at Onandjokwe Lutheran Hospital. The study was conducted in order to gain an understanding of the processes involved in hospital emergency and disaster preparedness. In order to achieve this, the following objectives were formulated:

- To examine the policies governing emergency and disaster preparedness at Onandjokwe Lutheran Hospital.

- To identify and describe the Onandjokwe Lutheran Hospital disaster and emergency preparedness plan.

- To assess the knowledge, attitudes, and practices of healthcare workers with regards to emergency and disaster preparedness.

1.2.1 Research questions

- What legislation governs hospital emergency and disaster preparedness?

- What major components are covered in the Hospital Disaster Plan?

- What processes are there to monitor and evaluate the hospital disaster preparedness process?

- What knowledge of disaster preparedness do the healthcare workers have?

- What measures are in place in order to ensure that the hospital's staff members know about disasters and disaster preparedness plans?

- What are the attitudes and practices of the healthcare workers regarding disaster and emergency preparedness?

1.3 Justification of the Study

This study looked at hospital disaster and emergency preparedness of Onandjokwe Lutheran Hospital. There were no documented studies on the preparedness of the healthcare system for disasters in Namibia. Furthermore, there was also a lack of research available on electronic databases regarding disaster and emergency preparedness in the African Region.

This study contributes to the knowledge base on hospital disaster preparedness in Namibia. It is anticipated that the Onandjokwe Lutheran Hospital authorities and the Ministry of Health and Social Services (MoHSS) of Namibia will utilize the results of the study. It will enable them to gain a better understanding of the process of disaster preparedness in the health sector in order to strengthen the capacities and capabilities of hospitals in Namibia in terms of disaster and emergency preparedness.

1.4 Research Methodology

1.4.1 Study design

This was a cross sectional study involving the healthcare workers at Onandjokwe Lutheran Hospital. In order to answer the research questions, meet the study objectives and gain a better

understanding of the research problem, the research focussed on collecting and analysing data by mixing both quantitative and qualitative data through the use of questionnaires with open and closed ended questions, key informant interviews with open ended questions and a disaster plan checklist (Creswell, 2006:5).

Qualitative research methods were used to gather data and gain an understanding of the attitudes, perceptions, and practices of healthcare workers regarding hospital emergency and disaster preparedness (Pope & Mays, 1995:43). This also enabled the researcher to gain an insight into the nature of the Onandjokwe Lutheran Hospital emergency preparedness process (Leedy & Omrod, 2001:148). The research also looked at numerical descriptions through quantification of the differences in the knowledge, attitudes and practices of healthcare workers concerning hospital emergency and disaster preparedness, thereby utilizing quantitative research methods. The use of both quantitative and qualitative methods enabled the researcher to gain a better and in-depth understanding of the research problem (Creswell, 2006:5).

1.4.2 Population and sampling

This was a study involving the healthcare workers at Onandjokwe Lutheran Hospital. It included all staff categories and positions within the hospital, as all of the workers had a part to play in responding to disasters. The hospital had a total number of 717 filled post and 52 vacant posts (Onandjokwe Health District, 2009:12). The registered nurses and enrolled nurses contributed to more than 50% of the staff compliment. The sampling method used was that of stratified sampling as discussed below.

For the purpose of the study, the healthcare workers were divided into eight categories based on their current position. The categories used were as follows: medical officers (doctors who are not specialists); specialist doctors; pharmacists; laboratory scientist; administrators; registered nurses; enrolled nurses; and the rest of the staff were included in a collective group represented by "other" in the questionnaire. The "other" group consisted of clerical staff, pharmacy technicians, radiographers and their assistants, switchboard operators and receptionists.

The nurses were divided into two groups (registered and enrolled) because they occupied different levels of the staff hierarchy, with the registered nurses being at a higher level than the enrolled nurses were. The medical officers were also separated from the specialist doctors based

on qualifications and hierarchy level. The administrator's group consisted of those who worked in the hospital administration and included human resource officers, accountants and chief clerk.

The research used a sample size of 120 and they were distributed as follows:

- The hospital had a total number of 15 medical officers, two pharmacists, five specialist doctors, and ten laboratory scientists. All of these were included in the study due to their small numbers and difficulties in sampling.
- The registered nurses contribute approximately 30% of the staff compliment and so 40 (30% of the sample) were selected to participate in the study.
- The enrolled nurses contributed more than 20% of the staff compliment and so 30 (25% of study sample) were selected to participate in the study.
- The category, other, contributed about ten per cent of the staff compliment and 15 (12.5% of sample) were selected to participate in the study.
- Three administrators were included in the study.

Purposive sampling was used to select four key informants. A fifth key informant was chosen after having been recommended by one of the key informants as having valuable information pertaining to the study problem. The criteria used for selecting the key informants were as follows:

- The key informant was a member of the hospital emergency preparedness committee.
- The key informant would be part of the disaster command and control in the event of a disaster.
- The key informant was part of the hospital management team.

The criteria were used in order to make sure that the key informants would provide valuable information on the hospital's emergency and disaster preparedness as they formed part of the committee formulating polices and plans for the hospital. The selected key informants were the Principal Medical Officer, the Medical Superintendent of the hospital, the Chief Control Officer (Hospital administrator), the Nurse Manager, and the fifth informant who was suggested by one of the key informants was the environmental health officer.

1.4.3 Research instruments

The following research instruments were used to collect data:

i.   Questionnaires with open ended and closed questions.

ii.   Semi-structured interviews of key informants.

iii.   A checklist was used for checking the major components of the disaster plan.

1.4.3.1 Questionnaires

The use of questionnaires enabled the researcher to collect data by engaging in a special type conversation with respondents in which the researcher asked questions relevant to the study problem (Olsen & George, 2004:9). In the conversation, the researcher collected quantitative and qualitative data with both closed and open-ended questions. Open-ended questions enabled the respondents to answer freely and enabled the researcher to elicit unprompted opinions. This also enabled the researcher to obtain a variety of responses and opinions of the study problem. In addition, open-ended questions allowed the respondents to include more information about their attitudes and understanding of hospital disaster and emergency preparedness (Metagora, s.a.). Closed questions had predetermined responses that restricted the answer set, and made them easier to administer and analyse using the statistical software (Metagora, s.a.).

The questionnaires were self-administered and this enabled the respondents to answer the questions freely and at their own time without the influence of the researcher. The developed questionnaire was pre-tested on a sample of eight respondents from the categories of staff discussed in the sampling section above. This was followed by a discussion with the participants in order to determine their understanding of the questionnaires. The questionnaire was adjusted and finalized based on the pilot testing.

1.4.3.2 Key informant interviews

Face-to-face key informant interviews enabled the researcher to establish rapport with the participants and gain their full cooperation. The interviews were semi-structured, allowing the researcher to probe for clarification and ask follow-up questions in order to gain a better understanding of the research problem (Leedy & Omrod, 2001:196). Using open-ended

questions the respondents were allowed to express their opinions and understanding of disaster preparedness and offer more information.

1.4.3.3 Checklist

A checklist is a list of behaviours, characteristics, or other entities that a researcher is looking for (Leedy & Omrod, 2001:197). Using a checklist, the researcher was able to list the major components of a hospital disaster plan and compare them with those of the participating hospital. This gave the researcher an insight into the hospital's disaster preparedness planning. The major components of the disaster plan were obtained form a checklist developed by the Association for Professionals in Infection control and Epidemiology (APIC).

1.4.4 Data collection

A research assistant was recruited to assist with data collection. This was a colleague, a registered nurse and had been involved in flood disaster response in the region. She was fluent in the local vernacular language (Oshiwambo) spoken in the Northern region of Namibia. The assistant was trained in order to familiarise her with the distribution and administration of the study instruments as well as in upholding the confidentiality of the respondents.

1.4.4.1 Questionnaires

Having developed, pre-tested, and finalised the questionnaire the researcher and the research assistant administered 120 questionnaires to the selected participants. The researcher was unable to get the list of staff members at the hospital because of perceived privacy issues and confidentiality. This led to the questionnaires being distributed to the members of staff who were available at work on the day of data collection. The data was collected during the various shifts of the hospital targeting both day and night duty staff. It was done while maintaining the stratification based on current position at the hospital as discussed in the sampling section above.

The purpose of the study as well as confidentiality issues were explained to the participants and informed consent was obtained from the participants. Of the 120 distributed questionnaires, one hundred were returned to the researcher. Ten of the returned questionnaires were discarded, as they were incomplete. This meant that 90 (75 %) of the questionnaires were eventually used in the data analysis. The highest response rate was among the registered nurses who returned 35 out

of 40 questionnaires distributed, while the lowest response rate was from the specialist doctors as none of them returned the questionnaires despite being reminded several times. One questionnaire was returned by the administrators, but was discarded because it was incomplete. Table 1 shows the response rate of the various staff categories.

TABLE 1: RESPONSE RATE BASED ON POSITION

Position	Questionnaires Distributed	Completed Questionnaires	Response Rate
Medical Officer	15	9	60%
Specialist Doctor	5	0	0%
Registered Nurse	40	35	87.5%
Pharmacist	2	2	100%
Laboratory Scientist	10	7	70%
Enrolled Nurse	30	25	83.3%
Administrator	3	0	0%
Other	15	12	80%
Total	**120**	**90**	**75%**

1.4.4.2 Key informant interviews

The researcher conducted three face-to-face key informant interviews. Four key informant interviews had been planned with the Medical Superintendent, the Principal Medical Officer, the Chief Control Officer and the Nurse Manager. A fifth key informant (the Chief Environmental Health Officer) was included based on recommendations from the other key informants. However, two of the key informants were not able to avail themselves for the interviews due to their repeatedly busy schedules. The purpose of the study was explained to the informants and an informed consent obtained prior to the interview.

1.4.4.3 Disaster plan checklist

The researcher used a checklist adapted from a checklist developed by APIC. The checklist was used for checking the major components of the hospital's disaster plan. The use of the checklist was followed by a physical check of the hospital for the components listed or discussed in the Hospital disaster plan.

1.4.5 Data analysis

1.4.5.1 Quantitative data

Quantitative data from the questionnaire was coded and then analysed using descriptive statistics with Microsoft Excel and Statistical package for the social sciences (SPSS).

1.4.5.2 Qualitative data

Qualitative data from key informant interviews was organised into themes and summaries of the views of the respondents based on the themes. The data was organised into five subtopics: policies, hospital disaster plans, vulnerability assessments, training and education, and monitoring and evaluation.

1.5 Limitations of the Study

- Not all the questionnaires were returned. None of the specialist doctors at the hospital returned the questionnaire and so they were excluded from the study.

- Some of the questionnaires were incomplete and so they were discarded.

- Some of the key informants could not avail themselves for the interviews due to their busy schedules.

- The study used a sample of staff that was available on the day of data collection and in the process; some of respondents who could have useful information were excluded from the study.

- Some of the key informants were not comfortable to release information citing confidentiality.

- The use of self-completed questionnaires meant that the response depended on the comprehension, knowledge and writing skills of the respondents.

- Some of the participants who agreed to participate in the study were unwilling to sign the consent form.

1.6 Ethical Considerations

- The research was approved by the Ministry of Health and Social Services of Namibia.

- The purpose of the research was explained to the participants, and informed consent was obtained prior to the issuing of questionnaires.

- All the information gathered from the respondents was kept confidential, and their names did not appear on the questionnaires.

- Participation in the study was voluntary and that was explained to the participants.

1.7 Conclusion

This chapter provided an overview of the study. It provided the background of the study, the study setting, the problem statement, as well as the objectives of the study. The chapter also provided the research methodology and described the sampling method that was used, the study instruments that were used and the administration of the study instruments. The chapter also highlighted the ethical issues and limitations of the study. The research focused on emergency and disaster preparedness at Onandjokwe Lutheran Hospital, and sought to add to the knowledge base on hospital emergency and disaster preparedness. The next chapter provides an overview of disaster preparedness.

CHAPTER 2

UNDERSTANDING DISASTER PREPAREDNESS

2.1 Introduction

> *Not even windstorm, earth-tremor, or rush of water is a catastrophe. A catastrophe is known by its works; that is to say, by the occurrence of disaster. So long as the ship rides out the storm, so long as the city resists the earth-shocks, so long as the levees hold, there is no disaster. It is the collapse of the cultural protections that constitutes the disaster proper* (Carr, 1932:211 cited in De Guzman, n.d:3).

This is probably one of the early understandings of disasters and bears similarities with the understanding of today. A disaster is defined as a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources (ISDR, 2009:9).

Disasters have surely caused widespread destruction disrupting people's lives and causing human suffering with communities finding it difficult to cope. When disasters occur, human beings may not have the power to stop them from occurring, but they certainly have the power and ability to adapt, survive, and minimise the impact of the disaster on their lives. Disasters have a potential of producing mass casualties thereby straining the health care systems. This means that hospitals need to be prepared for an unusual increase in workload, hence the importance of hospital disaster preparedness (Mehta, 2006:89).

As human beings, God has granted us power over animals and the earth, and so we choose to live and survive, even though there are disruptions caused by disasters. Natural hazards are certainly part of our lives and they will certainly cause destruction and will not ask for permission to occur in a particular area. Therefore, human beings must find ways to survive and minimize the damages caused by disasters. However, it is also important to note that disasters are not only caused by natural events, but also by human actions. It is with this in mind that disaster risk

reduction measures should be put in place to help communities cope and minimise the impact of the disasters.

This chapter discusses the concept and terminology used in disaster risk management with a view of explaining the importance of disaster preparedness. The ISDR (2009:10) defines disaster risk management as "the systematic process of using administrative directives, organizations and operational skills and capacities to implement strategies, policies, and improved coping capacities in order to lessen the adverse impacts of hazards and possibility of disaster". This involves a range of measures that include mitigation, emergency preparedness, impact response and disaster recovery all contributing to the safety and well being of communities (Britton, n.d:1).

2.2 Key Disaster Risk Management Terminology

In this section, there will be definitions of the key terminology used in the thesis pertaining to disaster risk management. In order to understand disaster preparedness, it is important to understand the terms used in disaster risk management first. This section will help the reader understand what a hazard is; what a disaster is; why some communities are affected more than others are during disasters; and what can be done to reduce the impact of disasters. This is with a view of explaining why communities should have measures in place for disaster preparedness.

2.2.1 Disaster, emergency and mass casualty incident

2.2.1.1 Disaster

The ISDR definition of a disaster has been discussed above. The South African Disaster Management Act (South Africa, 2002:6), defines a disaster as a progressive or sudden, widespread or localized natural or human-caused occurrence which causes or threatens to cause death, injury or disease; damage to property, infrastructure or the environment; or the disruption of the life of a community; and is of a magnitude that exceeds the ability of those affected by the disaster to cope with the effects using only their own resources.

The South African definition, though similar to the ISDR definition, is a broader definition showing that a disaster can be 'natural' or 'human-caused' and that it is not only 'widespread' but can also be 'localized'. The two definitions also describe the impacts of a disaster.

Rassin *et al.* (2007:37) defines a disaster as an event that causes damage to people's lives, health and or property to an extent that they have no ability to cope, while Gebhart and Pence (2007:68) simply define it as an event in which response capabilities are overwhelmed. Benson and Clay (2004:5) add an economic perspective to disasters, defining them as human physical, and financial capital losses with reduced economic activity and severe effects on financial flows.

Carter (1991: xxiii) describes four characteristics of a disaster which can be identified in the above definitions:

- Disruption; this relates to the disruption of normal life and livelihoods and that this disruption can be sudden, widespread and unexpected.

- Human effects; showing how human beings are affected by disasters. In this context it is important to note that when an event (for example an earthquake or volcano) occurs in places where they do not adversely and seriously affect human life, livelihoods and property (for example in a desert where there are no human settlements), they are not classified as disasters (International Federation of Red Cross and Red Crescent Movement (IFRC), 2000: 6-7).

- Effects on social structure; destruction or damage to property and infrastructure.

- Community needs; assistance needed following a disaster. This shows the need for humanitarian assistance because a disaster affects the coping capabilities of people.

2.2.1.2 Emergency

Emergency is defined as a sudden threatening condition/event or occurrence that demands immediate action to minimize its adverse consequences (Health Action in Crises, 2007:8; ISDR, 2009:13).The World Health Organisation − Western Pacific Region (WHO-WPR) (2003:9) defines an emergency as "any public health situation endangering the life or health of a significant number of people and demanding immediate action. An emergency situation may result for a natural or man-made disaster or be a complex (conflict) emergency". The United Nations Disaster Management Team-Nepal (2001:3) agrees with this definition and points out that an emergency is closely related to a disaster, but with a stronger focus on humans and can be

as result of "disasters, potential disasters or cumulative processes of neglect, civil conflict, environmental degradation and socio economic instability".

This means that an emergency is a "state" or "situation" which occurs because of a disaster or other conditions as described above. Disasters can be viewed as events, which give rise to emergencies, demanding extraordinary measures to minimize the adverse effects.

The term "emergency" can be used as an administrative term, which relates to the level of response required, depending on the level of resources required for responding. Waeckrle (1991:816) is of the opinion that there are three levels of response:

- Level I emergency requires a local response, and is dealt with by using local resources, but does not overwhelm the resources. This is called an "incident" and does not usually escalate into a more serious event. An example would be a motor vehicle accident in which the local ambulances and personnel help the injured and they do not need help from outside their jurisdiction.

- Level II emergency is when the local resources are overwhelmed and there is need for a regional response system to be activated. This can also be called a local disaster, using the South African Disaster Management Act (South Africa, 2002) definition.

- Level III emergency occurs when the local and regional response system is overwhelmed and is unable to cope and this needs activation of the national response system.

Other authors also add levels IV, V and VI depending on the response required. This thesis is on emergency and disaster preparedness, and uses the ISDR definition of a disaster, while an emergency will be viewed as any threatening condition demanding urgent action to minimise adverse effects and escalation into a disaster.

2.2.1.3 Mass casualty incident

A mass casualty incident is an event which causes disruption of emergency and health care services due to the large number of victims (WHO/PAHO 2001:3). It can also be defined as an event which overwhelms the locally available resources used for routine procedures, due to the

event generating more patients/casualties than can be managed at one time, thereby requiring special and additional emergency arrangements(WHO, 2007b:6). The event usually causes a sudden surge or increase in the number of patients that need to be treated. This means that regardless of the severity or extent of the event, as long as the locally available resources are overwhelmed, then a mass casualty incident would have occurred for that particular health facility. The events range from minor incidents like those causing level I emergencies to disasters that can cause a surge in patients.

2.2.2 Hazard, risk and vulnerability

Disaster preparedness is part of the measures, which can be put in place so that the risk of disasters occurring is reduced. The thesis is mainly on preparedness, but there is need to explain some concepts involved in reducing disaster risk. In order to understand disaster risk reduction it is important to gain an understanding of the terms hazard, risk and vulnerability. These terms will be discussed in this section.

2.2.2.1 Risk

This refers to the probability of loss, which occurs as a result of a hazard. It is defined as the combination of the probability of an event and its negative consequences (ISDR, 2009:25). It can be expressed as an equation: Risk = Hazard X Vulnerability/ Capacity (ISDR, 2002:41). This means that risk is a function of a hazard and a vulnerable population.

Using the above equation mathematically, it means that there is no risk without a vulnerable population and the more the level of vulnerability of people, the greater their risk and so more losses when hazards like an earthquake occurs. This means reducing vulnerability would lead to reduced risk and therefore a reduction in losses. This is the basis of risk reduction measures in that reducing vulnerability while increasing capacity would lead to reduced risk. In this lifetime, people are living with risk, but they choose to survive and live with acceptable levels of risk to manage any losses.

2.2.2.2 Hazard

This is defined as a potentially damaging physical event, phenomenon or human activity, which may cause the loss of life or injury, property damage, social and economic disruption or

environmental degradation (ISDR, 2002:44). Hazards can be classified as; hydro meteorological (for example floods and drought); geological (for example earthquakes and volcano); biological (for example epidemics), technological (for example motor vehicle accidents) and environmental (for example drought).

Hazards affect different regions differently and there may be certain communities, which are more prone to certain types of hazards than others are. This makes it important for communities to conduct hazard assessments to be prepared, and plan for the hazards in their regions, as part of disaster preparedness measures, which are important in disaster risk reduction. Hazard assessments help communities identify the probability of occurrence of a hazard and its intensity and extent.

2.2.2.3 Vulnerability

This refers to the characteristics and circumstances of a community, system or asset arising from various physical, social, economic and environmental factors that makes it susceptible to the damaging effects of a hazard (ISDR, 2009:30).Vulnerability varies within communities depending on the characteristics of communities based on the physical, social, economic and environmental factors. Some of the factors affecting vulnerability include age, gender, education, socioeconomic status, and socio cultural factors. Increased vulnerability to a certain hazard implies an increased disaster risk and a higher impact when disasters occur.

Poverty is one of the main factors affecting vulnerability and has been the main target for most disaster risk reduction programmes. Yodmani (2001:4), argues that even though the poor are the most affected by disasters, there is no direct causal relationship between poverty and vulnerability because it is not only the poor who suffer from the impact of disasters and that poverty is just an indicator of lack of access to resources.

2.2.3 Disaster risk reduction

This is defined as a concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment and improved preparedness for adverse events (ISDR, 2009:10-11). Disaster risk

reduction includes activities aimed at avoiding (prevention) or limiting (mitigation and preparedness) the adverse impacts of disasters.

Disaster risk reduction has become important because of the frequency with which disasters have been occurring and the impact they have had on development. Disasters have affected efforts to achieve Millennium Development Goals, particularly the target of halving extreme poverty by the year 2015(UNDP, 2004: i). This is because disasters cause diversion of resources needed by developing countries to escape poverty (ISDR, 2002:3). This is why it is important to have Disaster Risk Reduction measures in place, to reduce the impact of disasters.

The importance of reducing disaster risk is shown by the various efforts being made by different governments, the United Nations and other organisations. These efforts include the Yokohama strategy of 1994 and later the Hyogo Framework for Action 2005-2015 aimed at "building resilience of nations and communities to disasters" with an expected outcome of a substantial reduction of disaster losses in lives and in the social, economic and environmental assets of communities and countries (ISDR, 2005:3).

The discussion so far has shown that a disaster occurs when a hazard interacts with a vulnerable population and that the greater the vulnerability of a person or community the greater the risk of adverse impacts of the disaster. This means that reducing vulnerability is an important measure in reducing disaster risk. Disaster risk reduction consists of measures aimed at preventing, mitigating and preparing for disasters.

Disaster risk reduction helps governments reduce disaster losses and enables them to channel more resources towards poverty reduction. As part of Disaster Risk Reduction activities, disaster preparedness will be discussed later in the chapter.

The next section will focus on the phases of a disaster in the form of the disaster continuum or disaster circle.

2.3 Disaster Management Continuum

The disaster management continuum is divided into two phases: Pre-disaster risk reduction phase and the post-disaster recovery phase as shown below:
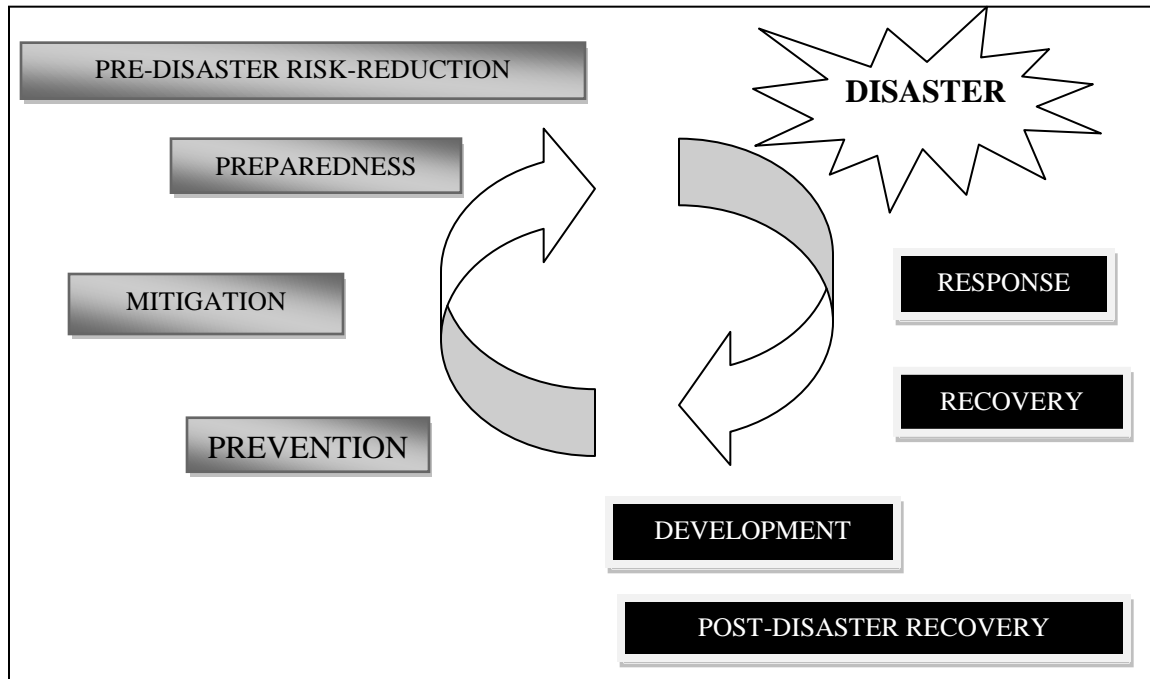
Figure 3: Disaster management continuum
(Source: Disaster Management Guidelines for Municipalities, n.d.)

As shown in Figure 3, disaster management is a continuous process, which involves activities at each phase of the cycle. The pre-disaster reduction phase, which involves prevention, mitigation and preparedness, has been the focus for many organisations and governments. Its importance is also shown by the United Nations General Assembly resolution 57/256 of 2003 which calls for "recognizing that disaster reduction, including reducing vulnerability to natural disasters, is an important element that contributes to the achievement of sustainable development"(UN, 2003:1). The Namibian Government also recognises the importance of disaster risk reduction and has come up with the Namibian National Disaster Risk Management Policy of 2009, which aligns itself with the Hyogo Framework for Action 2005-2015 and the African Regional Strategy for Disaster Risk Reduction. Currently the country has a Disaster Risk Management Bill (Namibia, 2010). The disaster continuum shows that preparedness is part of the pre-disaster risk reduction

phase. The importance of disaster preparedness as part of risk reduction activities will be discussed in the next section.

2.4 Preparedness

> *This is the first and foremost lesson we learned from the death and devastation caused by our country's most destructive natural disaster: No matter how prepared we think we are, we must work every day to improve* (Townsend, 2006).

This statement shows the importance of preparedness, and that it should be a continuous process regardless of how prepared communities may think they are. It was written by Frances Fragos Townsend (2006), the then assistant to the President for Homeland security and Counter terrorism in a letter to former President George W. Bush after the devastating Hurricane Katrina of 2005. Few would ever have imagined that the United States of America (USA), a developed country, with its technology and strong economic and financial background would experience such devastation as that caused by hurricane Katrina. However, lessons were learnt and one of the most important of all was that of preparedness.

Preparedness is defined as the knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions (ISDR, 2009:21). It is a protective process which encompasses all measures taken before a disaster event aimed at minimizing the loss of life, disruption of critical services and damage to infrastructure and the environment, enabling governments, communities and individuals to respond rapidly and efficiently to disasters (Government of India- United Nations Development Programme (GOI/UNDP), 2002: 8).

2.4.1 Preparedness framework

Key preparedness activities, which should be included in a preparedness strategy, are shown in Table 2 in the disaster preparedness framework.

TABLE 2: DISASTER PREPAREDNESS FRAMEWORK

Disaster Preparedness Framework		
1. Hazard, risk and Vulnerability assessments	2. Response mechanisms and strategies	3. Preparedness plans
4. Coordination	5. Information management	6. Early warning systems
7. Resource mobilisation	8. Public education, training, and rehearsals	9. Community-Based disaster preparedness

(Source: IFRCS, 2000: 10/20)

2.4.1.1 Hazard, risk and vulnerability assessments

These terms have been defined in the above sections, where their relationship has been shown in the risk equation: Risk= Hazard X Vulnerability/Capacity. Mathematically this means that there is no risk without vulnerability, which means that a disaster only occurs when a hazard interacts with a vulnerable population. An increase in vulnerability would mean an increased disaster risk.

Risk assessment involves the determination of the nature and extent of risk through analysis of the potential hazards, and the evaluation of the existing conditions of vulnerability that could potentially harm the people, property, livelihoods and the environment on which they depend (ISDR, 2009:26). The importance of risk assessment is outlined by Principle 1 of the 1994 Yokohama Strategy and Plan of Action for a safer world: "Risk assessment is a required step for the adoption of adequate and successful disaster reduction policies and measures" (ISDR, 2002: 66). The assessments should involve identification of the characteristics, frequency and potential severity of the hazards faced by communities, and the particular geographical areas that are most susceptible to the hazards; an identification of the particular areas and sectors of the community that will be affected by the particular hazard and the ability of these sectors to cope with the effects of the hazard (IFRCS, 2000:10-20).

Hazard, risk and vulnerability assessments are important in that they enable communities and governments to plan, and allocate appropriate resources towards certain hazards and make informed choices when coming up with disaster risk reduction measures based on the hazards in their areas. This is because it is not possible to try to prepare for all hazards including those that do not affect a particular community, and so these assessments are necessary.

Onandjokwe Lutheran Hospital is situated in Oshikoto region of northern Namibia. The hazards that have been identified by the Oshikoto Regional Council (2009:6-7) include floods, drought,

wild fires, epidemics mostly malaria and diarrhoea, and motor vehicle accidents. Besides preparing for these hazards, the hospital should also take into consideration the Ondangwa airport which is situated within 30 kilometres. The Oshikoto Regional Council notes that the sectors that are mostly affected by the above hazards are health, education, transport and agricultural sectors.

2.4.1.2 Response mechanisms and strategies

These are the mechanisms for disaster response, which should be incorporated into the disaster preparedness plan. These mechanisms and strategies include evacuation procedures; formation of search and rescue teams including their training; formation of assessment teams; procedures for emergency reception centres and shelters; procedures for activating distribution systems (IFRCS, 2009: 11, 20). The Oshikoto Regional Council has prepared a flood contingency plan, which can be used for response when other hazards occur. Within this plan, there are likely scenarios that the region plans for, and there are response mechanisms and the roles and responsibilities of different sectors including the health sector. Onandjokwe Lutheran Hospital, however, is still working on its emergency preparedness plan and they currently rely on the roles and responsibilities given to them by the Oshikoto Regional Council.

2.4.1.3 Preparedness planning

This is a process for coming up with a plan, which has clear goals and objectives, with specific roles and responsibilities for the people involved including Non-governmental Organisations. It is an important step, which ensures that during a disaster, the response is effective, timely and appropriate. The preparedness plan should include identification of possible emergency shelter, evacuation procedures and routes, command and communication procedures as well as training of personnel responsible for responding to the disaster.

In its flood contingency plan, the Oshikoto Regional Council has identified three scenarios to plan for: scenario one looks at the best case where the regional resources are adequate for an effective response, while scenario three looks at the worst case where the resources are inadequate, and scenario two being a mid case between one and three. These scenarios have been incorporated by the health sector. However, as noted above, Onandjokwe Lutheran Hospital is

still working on its preparedness and contingency plan and currently responds to disasters based on the Oshikoto region Contingency Plan, and takes up responsibilities listed in the plan. These activities are categorised into activities before, during, and after the emergency or disaster.

2.4.1.4 Coordination

This has also been referred to as institutional framework, which involves coordination of activities to avoid duplication of roles. This requires prior arrangements and agreements between the communities and the various organizations that offer assistance during disasters. This will ensure that the disaster response is effective. The coordination should be "horizontal" involving central government and sub-national levels among ministries and specialised agencies or "vertical" between local and central authorities (Kent, 1994:23-24).

Coordination should ensure that; the roles and responsibilities reflect expertise (for example health related matters should be handled by the Ministry of Health); that the roles and responsibilities are clearly defined to avoid overlap and duplication; that the roles and responsibilities are appropriate (Kent, 1994:25). This will help ensure that the response is effective and as many people as possible are assisted and will help minimize disaster losses.

An example of coordination of response is shown in the Oshikoto Regional Council Flood Contingency Plan (2009) which lists the activities required and assigns a lead agency for the particular activity as well as supporting institutions. This will help in that the lead agency will be responsible for the activity and whenever they are lacking or unable to cope they may ask the supporting institutions for assistance, therefore ensuring a rapid and effective response.

2.4.1.5 Information management

This involves the gathering of information before, during, and after a disaster. This information should include hazard and early warning information, disaster needs assessment and progress of post-disaster recovery. An effective preparedness plan should incorporate information from various sectors to ensure a coordinated response. It is also important to gather historical information on the hazards affecting a particular community to plan adequately. During disasters, there is need for rapid assessments of disaster situations so that information on the people requiring urgent help may be disseminated.

To effectively coordinate and respond to disasters, there is need for knowledge about hazards, where they occur, their characteristics, frequencies, the impact of previous disasters of the same nature and the course events. This information is important and necessary in order to come up with effective disaster preparedness plans to have effective and efficient disaster response and reduce the impact of disasters.

2.4.1.6 Early warning systems

These are important as they assist in detecting and issuing alerts on impending hazard events so that necessary measures can be taken to protect the people in the areas affected. Kent (1994:30) is of the view that warning systems should be planned around the assumption that the functioning communication systems, such as telephones, may not be available during disasters. This means that there should be plans for alternative communication methods to warn people about an imminent hazard event. There is also need to plan for those who may not heed early warning systems as a result of misunderstanding or lack of knowledge.

2.4.1.7 Resource mobilisation

This involves the mobilisation of funds, supplies and equipment for responding to a disaster. There should be agreements and strategies for the resource mobilisation. When a disaster occurs, the local community is unable to cope using its own resources. This makes it important for the preparedness plans to have strategies for mobilizing the required resources and procedures to be taken when appealing for assistance.

Assessment of the resources required for an emergency preparedness plan should consider the following: disaster relief funding through the establishment of an emergency contingency plan; disaster preparedness funding for use on preparedness planning activities; mechanism of aid coordination to ensure an effective response; stockpiling whereby there should be consideration of the types and amounts of materials needed and their storage facilities (Kent, 1994: 29).

2.4.1.8 Public education, training and rehearsals

This is one of the important aspects of disaster preparedness, which involves training of those who are at risk of being affected by the disaster. This would involve education in schools, special training courses, and workshops involving community members, training of community outreach

workers who can take the information to the members of their communities. Public information can also be disseminated through the media via radio, television, and posters.

Currently in Namibia, information dissemination and public education are done by community radios. Members of the community are free to participate in debates using these radios. These radios are useful in educating the community and can complement disaster risk reduction measures. They also encourage freedom of speech and expression. These radios play an important role in disaster risk reduction education and training and they have been used in Northern Namibia for training and education on flood disasters.

After having come up with preparedness plans, it is also important to conduct rehearsals. These will assist in identifying any gaps which may need further strengthening, refreshing the plans during the periods when there are no disasters, thereby ensuring that communities and their people are always prepared. These rehearsals should include all the sectors involved in disaster preparedness and response and they help in assessing the effectiveness of the disaster plans.

2.4.1.9 Community-Based Disaster Preparedness

This is a process of involving the community in disaster preparedness plans to ensure a locally prepared and acceptable plan that meets the needs of the community. When disasters strike, local communities are the first responders, and they take part in search and rescue operations. This makes it important for the national societies and other organisations involved in disaster management to form partnerships with communities to ensure that an effective and locally owned preparedness plan is put in place. Involving communities is also essential in that community members can educate each other on disaster risk reduction and they can take risk reduction measures, which are appropriate and acceptable to them as a community.

2.5 Conclusion

The aim of this chapter was to explain the concepts and terminology used in disaster risk management, with a view of showing the importance of preparedness as part of Disaster Risk Reduction measures. The disaster management continuum, which is presented as a cyclical and continuous process, shows that preparedness is part of the pre-disaster risk reduction phase. The importance of this phase has been shown by the various efforts on reducing disaster risk being

made by governments and other organisations, particularly the Hyogo framework for action 2005-2015. It is also important for all sectors involved in disaster management to have preparedness plans, and this includes the health sector. The next chapter will be on health care preparedness, focusing particularly on hospital emergency preparedness process.

CHAPTER 3

HOSPITAL EMERGENCY PREPAREDNESS PROCESS: THEORY AND FRAMEWORK

3.1: Introduction

This government will learn the lessons of Hurricane Katrina. We are going to review every action and make necessary changes so that we are better prepared for any challenge of nature, or act of evil man, that could threaten our people. President George W. Bush, September 15, 2005 (The White House report on Hurricane Katrina 2006:51).

Hurricane Katrina occurred in 2005 causing widespread destruction and devastation along the Gulf Coast states of Mississippi, Louisiana and Alabama in the USA (USA, 2006:51). In The White House report *Federal response to Hurricane Katrina: Lessons Learnt,* (2006:1, 58) it is estimated that Hurricane Katrina caused the death of over 1 300 people and left tens of thousands requiring medical attention, with over 200 000 people who were on chronic medications and displaced by the floods being left without access to their usual medications. This was as a result of the destruction that the hurricane caused on several major hospitals, which were left non-functional with almost all the smaller health care facilities being shut down (USA, 2006:58). That meant that the health facilities were not available at a time when they were needed the most, which showed the importance of protecting health facilities and making sure that they were always prepared for disasters.

The previous chapter dealt with preparedness and its importance as part of the pre-disaster risk reduction phase. One of the important sectors, which should have preparedness plans in place, is the health sector. This chapter will discuss health sector preparedness for mass casualty incidents, with emphasis on hospitals, and will provide a theoretical overview of the processes involved in health sector emergency preparedness.

3.2 The role of hospitals during disasters

"Hospitals are expected to handle whatever they receive and do it right the first time" (Rubin, 2004:1). It is public expectation that hospitals are always available to take care of them in all

circumstances, and so the hospitals should be able to provide this support in all situations including during disasters.

When disasters occur, people pay particular attention to the victims with a view of helping the injured and preventing death. The injured need urgent medical attention, while those who escape without physical injuries may still need long-term medical care including psychosocial services (Briceno, cited in ISDR 2009:3). When hospitals fail to help these victims in emergency situations as a result of collapse of the health system, it means they are not available when they are needed the most and this causes unnecessary suffering and avoidable deaths (Alwan, cited in ISDR 2009:5).

Hospitals are viewed as safe havens for people (Chaffe & Oster, 2006: 36), and are a measure of a communities' well being and health status. Therefore, it is important that they function before, during and after disasters. They are a community's lifeline in normal times and their role may extend beyond direct life saving, as they are also symbols of social progress and economic development (ISDR, 2008:8).

Hospitals play a critical role during disasters, as they provide emergency care services and are perceived as vital resources for diagnosis, treatment and follow-up for both physical and psychological care (GOI/UNDP), 2002:8). When responding to mass casualties, the main goal of the hospitals is to save as many lives as possible, and this requires allocating their limited resources in a modified manner (Mehta, 2006:89).

3.2.1 Reasons for hospital preparedness

When the Japanese people woke up on March 11 2011, they did not know that at 1446 local time a massive earthquake of magnitude 9.0, followed by a devastating *Tsunami* and damage to nuclear reactors was going to hit the North Eastern Coast of Honshu. They did not know that these events were going to displace people and cause death and injury to thousands of people. They might have known that they were living in an earthquake zone, and might be affected at any time. The health sector had repeatedly tried to prepare for such events by having disaster designated hospitals, disaster medical assistance teams, stockpiling of medical supplies for use in early intervention during disasters and by having disaster manuals for use during disasters

(WHO-WPR 2011:57). However, despite these preparedness measures the WHO-WPR situation report 17 of March 26, 2011 reported that:

> *As of 25 March, local media reports that 53 percent of hospitals with 100 beds or more are either closed or only partially operational in the three worst affected prefectures. Out of 255 hospitals, 17 are closed and 117 are operating on a limited scale. The majority of hospitals explained this was due to a shortage of staff and medicine, due to damaged buildings and equipment, and a delay in restoration of water, electricity or gas. 46 hospitals said they didn't have the capacity to meet the number of demands.*

This means that some of the hospitals were not available when they were needed the most to save as many lives as people. This and other disasters that have occurred in other parts of the world illustrate the effects that disasters have on health care systems and the importance of hospitals and the need for preparedness measures to be in place.

Hospitals are at risk of structural damage and functional collapse during disasters. Functional collapse occurs when the system fails to function, because the elements that allow the hospital to operate on a day-to-day basis are unable to perform their functions mostly due to system overload (ISDR, 2008:15).

Disasters have a potential of causing mass casualties, placing a heavy demand on hospital services. This may overwhelm the hospital's resources, staffs, space and supplies, causing confusion and inefficiency in the hospital (GOI/UNDP, 2002:9). This makes it important for hospitals to have well documented and tested disaster management plans to prepare them to handle the unusual workload (Mehta, 2006:89).

According to Keim and Giannone (2006: 166) the objectives of preparedness for health emergencies are:

- Prevention of morbidity and mortality
- Provision of care for casualties
- Management of adverse climatic and environmental conditions
- Ensuring restoration of normal health

- Re-establishment of health services

- Protection of staff

- Protection of public health and medical assets.

Lack of a preparedness plan may lead to situations where there are many leaders and sources of command with everyone doing their own work without contributing to solving the problem of the hospital effectively and efficiently (GOI/UNDP, 2002:9). This means that hospitals should have preparedness plans in place in order to respond efficiently and effectively, avoid chaos and save as many lives as possible: which is the main goal for response.

3.3 Health Sector Emergency Preparedness Process

Emergency preparedness in the health sector involves a logical process, with a series of activities ranging from formulation of policies, to continuous monitoring and evaluations, and this process is a dynamic process requiring constant improvements and fine tuning (WHO-WPR, 2006:1).The following steps can be followed in health facility preparedness planning.
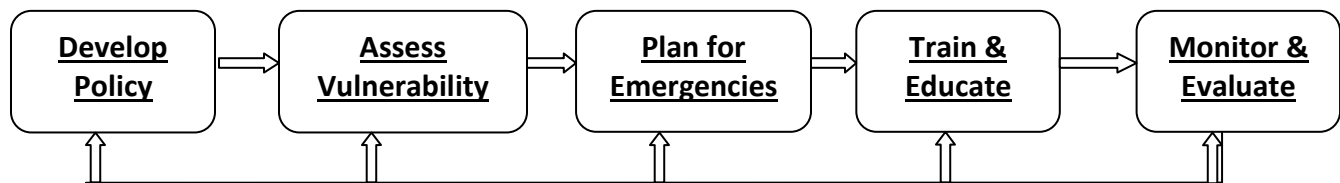
Figure 4: Processes involved in health sector emergency preparedness
(Source: WHO-WPR, 2006:1)

There is need to develop policies in emergency preparedness to ensure that common goals are pursued by the different sectors and departments involved in emergency preparedness. Policies ensure the setting up of goals, assignment of responsibilities for achieving these goals to various organisations and sectors, and assist in the decision making process.

Vulnerability assessments are important in that they assist communities identify, plan, prioritise and make informed decisions based on the hazards in their areas. This will ensure that the emergency preparedness plans cater for the hazards in the particular area in which the hospital is located. The emergency preparedness plan should also take the "all hazards" approach in which

all the hazards in the area are identified and a vulnerability assessment is conducted, and then a plan formulated based on the vulnerability assessment.

In an effort to study the preparedness of Onandjokwe Lutheran Hospital, this study used the processes outlined above as a framework of the study. A theoretical overview of these processes is presented in this chapter. All the components are discussed in the following sections.

3.4 Policy Issues

This section discusses policy issues as part of the emergency preparedness process highlighted in Figure 5. It focuses on WHO policies and African regional policies on emergency and disaster preparedness.
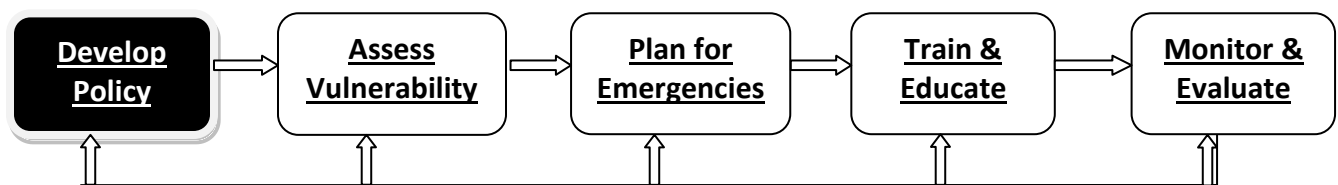
Figure 5: Processes involved in health sector emergency preparedness (Policy Development)

Policy is "the formal statement of a course of action" (WHO, 1999:20). Policy development is an important first step in the emergency preparedness process and performs the following functions (WHO, 1999:20):

- Establishes long term goals
- Assigns responsibilities for achieving goals
- Establishes recommended work practices
- Determines criteria for decision-making.

3.4.1 World Health Organisation (WHO): policies and strategies on emergency preparedness

3.4.1.1: WHO function in emergencies

> *The mission of WHO's work in Emergencies and Crises is to help reduce the suffering of affected people through the implementation of programmes that prepare the health sector to deal with emergencies and support efforts for improving health during and*

after crises, applying professionalism and humanitarian principles (WHO/HAC, 2008:6)

The WHO Constitution (Article 2d) calls on the Organisation to furnish appropriate technical assistance and in emergencies, necessary aid upon the request or acceptance of Governments. The WHA46.6 resolution also states that "it is a constitutional function of WHO to provide health services and facilities to special groups affected by disasters at the request of Member States or by the United Nations". The specific functions of the WHO in emergency response as defined in the WHO/WPR emergency response manual (2003:10) include:

- The provision of technical and normative guidance, as contained in resolution WHA48.2.

- Planning and implementation of emergency and humanitarian assistance in partnership with Governments, local authorities, organisations of the United Nations system and other humanitarian organisations.

- Resource mobilisation to provide the affected countries with the necessary assistance to meet medical and health needs.

- Coordination of health sector activities in emergency response.

- To advocate for the protection of health care personnel and infrastructure, and the protection of non-combatants, in violent situations.

3.4.1.2 WHO policy on emergency preparedness

WHO is the lead agency for addressing the health aspects of emergency preparedness and response and its policy is determined by its governing bodies, particularly the World Health Assembly (WHA) (WHO, 2007a:5,12). One of the main objectives of WHO in emergency preparedness and response is to promote emergency preparedness and response in Member States within the health-for-all strategies for health development (WHO/WPR, 2003:10). Owing to the longstanding concerns that the WHO governing bodies have placed on prevention, mitigation and preparedness for disasters, there has been a number of resolutions passed by the WHA. These resolutions form the basis of the WHO policy on emergency preparedness, and give it the mandate to undertake specific functions related to emergencies.

The resolutions have marked a major shift in the way emergencies are managed. In the past, more emphasis was on humanitarian response and relief activities than on strategies and actions to mitigate the effects of disasters on communities to preserve lives and assets (WHO, 2007a:9). This has changed over the past 30 years with the recognition that community-based risk reduction and emergency preparedness are important and essential for attainment and protection of sustainable development through reducing the effects of disasters.

In 1981, the WHA passed resolution WHA34.26 that stressed the importance of emergency preparedness and stated, "Despite the undoubted importance of relief in emergencies, preventive measures and preparedness are of fundamental importance" (WHO, 2007a:12; WHO, 2007b: 10). This resolution was part of early efforts by WHO to reduce the effects of disasters. It showed that despite the importance of humanitarian response and relief, emergency preparedness programmes were critical in reducing the effects of disasters.

During the International Decade on Natural Disaster Reduction (1990-1999), WHO further strengthened its efforts in emergency preparedness by passing resolutions WHA42.16 (1989) and WHA 46.6(1993). In 1995 the WHA clearly differentiated the role of WHO in emergency preparedness and disaster reduction from its responsibilities in emergency response and humanitarian action by passing resolution WHA48.2 which also recognised that disaster reduction is an integral part of sustainable development and each country bears the primary responsibility for strengthening its capacity (WHO, 2007a:12; WHO, 2007b:10).

In January 2005 the World Conference on Disaster Reduction adopted the Hyogo Framework for Action (2005-2015), which called for strengthening of disaster preparedness for effective response at all levels and the integration of risk reduction planning into the health sector (UNISDR, 2005:8,13). As a result of this conference and against the background of the devastating December 2004 Tsunami, the importance of preparedness was re-endorsed in May 2005 when WHO Member States adopted resolution WHA58.1 which called on WHO to intensify and improve its efficiency on emergency work, and emphasised the need to strengthen the ingenuity and resilience of communities, the capacities of local authorities and the preparedness of health systems (WHO, 2007a:12; WHO, 2007b:10; WHO/HAC, 2008:6). Member states were urged to:

Make the best efforts to engage actively in the collective measures to establish global and regional preparedness plans that integrate risk reduction planning into the health sector and build up capacity to respond to health related crises….

And:

To formulate…national emergency-preparedness plans… in order to improve the effectiveness of response to crises and of contributions to the recovery of health systems (WHA58.1, 2005:8).

In order to strengthen disaster preparedness in Member States, resolutions have been passed by the WHO regional committees. These resolutions, though not legally binding are important policy documents that set the stage for public health actions, and are considered the main policy tools for guiding WHO programmes through provision of a mandate to undertake activities in a specific area (Mock, 2007: 285). The resolutions have been adopted in order to urge Member States to take action on particular health problems and to urge the WHO itself to carry out activities in support of Member States (Mock, 2007:285).

The resolutions discussed above have emphasised the importance of preparedness in order to reduce the effects of disasters. Governments have the responsibility of protecting public safety and providing relief in emergencies, ensuring a dignified life (WHO, 2007a:9; WHO, 2007b:10). Governments have the responsibility to ensure that actions are taken to compliment the efforts by the WHO, and carry out activities aimed at disaster risk reduction as proposed by the resolutions. In order to assist the Governments carry out these actions, academics need to conduct research related to the various stages of the disaster continuum to come up with recommendations and country specific Disaster Risk Reduction policies. This thesis is expected to contribute to the knowledge base on health care risk reduction and emergency preparedness in Namibia and to stimulate continuous research into issues related to emergency preparedness.

3.4.1.3 WHO six year strategy for the health sector and community capacity development

WHO is the Inter-Agency Standing Committee (IASC) global health cluster leader and has been given the mandate to build global capacity for humanitarian health action through strengthening of the preparedness capacity of communities and countries at risk (WHO, 2007a:6). Following various International Policies and WHA resolutions, and with its role as the International health lead agency, WHO came up with a global strategy for risk reduction and emergency

preparedness in 2006. The strategy is based on recommendations of a global consultation held by WHO in 2006, with input from experts in emergency preparedness and response (WHO, 2007a:7).

This risk reduction and emergency preparedness strategy is based on an all hazard/whole health concept:

- *All hazards:* This involves the development and implementation of risk reduction and emergency preparedness strategies for all the hazards in the community. The different hazards can cause similar problems in a community and so they require the same model and tools for risk reduction regardless of cause (WHO, 2007a:14). This is because countries and communities cannot afford to develop separate tools for emergency preparedness, mitigation and response for each and every hazard they are vulnerable to, hence the use of the same tools for all hazards.

- *Whole Health Approach:* Countries and communities cannot afford to have separate emergency planning and coordination systems for the different categories of health risks. Therefore they should take a whole health approach which involves the unification of all emergency preparedness planning and coordination activities for the various health risks in one emergency preparedness and response unit. The WHO (2007a: 11) recommends that the emergency preparedness plans should also include environmental health, management of chronic diseases, maternal and child health, communicable disease control, nutrition, pharmaceuticals, health care delivery services and other specialised health services.

This strategy was targeting all member states with the aim of increasing investment in health emergency preparedness and risk reduction programmes, with the WHO providing technical assistance. The goal of the strategy was to support countries in building national capacity in risk reduction and emergency preparedness, and to assist the health sector in member states in reducing the adverse effects of disasters (WHO, 2007a:15). To achieve this goal WHO, in consultation with International experts in February 2006, came up with four priority areas:

- Assessing and monitoring baseline information on the status of risk reduction and emergency preparedness in the health sector at regional and country levels.

- Institutionalizing risk reduction and emergency preparedness programmes in ministries of health and establishing an effective all hazard/whole health programme for this purpose.

- Encouraging and supporting community based risk reduction and emergency preparedness programmes.

- Improving knowledge and skills in risk reduction and emergency preparedness and response in the health sector (WHO, 2007a:16).

WHO will support Member States in each of these priority areas through provision of technical assistance and also developing standards and training resources on health sector risk reduction and emergency preparedness. This strategy is a clear indication of the efforts by WHO in risk reduction and emergency preparedness. The responsibility of coming up with emergency preparedness plans and risk reduction activities is for the Governments, with WHO focusing on technical support.

3.4.2 Emergency preparedness in the African region

WHO in the African Region (WHO-AFRO) notes that its Member States face key challenges in reducing the negative consequences of emergencies, disasters, conflicts, and other humanitarian crises including responding to the health and nutrition needs of those affected by such events (WHO-Afro, s.a). The frequency of crises and disasters and the burden that these have caused on the WHO African Region Member States is reflected in the following statistics as reported by WHO-Afro (2008:1):

- Between 1992 and 2004, 22 of the 33 humanitarian crises that lasted two or more years occurred in Africa.

- A total of 21 out of 31 humanitarian appeals in 2006, and 9 out of 13 appeals in 2007 were from the African Region.

- More than 98% of the Member States in the African Region were affected by emergencies in 2008, which comprised of floods, drought, disease outbreaks as well as various degrees of conflicts.

- In the year 2007, there were 5 965 disaster related deaths, with 2 770 due to epidemics, 1 700 due to traffic accidents, and 722 due to floods.

- Financially, Africa lost USD$ 15 billion due to emergencies and disasters, in 2007 alone.

- One of the worst affected Member States was Algeria during the earthquake in 2000 in which 2300 lives were lost, 15000 people injured and USD$5 billion was lost.

These statistics demonstrate the need for action by WHO and its Member States, to reduce the negative consequences of the emergencies. The goal would be to reduce the health consequences of emergencies, and disasters by improving health sector, risk reduction and emergency preparedness in countries and communities at risk (WHO-Afro, 2008:11). A number of resolutions have been passed by the WHA aimed at improving the capacities of countries and communities in disaster risk reduction and emergency preparedness. These were discussed above. In Africa, emergency preparedness and response activities were guided by the principles set out in resolution AFR/RC47/7 adopted in May 1997 by the forty-seventh session of WHO regional committee for Africa (WHO-AFRO, 2008:2).

Resolutions, however, are there to urge countries to take action, but they are not legally binding, and hence do not compel countries to take action. They are only there to guide countries, and are regarded as policy documents for the WHO and guide its work in risk reduction and emergency preparedness. The WHO African Region noted that despite countries now having a clearer understanding of risk reduction and emergency preparedness, brought about by the various international policies and frameworks particularly the Hyogo Framework for Action, developing a culture of preparedness remained a challenge for most national authorities. This is reflected in resolution AFR/RC60/11 of 2010 adopted by the sixtieth session of the Regional committee for Africa, which listed some of the issues and challenges in emergency preparedness in the African Region:

- Most of the countries in the Region had not conducted Vulnerability assessments, and of those who had conducted the assessments, only 12 had included a health component. This means that most emergency preparedness and response plans developed by countries were not based on assessments of vulnerabilities and capacities, and usually targeted epidemics and pandemics instead of an all hazards approach. Only 11 countries in Africa had emergency preparedness plans reflecting multiple hazards.

- The countries did not have comprehensive emergency preparedness plans containing minimum WHO recommended elements regarding risk reduction and emergency preparedness. Most countries had not yet implemented the recommendations contained in the Hyogo Framework for action calling on all countries to "assess the status and build the resilience and risk management capability of hospitals and other key health infrastructures".

- Some countries did not have functional emergency units, and there was understaffing and under resourcing of these units in countries that had them. Most countries did not have emergency funds.

- There was lack of trained staff in emergency preparedness and response in many countries in the region. Some countries had trained staff but they were limited in number, while some did not even have staff trained in basic skills of emergency preparedness and response.

These issues and challenges show the need to stimulate governments on the importance of health sector emergency preparedness and response. One of the targets for the WHO African region is for all countries to have Disaster Risk reduction and emergency preparedness plans covering multiple hazards by the year 2013 (WHO-Afro website s.a.). The discussion so far has shown the commitment by WHO in risk reduction and emergency preparedness in the health sector. Conducting research in order to identify gaps in risk reduction and emergency preparedness and coming up with recommendations for the Government to act on may be a way of stimulating action.

3.5 Vulnerability Assessment

Following development of policies, vulnerability assessments should be conducted as part of the emergency preparedness process shown in figure 6 below.
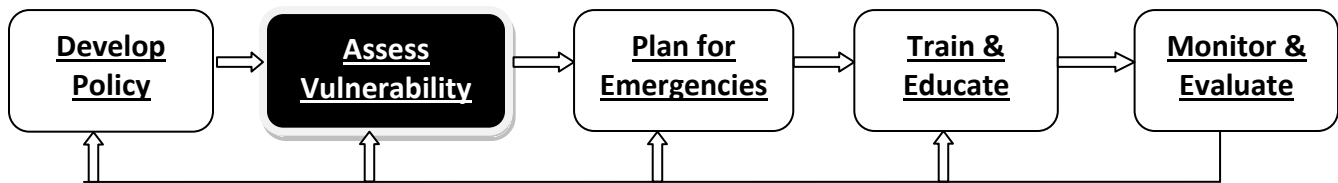
Figure 6: Processes involved in health sector emergency preparedness (vulnerability assessment)

The reality is that "there is not a single facet of life, not a single act by any person, not a place on earth, and not a moment in time that does not inherently contain a degree of hazard" (Kuban & Mackenzie-Carey, 2001:1).

A vulnerability assessment identifies and prioritises the potential hazards affecting communities and provides a baseline for recovery strategies (Keim & Giannone, 2006:167). It enables communities and governments to make informed decisions about the hazards, which are most important to them. This is because governments do not have unlimited resources that allow them to plan for every hazard, and so they need some form of ranking in order to decide which hazards they will focus on (Region al District of Nanaimo, 2006:4). A vulnerability assessment yields information for (WHO, 1999:30):

- Sustainable development: development can be undermined without strategies and programmes aimed at vulnerability reduction.

- Emergency prevention, mitigation and preparedness: it is important to know and understand a community's susceptibility and resilience factors in order to come up with programmes aimed at disaster prevention, mitigation and preparedness as part of a disaster risk reduction programme.

- Emergency recovery: vulnerability assessments provide a baseline of the community's condition before a disaster, against which the effectiveness of recovery programmes can be compared and enables programmes that assist in vulnerability reduction.

A health facility's preparedness for emergencies should be based on a sound assessment of vulnerability (WHO-WPR, 2006:1). This will enable the facility to include the most important hazards in the community when coming up with the disaster plan. The disaster plan should use an all hazards approach in which all the important hazards are catered for by one general plan. A vulnerability assessment also enables a health facility to effectively identify and modify factors that increase its susceptibility and reduce its resilience. This will enable the protection of health facilities so that they will not collapse during disasters when they are needed the most.

There are a number of ways of assessing vulnerability. WHO-WPR (2006:1) suggests the following process for vulnerability assessment as shown in Figure 7.
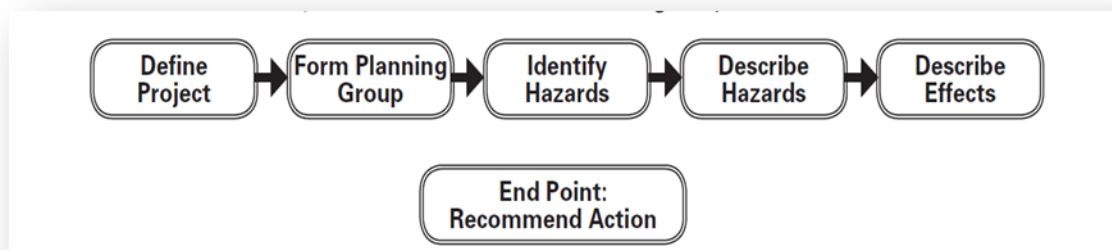
Figure 7: Vulnerability Assessment Process.
(Source: WHO-WPR, 2006:1)

The process begins with a project definition*,* which provides the aims and objectives, the scope and context of the vulnerability assessment as well as the tasks to be performed and the resources required to perform these tasks. The second step is the formation of a planning group, which should consist of members of the community as well as experts in the field of disaster management. The planning group facilitates coordination of activities and ensures a commitment to the realisation of the objectives. Having laid down the groundwork by defining the project and forming the planning group, the hazards facing the health facility are identified, described and their effects on the health facility evaluated. Finally, there will be recommendations for action based on the vulnerability assessment. Disaster planning, training and education, and monitoring and evaluation, which are part of the emergency preparedness process, should be based on the results of the vulnerability assessment.

3.6 Planning for Disasters

Having developed policies and assessed vulnerability, the next step is to plan for emergencies as shown in Figure 8.

Figure 8: Processes involved in health sector emergency preparedness (Planning for disasters)

Hospitals play a significant role during disasters, and so they need to have a disaster plan to enable them to respond efficiently and effectively. In the United States of America, there is a statutory regulation requiring all hospitals seeking accreditation by the Joint Commission on Accreditation of Healthcare Organisations (JCAHO) to have disaster response plans (Mehta, 2006:89). In Namibia, the National Health Emergency Preparedness and Response Plan (NHEPRP) of 2003 seeks to establish emergency preparedness plans at all levels of the health sector. It is, however, not a statutory requirement that hospitals need to have disaster plans.

3.6.1 Hospital disaster plan

A disaster plan is an agreed set of arrangements for preparing for, responding to, and recovering from emergencies, and involves the description of responsibilities, management structures, strategies, and resource and information management with a view of protecting life, property and the environment (Keim & Giannone 2006:167).

The writing of the plan is only one part of the disaster planning process, which according to Keim and Giannone (2006:167) should produce:

- An understanding of organisational responsibilities in response and recovery.

- A strong emergency management network.

- Improved community participation and awareness.

- Effective response and recovery strategies and systems.

- A simple and flexible written plan.

An effective hospital disaster plan should have activities aimed at mitigation, preparedness, response and recovery. The GOI/UNDP (2002:18) recommends that the hospital emergency preparedness planning process be divided into three phases: pre-disaster phase; disaster phase; post disaster phase. This will ensure that all aspects of the disaster continuum are included in the plan.

➢ **Pre-disaster phase**

The pre-disaster phase has mitigation and preparedness activities. This is the pre-disaster risk reduction phase of the disaster continuum and is the main emphasis of Disaster Risk Reduction activities. For hospitals, this phase involves most of the planning for emergencies with the writing down of the emergency plan, staff education and training including disaster drills so that they are well prepared for any emergency.

➢ **Disaster phase**

This phase can be subdivided into three phases (GOI/UNDP, 2002:18):

- Activation phase in which the hospital plan is activated. During this phase the hospital incident commander, who is usually the most competent person at the hospital, is appointed. The job of the commander is to direct all hospital response operations and is not expected to carry out patient care, logistical, security or any other activities (GOI/UNDP, 2002:26).

- Operational phase in which all the response operations for mass casualties are conducted in accordance with the disaster/emergency plan.

- Deactivation phase, which occurs when the hospital command is satisfied that the flow of victims is not overwhelming the hospital resources and the disaster/emergency plan, is deactivated.

➢ **Post disaster phase**

This is an important phase of the planning process in which all the activities of the pre-disaster and disaster phases are evaluated and possible action taken on any gaps noted so that there is improvement in future response.

3.6.1.2 Characteristics of a Hospital Disaster Plan

According to the GOI/UNDP (2002:17-18) a hospital preparedness plan needs to have the following characteristics:

- Predictable: there should be a predictable chain of management in the disaster plan, which includes the roles and responsibilities of the managers.

- Simple: the plan should be simple and easy to understand and follow during a disaster. When disasters occur, there should be clear and concise instructions for people to follow in order to have an effective response.

- Flexible: the plan should have organisational charts, and should be flexible so that it can be used for various forms and dimensions of different disasters.

- Comprehensive: it should be comprehensive and compatible with various hospitals, and should take into consideration the other health care facilities and the transfer policy to other hospitals in the event of a disaster.

- Anticipatory: there should be consideration of the worst-case scenario. Chaffe and Oster (2006: 37) summarises it as "imagining the unimaginable".

- Part of a regional plan in disasters: hospitals do not work in isolation during disasters and they are part of a region. Their plans should be in line with regional recommendations, and should be integrated with the regional plans.

In addition to these characteristics, Chaffe and Oster (2006:37) suggest that hospital emergency preparedness can be enhanced by a commitment to the following philosophies:

- Imagine the unimaginable: it is the belief that a problem will not happen to you or your hospital that poses a threat to hospital disaster planning. Some also believe that they know what to do in emergencies so why bother with writing plans and rehearsing them. While it is true that the medical staff know how to suture a wound or how to put up a drip, it is also true that without a plan, there can be duplication of roles, many leaders, many sources of command, confusion and resources can be overwhelmed. Hence, it is important to imagine situations where hospitals resources are overwhelmed by a sudden surge of patients.

- Protect the staff: there is need to ensure that staff are not injured or become ill during disasters through the provision of protective materials like gloves and masks and a commitment to self-protective policies.

- Build in redundancy: important to expect the failure of the primary plan hence the need for alternative plans for every emergency.

- Rely on standard procedures whenever possible: during disasters, staff members need to perform activities that are close to what they do in normal times.

- Maintain Records: patient records need to be properly maintained before during and after disasters. There can be patients on chronic medications that still need their medicines during disasters. Maintaining records also allows for reimbursement of care provided during disasters.

- Plan to degrade services: it will be difficult to maintain normal levels of services during disasters and so it is important to plan for such situations. This may mean that certain non-urgent operations (theatre cases) may need to be postponed so that critical patients are taken care of first. This is to ensure that critical personnel and resources are reassigned so that there is an effective response in order to save as many lives as possible.

3.6.1.3 Basic components of a Disaster Plan

The first step in writing the disaster plan is to form a hospital disaster/emergency committee. This committee should contain representatives from the various departments of the hospital. The committee's task is to write a disaster plan and make sure that all staff members are familiar with the plan. According to Keim and Giannone (2006:167-168) the plan should contain four basic elements:

➢ A basic plan, which contains a statement of policy, assignment of responsibilities, and concept of operations.

➢ A functional annex or set of contingencies that organize tasks around the completion of objectives related to each critical function.

➢ Hazard specific appendices, which provide additional detailed information applicable to specific hazards.

➢ Standard operating procedures detailing the tasks to be performed by responders.

The structure of the plan can be addressed under the following headings as described in the Hospital Major Incident Medical Management and Support (HMIMMS) manual by Carley and Mackway-Jones (2005:26):

3.6.1.4 Command and control

A hospital emergency incident command system is important for the coordination of emergency response actions. The command system will ensure that there is avoidance of situations in which there are many leaders and sources of command leading to an inefficient and ineffective response. The Hospital Coordination Team, headed by the Medical Coordinator, coordinates the response and controls all the medical and administrative tasks. The structure of the incident command is based on the medical, nursing and administrative hierarchies. According to Chaffe and Oster (2006:38), the incident command system should have:

- A reproducible, predictable chain of command.

- A flexible organizational design that can be scaled to the scope of the problem.

- Checklists for each position to simplify response and carefully define each task.

- A common language that permits communication with outside agencies.

3.6.1.5 Communications

The plan should have a communication system for the notification and activation procedures during disasters. All the departments of the hospital should have the plan and the staff should be familiar with language used when the plan is activated or deactivated. There should also be a system of notifying and calling in staff. Communication is vital, as some plans fail due to poor communication. The staff must receive the accurate information, which includes when and where to assemble. In addition, there should be a system whereby the hospital is notified by the external agencies and ideally, the information should include the place, type and time of incident and the estimated number of casualties.

3.6.1.6 Key staff selection

There should be identification of the key staff that is required during a disaster. Ideally, the most experienced staff is needed to respond effectively. This may be difficult especially at night and during weekends. Hence, the plan should take this into account and have a system of using the most senior staff that is present at the time of the disaster.

3.6.1.7 Key staff tasking

"Few individuals are interested enough or mad enough to read and remember the whole of the major incident plan." (Carley & Mackway-Jones, 2005:27). To aid key staff on what their roles will be, and the basic information they need to carry out their roles during a disaster, there can be the use of action cards. An example of an action card is shown in Figure 9.

Figure 9: Example of an Action Card.
(Adapted from Disaster Medicine Course Manual for Master of Medicine in Emergency Medicine: Joint Programme: Universities of Cape Town and Stellenbosch).

3.6.1.8 Team definition

Medical and Nursing staff need to form teams headed by a team coordinator. All teams will have action cards regarding the roles of the individual members of the team. This will ensure proper coordination of response without duplicating roles.

3.6.1.9: Key area selection

During disasters, the hospital environment may need to change and there may be need for expansion of certain areas to accommodate patients. Facilities such as the emergency department and intensive care unit need to plan so that they increase their capacity.

TABLE 3: KEY AREA SELECTION

Area	Staffing	Characteristic
Staff reporting area	Team Coordinator	Near to the emergency department. Easy access from outside of hospital. Major incident phone.
Discharge/reunion area	Senior nursing staff	Separated from press and general public. Route out to avoid press. Major incident phone.
Body holding area	Pathology staff	Large area. Close to emergency department, No access to press or public (e.g. gym).
Hospital control room	Hospital Coordination Team, clerks	Next to or within emergency department. Good communications. Access to phone and fax.
Volunteer reporting	Volunteer Coordinator	Near hospital entrance. Major incident phone.
Hospital enquiry point	Enquiries Officer	Near discharge/ reunion area. Major incident phone.
Press area	Press Officer	Space to hold news conference.
Emergency blood donation	Blood transfusion service (BTS) staff	Arrange location with local BTS (may not be in hospital).
Relatives area	Relatives Officer	Refreshments. Major incident phone.

(Source: Carley & Mackway-Jones, 2005:27)

There should be pre-designation of the areas and wards that will be used during emergency response operations so that the staff in these areas are familiarised with their roles and procedures to take when the plan is activated.

3.6.1.10 Infrastructure

There should be adequate resources and facilities for the provision of care for patients and staff. The planning process should look at the essential services needed to support the response and plan for possible changes to the hospital infrastructure (for example the need to increase supply of equipment and consumables to the emergency department; the need to increase catering supplies to different areas).

3.6.1.11 Triage

When faced with mass casualties medical services can be overwhelmed, so it is necessary to prioritise patients according to medical need. This process is called triage, meaning to sort or choose. Triage was originally used by French Surgeon Baron Dominique Jean Larrey who introduced a system of sorting casualties that presented to the field dressing stations during Napoleon's wars. His aims were mainly military rather than medical, with the highest priority for treatment being given to those who had the highest probability of survival (and therefore ability to return to battle) (Carley & Mackway-Jones,2005:97; Gottschalk, 2004:325). This system has now been modified for use in emergency departments, and is an essential part of mass casualty incident planning and preparation.

The aim of triage is to deliver the right patient to the right place at the right time so that they receive optimum treatment, and can be applied in situations where the casualty load exceeds the skilled help available (Carley & Mackway-Jones,2005:98). Triage allows prioritisation of patients according to medical need, with those who are most ill being given the highest priority. During disasters, priority can be given to those with the most severe and life threatening injuries, in order to save lives. An ideal triage system primarily identifies patients with life-threatening conditions; requires minimal training; is easy to use; is able to process many patients quickly; provides information regarding services and waiting times; determines appropriate treatment area in the emergency department; decreases waiting area congestion; and provides continuity between the roadside (ambulance) and emergency units (Gottschalk, 2004:326).

The end point of a triage process is the allocation of priority which will determine the optimum care given to the patient/victim. There are variations in priority schemes throughout the world, for example, the United Kingdom military personnel uses a treatment 'T' (treatment) system, while the North Atlantic Treaty Organization (NATO) use a 'P' (priority) system, while civilian organizations use colour coded priorities. These priorities are shown in Table 4.

TABLE 4: TRIAGE CATEGORIES

Category	Description	Colour	Priority System	Treatment System
Immediate	Casualties who require immediate life saving treatment.	Red	P 1	T 1
Urgent	Casualties who require treatment within six hours.	Yellow	P 2	T 2
Delayed	Less serious cases that do not require urgent treatment.	Green	P 3	T 3
Expectant	Casualties: 1. Who cannot survive treatment. 2. For whom the degree of intervention required is such that in the circumstances their treatment would seriously compromise the provision of treatment for others.	Blue		T 4
Dead	Dead	White	Dead	Dead

(Source: Carley & Mackway-Jones, 2005:98)

There are a number of methods that can be used for triage. An example is the use of a triage sieve and a triage sort. A triage sieve is a primary method that can be used initially at the scene of a mass casualty incident (or when large numbers of patients are delivered to the hospital at once) (Carley & Mackway-Jones,2005:98).It rapidly identifies those who are most in need of medical attention and uses four basic characteristics: walking, breathing, respiratory rate and pulse rate. The triage sort is a clinical tool which requires equipment and medical knowledge and uses three clinical features Glasgow comma scale (GSC), Respiratory rate, and systolic blood pressure.

3.7 Training and Education

It is not enough to develop policy, assess vulnerability, and write disaster plans without training and educating not only the personnel involved in responding to disasters, but also communities affected by disasters. After planning for emergencies, training and education is the next step.
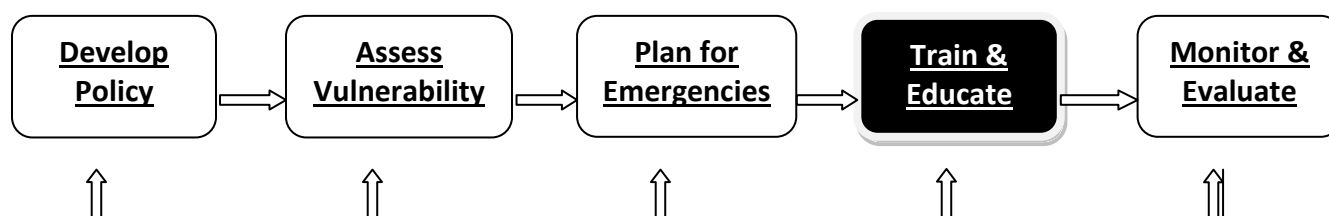
Figure 10: Processes involved in health sector emergency preparedness (Training and Education)

The objectives of training and education include (WHO, 1999:108):

- Empowering the community to participate in developing emergency management strategies.

- Community awareness of the hazards facing them.

- Community awareness of the appropriate actions to take for different types of emergencies and the organisations, which can assist them.

- Enabling the emergency management personnel to carry out their tasks and take appropriate actions when faced with different types of emergencies.

Training and education strategies vary according to audiences and their purposes, and selection should be based on need, available time, and resources. These strategies may include (WHO, 1999:108):

- Workshops, seminars, formal education programmes or conferences
- Self-directed learning
- Individual tuition
- Exercises
- Pamphlets, videos, media advertisements, newsletters, or journals
- Informal or formal presentations
- Public displays or public meetings

The importance of disaster training and education in the health sector has given rise to the discipline of disaster medicine, which has come about as a result the "marriage between emergency medicine and disaster management" (Ciottone, 2006:5). This is because emergency medicine plays an important role in disaster response through taking care of the injured. Disaster medicine is now being offered at a Masters Degree level in some Universities in USA and Europe. In Africa, two South African Universities have begun offering Disaster Medicine as part of the Emergency Medicine Degree, but not as a stand-alone Master's Programme. In addition, these Universities also offer short courses in disaster medicine to those working in emergency response and other interested parties. This should go a long way in creating or improving the

human resource base in disaster preparedness and response in the health sector in the African region.

3.8 Monitoring and Evaluation
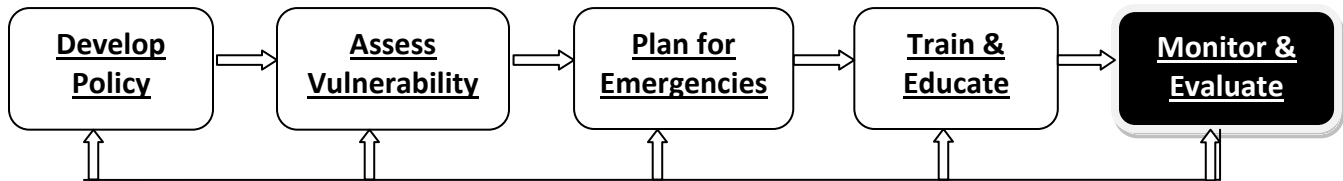
Figure 11: Processes involved in health sector emergency preparedness (Monitoring and Evaluation)

Having developed policies, done vulnerability assessments, planned for emergencies and conducted training and education, the monitoring and evaluation process determines how well each of these programmes has been developed and implemented and any gaps which may need improvement identified. The emergency preparedness process is a dynamic process that needs constant monitoring and evaluation and fine-tuning especially after disasters.

The methods used for monitoring and evaluating preparedness include:

- Project Management (Keim & Giannone, 2006:169; WHO, 1999:113).
- Operational Debriefing (Keim & Giannone, 2006:169)
- Exercises (Keim & Giannone, 2006:169; WHO, 1999:113)
- Checklists (WHO, 1999:113)

Project Management involves monitoring and evaluation during the implementation stage of a project (Keim & Giannone, 2006:169; WHO, 1999:113) and it includes:

- Measuring the progress towards the project objectives.
- Performing an analysis to find the cause of deviations in a project.
- Determining corrective actions.

Projects involve an analysis of the present and past, predicting the future, making changes and developing new ideas and products for future use. Very often, these predictions and changes may not be entirely true, and the environment in which the project is implemented may change over

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time (WHO, 1999:113). This is also true for the emergency preparedness process, in which it is possible to make mistakes in predicting the future, but there is always room for improvement.

Operational debriefing is a process of after-action study or a discussion or lessons learnt after significant operations. It involves a forum of discussion of what went right/wrong and what should be done to improve. Disasters, though unfortunate events, afford us with opportunities to learn from our mistakes and improve in our future response endeavours.

Exercises provide a means of monitoring and evaluating different aspects of the emergency preparedness process. There are different types of exercises that are suited for different purposes, some of which are as follows:

i) Operational exercise whereby personnel and resources are deployed in a simulation of an exercise.

ii) Tabletop exercises in which personnel are presented with scenarios, and asked what should be done and how will it be done.

iii) Syndicate exercises in which personnel are divide into syndicates to discuss a give scenario and decisions discussed in an open forum.

Checklists are used for evaluating an existing programme or in developing a new programme. They are considered a closed set in that they are not used for developing new ideas or strategies.

3.9 Conclusion

This chapter provided a theoretical overview of the health sector emergency preparedness, which is also used as the framework of the study. It looked at the importance of the health sector during disasters with particular focus on hospitals. It also looked at the emergency preparedness process with particular reference to hospitals. This process is a dynamic process, which ranges from formulating policies to constant monitoring and evaluation. Health care facilities are encouraged to follow this process in order to include all aspects of disaster preparedness in their plans. The next chapter will look at some of the research that has been done throughout the world in relation to the preparedness of hospitals for emergencies and disasters.

CHAPTER 4

HOSPITAL EMERGENCY PREPAREDNESS: A GLOBAL AND REGIONAL PERSPECTIVE

4.1 Introduction

Chapter three of this study highlighted the role and importance of hospitals during disasters. It provided a theoretical overview of the emergency preparedness process in the health sector, and highlighted some important concepts in hospital emergency preparedness.

The aim of this chapter is to provide an overview of studies conducted by other researchers globally in relation to hospital emergency preparedness. In addition, it highlights some lessons learnt during previous disasters that led to the realisation that the health sector was important and should be prepared for disasters.

4.2 Global Overview

The issues of disaster management principles and their assessment by emergency medicine and other specialty societies dates back to more than 20 years ago, with difficulties in undertaking these assessments leading to calls for continued development of standardised tools (Bradt *et al.*, 2009:1350). The continued occurrence and magnitude of disasters also prompted WHO and other organisations to come up with best practice models for hospitals and disaster management (Traub, Bradt & Joseph, and 2007:397). It resulted in increased attention on healthcare disaster preparedness and response in research agendas. Most research focused on large-scale events affecting many people (Adams, 2009:1; De Lorenzo, 2007:436).

Over the years there has been efforts by WHO and other technical bodies in promoting hospital preparedness, examples being the 2008-9 world disaster reduction campaign of "*hospitals safe from disasters*" and more recently the 2010-11 "*one million safe schools and hospitals*" initiative. This is because of the need to continue strengthening the healthcare system's preparedness and response for mass casualties with a view of saving as many lives as possible when disasters occur.

World events, such as the Singapore Airline crash in Taiwan in 2000, the attack on the World Trade Centre of 11 September 2001, severe acute respiratory distress syndrome (SARS) of 2003, Pakistan earthquake of 2005, Hurricanes Katrina and Rita of 2005 and the more recent Japanese earthquake and Tsunami of 2011, reaffirmed the need for disaster research to understand how people coped and survived when faced with such calamities. Those events also reaffirmed our limited understanding of hazard management, reinforcing the need for research (Ressler, 2007: xi). The events, though unfortunate afforded us an opportunity to learn and find ways of improving our preparedness for future events, shown by research conducted after the events, with a view of improving the knowledge base in emergency preparedness.

Because of disasters that occurred throughout the world, various organisations in the USA made efforts aimed at improving emergency preparedness and response. For example the Joint Commission on Accreditation of Healthcare Organisations (JCAHO, 2003) made it mandatory for healthcare institutions to have emergency planning based on hazard vulnerability analysis; the U.S. Department of Health and Human Services, (U.S DHHS, 2008), the Agency for Healthcare Research and Quality (AHRQ,2005) and the Centre for Disease Control and Prevention (CDC, 2008) placed emphasis on emergency preparedness in their research agendas; the Department of Homeland Security(DHS,2008) began funding initiatives designed to improve emergency preparedness (Adams, 2009:1).

Organisations such as the Association for Professionals in Infection Control and Epidemiology (APIC), the National Centre for Health Statistics (NCHS), the Naval Postgraduate School (NPS) in conjunction with CDC, the United States General Accounting Office (GAO) and others conducted surveys on different aspects of preparedness. Following concerns about the preparedness of US hospitals for mass casualties as a result of bioterrorist attacks, and mandated by the Public Health Improvement Act of 2000, the GAO conducted a survey on the "*extent of bioterrorism preparedness among hospitals in the urban areas in the United States*" in 2002 (GAO, 2003:1). Most of the hospitals surveyed (about 80%), reported having a written emergency plan addressing bioterrorism, but lacked the medical equipment to handle large numbers of patients that could result from a bioterrorist attack. Table 5 shows different dimensions of preparedness measured by various surveys conducted by USA organisations.

TABLE 5: DIMENSIONS OF PREPAREDNESS MEASURED BY SURVEYS

Dimension of Preparedness	NCHS	AHRQ	GAO	APIC	JCAHO	CDC/NPS	CDC/ SV
Response Plan	√	√	√	√	√		√
Surge Capacity	√	√	√	√	√		
Incident Management	√	√		√	√	√	
Education and Training	√	√	√	√			√
Surveillance		√		√	√	√	√
Communications			√	√		√	√
Security			√	√		√	√
Logistics				√		√	
Integration in College of Emergency Physicians	√	√	√	√	√	√	

(Source: Kelen (n.d) Power point presentation)

Emergency preparedness can be achieved through a process of planning and formulating policies; training and exercise; acquisition of important equipment and infrastructure needed for emergency response; and the acquisition and improvement of the knowledge and capabilities of staff (Adini *et al.*, 2006:451; Perry & Lindell, 2003: 338). One of the major components of the hospital emergency preparedness process is that of planning. The planning process generates response measures and protocols, which can be documented in a written plan. It is, however, important to note that the written plan does not guarantee preparedness (Perry & Lindell, 2003:338), but should be viewed as one of the elements of preparedness activities aimed at improving emergency response (Adini *et al.,* 2006:451-452).

Whenever disasters occur, hospitals are among the first institutions to be affected and so they need a well-documented and tested disaster plan (Mehta, 2006:89). The disaster plans should be based on vulnerability assessments and should incorporate various issues addressing the hazards in their areas.

Following the September 11 attacks on the World Trade Centre and Pentagon in the USA, there has been a worldwide emphasis on the rapid development of emergency plans to combat or cope with consequences of terrorism, especially in the US, United Kingdom and Europe (Perry & Lindell, 2003:336). In the USA, there have been some challenges in the development of plans for these incidents. Firstly, despite the JCACHO regulation that all hospitals should have disaster

plans, there were no guarantees that those plans extended beyond the written paper, and that they would be followed when disasters occurred (Krajewski *et al.,* 2005:2; Manley *et al.,* 2006:81). Secondly, the emphasis on the written plan drew attention away from the planning process itself and the objective of achieving preparedness (Perry & Lindell, 2003:336). Thirdly, there had been a lack of awareness of the literature on planning for natural and technological disasters on the part of those involved in formulating terrorism preparedness policies and plans (Perry & Lyondell, 2003:336).

Prior to the September 11, 2001 attack and the subsequent anthrax scare, and despite the 1993 World Trade Centre bombing and the 1995 Oklahoma City bombing, hospital preparedness in USA focussed mainly on natural disasters (Krajewski *et al.*, 2005:2). There was a gap in the preparedness for man-made disasters, particularly terrorist attacks, mainly because those were rare events which were not in the usual experience of U.S. hospitals (Niska & Burt, 2003:4).

In a survey of 30 hospitals (22 rural and eight urban) conducted before the September 11 attacks Treat *et al.,* (2001: 562-565) found that none of the rural respondents believed that their hospitals were prepared for a chemical, biological or nuclear disaster, while all the urban respondents believed that their hospitals were somewhat prepared. Following the attacks, there was a relook at emergency preparedness. This was shown by a survey conducted by the CDC and NCHS after the attacks, which showed that while almost all of the hospitals had plans for responding to natural disasters, most of them (92.3%) had begun revising their plans to include preparedness and response for terrorist attacks. Preparedness is a continuous process that requires constant monitoring and fine-tuning to include new threats in the planning process.

An important element in the maintenance of a high level of preparedness is the maintenance of an adequate staff compliment as well as the knowledge and capabilities of staff. In a survey conducted in the US it was shown that some emergency departments were understaffed and overwhelmed and so might not be able to provide an adequate and effective response during a disaster (Spranger *et al.*, 2007:82). In addition, most health care practitioners lacked the knowledge and management skills to deal with mass casualties resulting from terrorist attacks (Chen *et al.*, 2002: 745-750; Lee, 2003:2). That has a negative impact on the preparedness of the health sector for disasters. In a survey conducted in 2003 in the US, most health care

practitioners believed they and their local health care systems were not well prepared to respond to bioterrorism and natural epidemics (Alexander *et al*. 2006: 1238). In another survey, Hsu *et al.* (2005:106) discovered that most health care practitioners participating in the survey reported that they were not confident in their ability to diagnose or treat cases related to chemical, biologic, radiologic, nuclear and explosives (CBRNE) as they had never seen or treated such cases.

An effective health and medical response requires an adequate supply of qualified health care providers who are able and willing to report to work (Mehta, 2006:90). Of concern is that staff absenteeism can act as a significant barrier to disaster response. This is because some staff members may be reluctant while others may not be able to report for duty. Various studies investigating the willingness and ability of health care workers to report for duty during disaster, had been conducted in the US (Barnett *et al.*, 2009: 1-8; Qureshi *et al.,* 2005:378-388; Rokach *et al.,* 2010:637-643), Australia (Smith, 2007:21-24), Singapore (Cheong *et al.*, 2007: 653-661; Koh *et al*., 2005:676-682), Israel (Shapira, *et al.*, 1991: 704-11), and Canada (Singer *et al.*, 2003:1342-1344).

These studies have all shown that it may not be realistic to expect all staff to report for duty during a catastrophic event (Smith, 2007:21), hence the need for planning for such cases. However, health care workers have an ethical obligation to care for the sick, and are expected to be available during times of emergency (Singer, 2003:1343). This raises ethical issues about the risks and personal safety of the health care workers during outbreaks of infectious diseases like the Severe Acute Respiratory Syndrome (SARS) outbreak of 2003. During this outbreak, health care workers had to make the difficult decision of either reporting for duty risking their lives and those of their families or not report for duty and risked being fired. Subsequently some health care workers did not report for duty and were fired, while some of those who reported contracted the disease and had to be quarantined, with some of them dying from the disease (Singer, 2003:1343). These ethical dilemmas might need to be answered in further research.

The reluctance to report for duty might be due to lack of knowledge about the hazard (Rokach, 2010: 641), fear and concern for family and self and personal health problems (Qureshi, 2005: 378). In a study conducted in Israel, Shapira *et al.* (1991:704) found out that 42% of the respondents were willing to report for their duties following a missile attack. This percentage

increased in the event that their personnel safety was guaranteed. The rate of absenteeism has been shown to vary depending on the type of emergency. One survey predicted an absentee rate of 12% in response to a plane crash, which increased to 24% and 39% in a radioactive and biological warfare attack respectively(Steffen *et al.,* 2004:S34). The same was predicted by Qureshi *et al.* (2005: 378) who predicted a 14 % absentee rate in mass casualty incident, which increased to about 40% in an infectious disease outbreak. This reluctance might have a negative impact on the health care system's ability to cope during catastrophic event.

While health care workers have the moral and ethical duty to respond to emergencies, health care institutions have a duty to protect, and help them cope with stressful situations (Koh *et al.*, 2005:676). Protection of staff is one of the important philosophies of the hospital disaster preparedness process and should include provision of essential elements such as personal protective equipment (PPE) for common tasks and decontamination, immunization and chemoprophylaxis, training and education as well as development of policies to ensure that protective measures are appropriate and adequate (Rubin, 2004). Such is the importance of staff protection that Chaffee and Oster (2006:37) rightly point out "Only a true obsession with self-protection will ensure that staff members are not injured or become ill during disaster response."

The importance of staff protection was shown during the SARS outbreak in which some health care workers contracted the disease and some died from it. It was estimated that health care workers accounted for about 21% of the cases of SARS worldwide, with Canada having the highest proportion of healthcare workers affected (43%) (Koh *et al.*, 2005:676). There were also reports of significant levels of burnout, psychological distress, and posttraumatic stress disorder among health care workers who responded to the SARS outbreak in Canada, reinforcing the need for staff protection and support during emergencies (Maunder *et al.,* 2006: 1924; Nickell *et al.,* 2004: 793).

In an effort to provide support for staff, a survey by the National Association of Public Hospitals and Health Systems (NAPH, 2007: 1-6) showed that most hospitals in the US had either started or planned to start the provision of medical care for their staff and families, particularly the provision of medications during emergencies such as an infectious disease outbreak. The other measures put in place for emergency situations include sleeping areas for staff who may be

expected to stay at the hospitals for long periods; psychosocial services; shower facilities; communication services; support for staffs' dependents (NAPH, 2007:3). This support helps in curbing the problem of absenteeism, while also contributing to the health and well-being of staff members during disasters.

Effective disaster response requires an adequate supply of qualified and competent staff. This can be achieved through appropriate training and education of the healthcare workers in order to impart the necessary competencies required for responding to disasters. Competencies can be defined as knowledge, skills, abilities, and behaviours needed to carry out a job (Slepski, 2007:100). Although training and education is an important part of the emergency preparedness process, there have been concerns on the lack of an evidence base and standardization of teaching practices (Hsu *et al.,* 2006:1; Slepski 2007:100).

Faced with the challenge of preparing healthcare workers for disaster response as well as the need to assist professional schools to meet this challenge, various organisations, academic institutions, hospitals, governments and non-governmental organisations developed core competencies for healthcare workers and other emergency responders without attempts of harmonizing and standardizing them (Daily *et al.*, 2010:387; Slepski, 2007:100; Subbarao *et al.*, 2008:58). In 2007, Daily *et al.* (2010: 387-398) conducted a review of literature on competencies developed for healthcare providers and found out that: there were various competencies developed by different professional organisations; there was inconsistent and imprecise use of terminology; the competencies had not been accepted universally and they had not been validated through an evidence base. In an effort to standardise core competencies, the American Medical Association Centre formed an expert working group for Public Health Preparedness and Disaster Response. The group reviewed the various sets of competencies and achieved a consensus on a set of competencies, which educators could choose from for their training and education programmes (Subbarao *et al.*, 2008, 57).

There have been concerns over the lack of research that demonstrate that the existing emergency preparedness training addresses appropriate professional competencies and that training of healthcare providers in emergency preparedness is effective (Slepski, 2007:100). Hsu *et al.* (2004:191) investigated the effectiveness of hospital staff mass-casualty incident training

methods. Their research was based on a review of literature by an expert panel, with most of the literature coming from reported training in the US and some for the Middle East, Europe and Asia. The research showed that there was limited evidence on the effectiveness of mass casualty incident training (Hsu *et al.*, 2004:191). In a similar systematic review of literature on disaster training and education, Williams *et al*. (2008:211) concluded that there was insufficient evidence to determine the effectiveness of training in improving healthcare workers' knowledge and skills.

These researches were based on available literature, and not on an actual assessment of healthcare providers' knowledge before and after a training method. In an effort to address this gap Gershon *et al.* (2004:77), conducted a survey on the knowledge, attitudes and concerns of healthcare workers regarding bioterrorism after a brief educational programme and found that most participants reported increased confidence in their ability to recognise, address concerns and treat patients following a bioterrorism attack. Though the research showed that training might be helpful in enhancing the preparedness of healthcare workers, there is still need for more research to contribute to the evidence base.

The US Government, in recognition of the need for an enhanced healthcare capability for disaster response came up with a Homeland Security Presidential Directive-21, which was signed by President Bush in October 2007. The directive called on the nation to promote the establishment of a discipline that recognized the unique principles in disaster-related medicine and public health; provided a foundation for the development and dissemination of doctrine, education, training, and research in this field; better-integrated private and public disaster health systems (Subbarao *et al.,* 2008:57). The field of disaster medicine recognised these directives through training and education of healthcare workers and promoting research to enhance the capability of healthcare systems to respond to disasters.

As noted in Chapter 3 of this study, this field came about because of the marriage between disaster management and emergency medicine. Various Universities in the US and Europe recognised the need for education of healthcare workers and developed curricula for disaster medical sciences, for example the European Masters In Disaster Medicine in Italy and the International Disaster Medical Sciences Fellowship in the US. This would go a long way in

providing the necessary human resources and expertise to prepare for, respond to, and recover from public health emergencies (Subbarao *et al*., 2008:57-58).

Various studies showed knowledge gaps among healthcare workers especially in dealing with bioterrorism and weapons of mass destruction, hence the need for training and education. In one survey conducted in the US, Chen *et al.* (2002:745) found out that only 18% of the respondents had prior bioterrorism training, 75% of the respondents felt that they were not prepared to respond to a bioterrorist attack, and 93% of the respondents believed they needed training regarding response for bioterrorist attacks. In another survey investigating the preparedness for an anthrax attack Rokach *et al.* (2010:637-642) found that most of the healthcare workers who were unprepared and unwilling to respond to an anthrax attack had misconceptions and poor knowledge about the transmissibility of the disease. That showed the importance for appropriate and adequate training and education of healthcare workers, as they are the first contact with patients during disasters.

An effective and efficient disaster response can be achieved through coordination between the various response teams from different sectors (like the fire department, police, environmental health, emergency medical services, and forensic pathology services).Exercises and drills provide a platform for building relationships and ensuring a coordinated response. They provide a way of testing the disaster plans, staffing levels, personnel training, procedures, facilities, equipment and materials (Perry & Lindell, 2003:346).

In the US, the JCAHO made it a requirement that all hospitals should conduct at least two exercises per year, including one community-wide drill (Mehta, 2006:90; Rubin, 2004). The methods used include hospital disaster drills, computer simulations, tabletop exercises and other exercises. They are meant to test the hospital's disaster plan and to familiarise employees with disaster preparedness and response procedures, to incorporate advances in disaster-related procedures into the disaster plan, and to strengthen disaster preparedness based on the lessons learnt and problems identified during the drills (Hsu *et al.*, 2004:2; Mehta, 2006:90).The drills should identify problems and enable resolving of conflicts that might occur in disaster response.

When an exercise or drill does not identify any problems then it would probably have been done using a trivial scenario or an inadequate evaluation (Perry & Lindell, 2003:344). Exercises can

be judged successful when they evaluate the intended objectives and yield action, but only if there is action (Rubin, 2004). Some of the measures for success available in literature include: drills in which hospital employees became familiar with disaster procedure; drills allowing the identification of problems (for example in incident command, communications, triage, patient flow, materials and resources, and security); drills that provided the opportunity to apply lessons learned to disaster response (Hsu *et al.*, 2004:198).

While various studies suggest that hospital disaster drills could be effective in training hospital staff, there is insufficient evidence based on objective data such as pre- and post-test knowledge scores to support the level of effectiveness on drills (Hsu *et al.*, 2004:191,198). Drills alone might not be effective and might need to be augmented by other methods such as lectures. In a study conducted in Israel, Leiba *et al.* (2006:194) discovered that there was no significant improvement in pre-disaster drill test scores (54, 5%) of participants, versus post-disaster-drill scores (59.3%).   That does not make drills less important as a way of training and educating healthcare professionals, though there is need for further research on their effectiveness. The success of drills should not only be based on the improvement in knowledge and skills of healthcare providers, but also on other parameters discussed above (for example that drills are a way of identifying problems and improving them).

4.3 Regional Overview

This section provides an overview of studies on healthcare disaster preparedness and response conducted in the African Region. Like other continents, Africa has had its fair share of disasters and emergencies examples being the famine in Somalia; US Embassy bombings in Kenya and Tanzania in 1998; suicide bombings in Mombassa, Kenya in 2002; suicide bombings in Taba, Egypt in 2004; soccer stadium stampede in Zimbabwe, 2000; and the 2009, 2010, 2011 floods in Northern Namibia. In addition to these emergencies, Africa had the honour of hosting the Rugby World Cup in 1995, and the soccer World Cup in 2010, which could potentially have led to mass causalities. Despite these emergencies and important events, few reports on the healthcare system preparedness and response have been published or made available on electronic databases.

On 07 August 1998 the US Embassies in Nairobi, Kenya and Tanzania were bombed almost simultaneously (approximately nine minutes apart), killing over 200 people and injuring over 5 000 people (Chandler *et al.,* 2002:4). The medical response to those bombings was uncoordinated and inadequate, showing the need for healthcare disaster preparedness and the need for improved emergency management capabilities of both countries (Clack *et al.*, 2002:59). Some of the issues that were raised about the medical response to the bombings included:

- There was no coordination at the scene, most victims were not triaged, and did not receive pre-hospital care. Most of them were transported to hospital via private vehicles and commercial minibuses (Abdallah, 2007:418; Clack, 2002:60).

- Furthermore most of the hospitals were overwhelmed with victims and family members looking for their relatives hindering proper care of the injured victims (Clack, 2002:59). That showed the importance of having disaster plans, which pre-determined areas for treatment and special areas for relatives and friends.

- Nairobi citizens volunteered to donate blood but there was limited capacity to process and store the blood and that hampered the response (Abdallah, 2007:419; Clack *et al.*, 2002:59).

- Both countries had limited experience with incident command organisational management, mass casualty management systems, and procedures for search and rescue which hampered the disaster response (Clack *et al.*, 2002:59)

- The response was further hampered by traffic congestion on the roads and crowds gathering to investigate what had happened (Clack *et al.,* 2002:59-60). That demonstrated the need of proper scene management with establishment of cordons in which only the rescuers and those involved in the response were permitted to enter.

These bombings exposed deficiencies in basic disaster preparedness and emergency medical management capabilities in both countries, which existed despite the high risk of manmade and natural events (Clack *et al.,* 2002; 60). It showed the limited capacity to deal with disasters in those countries and the importance of healthcare disaster preparedness.

On 09 July 2000, during a World Cup qualifying match between Zimbabwe and South Africa at the National Sports Stadium in Harare, a stampede occurred killing 13 people and injuring many (Madzimbamuto, 2003:556). An audit of the medical response to the soccer stampede conducted by Madzimbamuto (2003) showed that the response was suboptimal, and the hospital disaster plan at Parirenyatwa Hospital (a 1 000-bed teaching hospital, which received most of the patients) failed. The audit showed deficiencies in the notification of the incident; management of patients in the casualty department; and the care of patients in the hospital.

In this audit Madzimbamuto (2003:556-559) also found out that:

- While the hospital disaster plan stated that the police had the responsibility of notification of the incident, no notification was done and the hospital casualty department only became aware of the incident when the first patients started arriving at the hospital.

- Furthermore there were no ambulance services present at the stadium regardless of the requirement that the City of Harare should provide ambulances at all mass gatherings and the spectators had to call ambulances using their mobile phones.

- Most of those who were injured were taken to hospital in private cars and so were not triaged and did not receive any pre-hospital care. Even those who were carried by ambulances were also not triaged.

- The casualty was overwhelmed by the injured patients, relatives and friends of the victims, the media, ambulance personnel and some hospital staff who were milling around without offering any care for the patients hindering proper care of the patients.

- Owing to a telephone system that was out of date, staff reinforcements were not called, and there was an industrial action at that time which further hampered the disaster response.

- Regardless of the local standard, which called for the establishment of a control centre, there was no command centre set up and that hampered the response.

This incident showed some deficiencies in the preparedness of the health care system for mass casualty incidents in Zimbabwe. The two incidents discussed above showed the need for improvement in the healthcare preparedness for mass casualties. Despite such incidents, and subsequent audits that show some lessons in healthcare disaster preparedness, there is a paucity of research in healthcare disaster preparedness in the African Region. This might lead to healthcare preparedness and response practices, which are not based on a valid evidence base. In the world of today, we are privileged to have the existence of science and knowledge at our disposal, which should be utilised in order to come up with evidence-based practices.

In Namibia there are no published reports or reports available on electronic databases on the preparedness of healthcare systems for disasters. This research will widen the evidence base in healthcare disaster preparedness at Onandjokwe Lutheran Hospital and other hospitals in Namibia. The research will contribute to the current literature on healthcare preparedness for mass casualty incidents, in Namibia and the African Region.

4.4 Status of Health Sector Emergency Preparedness and Response

Following the December 2004 Tsunami there were calls for WHO to increase its speed and efficiency in its emergency work in order to strengthen its emergency response (WHO/HAC, 2008:6) articulated in resolutions WHA58.1 and WHA59.22. WHA59.22 called on WHO to take the necessary steps to provide technical guidance and support to Member States for building the health sector emergency preparedness and response programmes at national and local levels including a focus on strengthening community preparedness and resilience (WHO, 2007a:12). As a result of those calls, WHO held a consultative meeting with International experts in emergency preparedness and response and came up with a six year strategy for the health sector and community capacity development. During that meeting, the experts highlighted a gap in information on the state of emergency preparedness in Member States. This culminated in a *"Global Assessment of National Health Sector Emergency Preparedness and Response"*, which called on Member States to assess the health sector emergency preparedness in their countries.

The main purpose of the survey was to assess the state of the health sector emergency preparedness in Member States and to identify gaps in preparedness and the need for technical support by Member States leading to recommendations for action at country, regional and global

level (WHO/HAC, 2008:3). The survey was an observational, cross-sectional study in which ten Member States were selected from each WHO Regional office based on selection criteria requiring one or more of the following as described in WHO/HAC (2008:60-61):

- Prior or current experience with hazards resulting in emergencies.

- Vulnerability (low preparedness for emergency risk management).

- Presence of potential hazards resulting in emergencies.

- Presence of a focal point for emergency preparedness and response.

- Currently receiving relief funds for emergency preparedness and response from international agencies.

The survey came up with the following results, as discussed in WHO/HAC (2008:33-37):

- Most (92%) of the countries participating had experienced an emergency or disaster in the last five years, with all the participating countries in the African Region having experienced a disaster. This highlighted the need for health emergency preparedness programmes for all countries in order to reduce the adverse effects of disasters, particularly in the health sector to save lives during disasters.

- The majority of the countries had been exposed to natural hazards, with a significant proportion (73%) reporting exposure to social hazards and less than half of the countries reporting exposure to technological hazards. This diversity of hazard exposure highlighted the need for an all hazards approach (as discussed above) when coming up with emergency preparedness plans and the need for training of health care workers on the various types of hazards that might affect the health of communities and countries.

- Most of the countries reported the existence of emergency preparedness and response policies. However, the African region had the least number of countries who reported existing policies. This highlighted the need for improvement in emergency preparedness policy in the African region. There was also need to assess the quality of the preparedness policies of those countries reporting their existence. That was not covered in this survey.

- A large number of the participants reported the lack of a dedicated emergency preparedness and response unit within the ministry of health. This calls for the need to train health workers in emergency preparedness and response and come up with an institutional arrangement that allows the ministry of health to participate in emergency preparedness and response as one of the main sectors that could be affected during disasters and emergencies.

- There was also need for countries to form multidisciplinary and multi-sectoral committees in emergency preparedness and response to integrate the different skills from various sectors. Approximately 89% of the respondents reported having such committees, highlighting the need to for improvement.

- This survey confirmed the lack of human resources in emergency preparedness response and recovery in all the participating countries. This impeded the development of emergency preparedness policies and programmes.

This survey demonstrated the need for countries to improve in all aspects regarding health sector emergency preparedness and response. It could be done by encouraging and funding research in health emergency preparedness issues. This study should stimulate further research in health care emergency preparedness in Namibia, and Africa at large in order to address the gaps highlighted by this survey.

4.5 Conclusion

This chapter provided an overview of healthcare disaster preparedness and studies done by other researchers. It showed that most of the studies have been done in the developed countries such as the US. There is a gap in literature in terms of the preparedness of the healthcare system in the African Region and this study would be a step towards filling in of this gap.

CHAPTER 5

PRESENTATION OF RESEARCH FINDINGS

5.1 Introduction

This chapter focuses on the presentation of research findings based on the questionnaire, key informant interviews and the disaster plan checklist. The research explored emergency and disaster preparedness at Onandjokwe Lutheran Hospital. The study further examined the hospital's disaster plan as well as the policies governing emergency and disaster preparedness at the hospital. The study determined the knowledge, attitudes and practices of the healthcare workers regarding disaster and emergency preparedness.

Chapter 3 of the study provided a theoretical framework for the study. It focussed on the processes involved in hospital emergency preparedness process. These processes included: policy development; vulnerability assessment; planning for disasters; training and education; and monitoring and evaluation. These processes will provide a framework for the presentation of results. The results were based on the questionnaire, key informant interviews and the disaster plan checklist. The results presentation was structured as follows:

- **Demographic characteristics**: this provides a description of the demographic characteristics of the study participants based on the questionnaire, which was distributed.

- **Policies:** this provides an overview of the policies governing disaster and emergency preparedness at Onandjokwe Lutheran Hospital based on the key informant interviews.

- **Vulnerability assessment/disaster risk profile**: this section looked at the hazards that were included in the hospital's disaster plan. The section includes the knowledge of the respondents regarding the disasters that occurred or were likely to occur in the area. It includes the respondents' attitudes regarding the hazards in their area. The results in this section are based on the questionnaire and the key informant interviews.

- **Planning for Disasters**: this section of the results provides an overview of the hospital's disaster plan, based on the checklist. It includes the knowledge and attitudes of the respondents regarding hospital disaster planning and their willingness to respond to disasters. This section includes results from the key informant interviews, questionnaire, and the hospital disaster plan checklist.

- **Training and education**: this section provides an overview of the practices of the hospital regarding disaster preparedness. It includes issues of training and educating staff on disaster preparedness.

- **Monitoring and evaluation**: this section is on practices of the hospital regarding disaster preparedness and provides an overview of systems in place, if any, for monitoring and evaluating the emergency preparedness process of the hospital and is based on the key informant interviews and the questionnaire.

5.2 Demographic Characteristics

This section looks at the gender, age, education level, duty station, work experiences, and the current position held by the respondents. The age distribution of the respondents is shown in Figure 12.
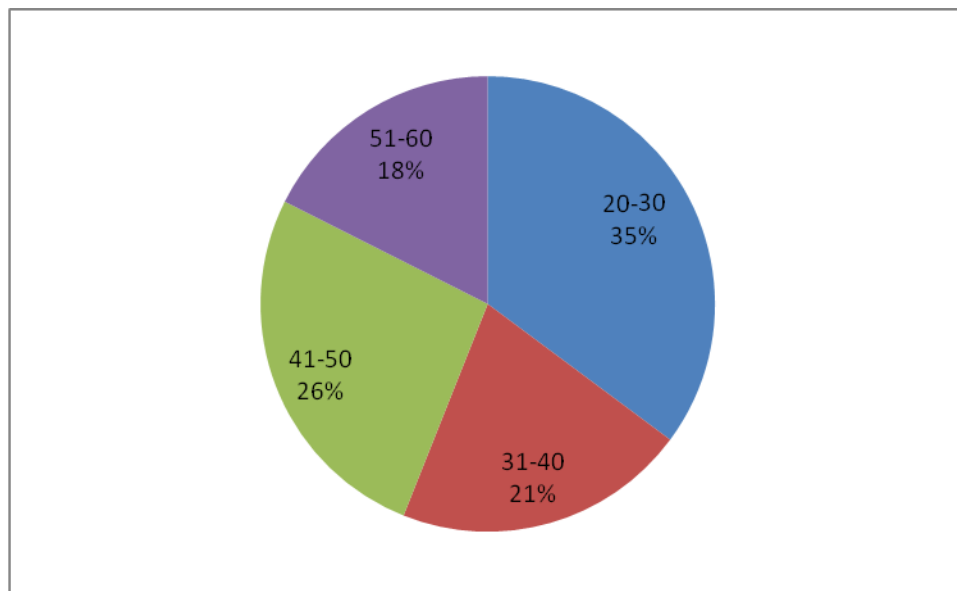
Figure 12: Distribution of respondents by age

Most of the respondents were in the 20-30 age group (35%). The 31-40 age group contributed to 21 % of the respondents, while those in the 41-50 age group were 26% and those in the 51-60 age group were 18%.

5.2.1 Staff category, gender and work experience

The sampling method, which was used, was based on the current position held by the respondent. Table 6 summarises the distribution of the respondents based on their position at the hospital.

TABLE 6: DISTRIBUTION OF RESPONDENTS BASED ON CURRENT POSITION

	Frequency	%	Valid %	Cumulative %
Medical Officer	9	10	10	10
Registered Nurse	35	38.9	38.9	48.9
Pharmacist	2	2.2	2.2	51.1
Laboratory scientist	7	7.8	7.8	58.9
Enrolled Nurse	25	27.8	27.8	86.7
Other	12	13.3	13.3	100.0
Total	90	100	100	

Table 6 shows that most of the respondents were registered nurses (38.9%), followed by enrolled nurses (27.8%). Twelve of the respondents (13.3%) belonged to the group, 'other' which was comprised of pharmacy assistants, radiographer assistants, clerical staff, receptionists, switchboard operators and porters. The medical officers accounted for nine of the respondents (10%). Seven of the respondents (7.8%) were laboratory scientists, while two (2.2%) were pharmacists.

Most of the respondents were female (73.6%) while 26.4% of the respondents were male as shown in Table 7. Table 7 shows the gender distribution per category of staff.

TABLE 7: GENDER DISTRIBUTION PER STAFF CATEGORY

Position	Female	Male	Grand Total
Enrolled Nurse	80 %	20 %	100 %
Laboratory scientist	71.4%	28.6%	100 %
Medical Officer	33.3%	66.7%	100 %
Other	58.3%	41.7%	100 %
Pharmacist	50 %	50 %	100 %
Registered Nurse	88.6%	11.4%	100 %
Grand Total	**73.6%**	**26.4%**	**100 %**

According to Table 7 the enrolled nurse category had 80% female respondents and 20% male respondents. The registered nurses category contributed the highest proportion of female respondents and had 88.6% female and 11.4% male respondents. 71.4% female respondents and 28.6% male respondents represented the laboratory scientists, while the 'other' category had 58.3% females and 41.7% males. Most of the staff categories had a higher proportion of females than males except for the medical officers who had more male respondents (66.7%) than female respondents (33.3%); the pharmacists had equal representation (50%).

Respondents were asked how many years they had worked in their current position and the results are summarised in Table 8.

TABLE 8: WORK EXPERIENCE

	Years				
Position	**1-5 years**	**5-10 years**	**10-15 years**	**More than 20 years**	**Grand Total**
Enrolled Nurse	56.0%	32.0%	4.0%	8.0%	100 %
Laboratory scientist	85.7%	0.0%	0.0%	14.3%	100 %
Medical Officer	55.6%	33.3%	11.1%	0.0%	100 %
Other	50.0%	33.3%	8.3%	8.3%	100 %
Pharmacist	0.0%	50.0%	50.0%	0.0%	100 %
Registered Nurse	48.6%	20.0%	17.1%	14.3%	100 %
Grand Total	**52.7%**	**26.4%**	**11.0%**	**9.9%**	**100 %**

Table 8 shows that most of the staff members (52.7%) worked in their current positions for one to five years while 26.4% of the respondents worked in their current positions for five to ten years. Only 11% of the respondents worked for 10-15 years, and 9.9 % worked for more than 20 years in their current positions. None of the respondents worked for the period 15-20 years and so it was excluded from the analysis. Most of the staff categories had higher proportions of staff with one to five years experience in their current positions. Those included the enrolled nurses with 56%, the laboratory scientists with 85.7%, the medical officers with 55.6%, the registered nurses with 48.6%, and the "other" category with 50% of the respondents who worked for one to five years. None of the respondents in the medical officer, pharmacist or administrator category had more than 20 years experience in their current positions.

5.2.2 Duty station

The participants were asked do indicate their duty station. The results are summarised in the Figure 13.
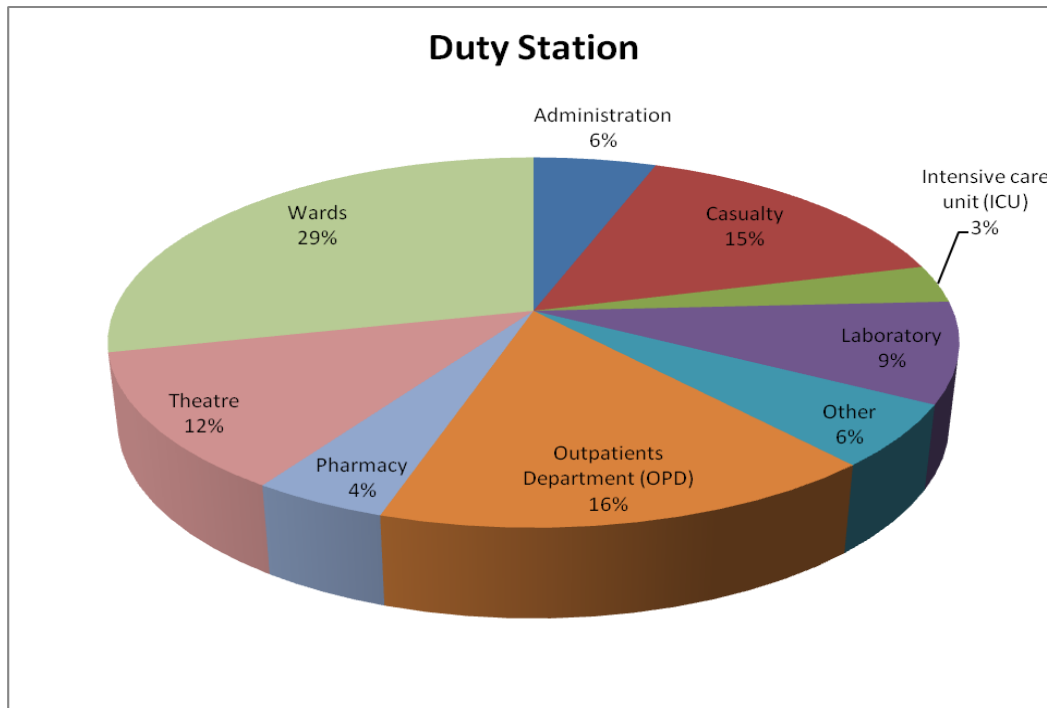
Figure 13: Distribution of respondents per duty station

As shown in Figure 13, most of the respondents worked in the wards (29%) followed by outpatients department (16%), then casualty (15%). Those working in casualty and outpatients department would be at the forefront when disasters occurred. The other duty stations represented were theatre (12%), laboratory (9%), administration (6%), pharmacy (4%), intensive care unit (3%), and the "other" category with (6%). The other category included the radiology department, the primary healthcare clinic at the hospital and the HIV clinic.

5.2.3 Level of education

The highest level of education of the respondents is shown in Figure 14, namely that 28 (30.8%) of the respondents had diplomas as their highest level of education. Those who had attained certificate level as their highest level of education 25 (27.5%) respondents followed this. Those who had postgraduate degrees were 18 (19.8%) while those who had secondary school education

were 12 (13.2%), with undergraduate degrees eight (8.8%). None of the respondents were in the "no schooling" category. There were no respondents with only primary school level.
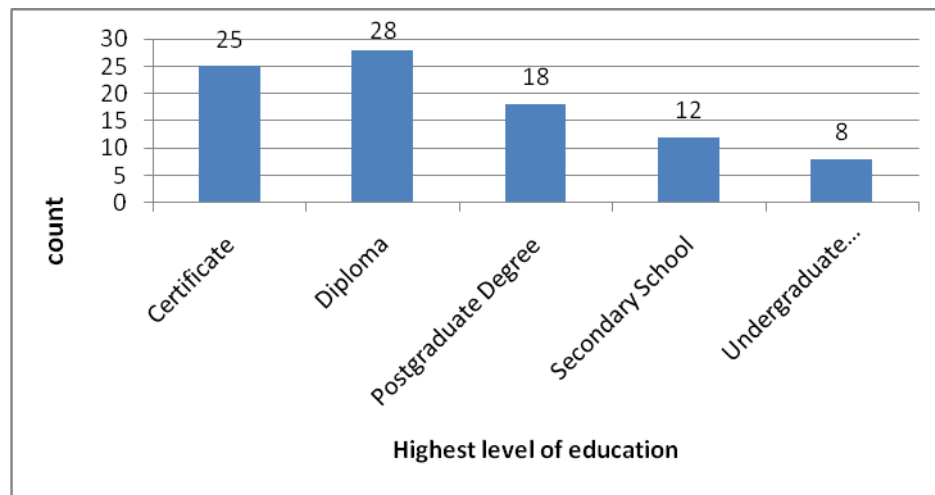
Figure 14: Distribution of respondents based on highest level of education

5.3 Disaster Policies

The research looked at the legislation governing disaster and emergency preparedness at Onandjokwe Lutheran hospital. They are:

i.   National Health Emergency Preparedness and Response Plan of April 2003.
ii.   The Namibia National Disaster Risk Management Policy (NDRM) of 2009.
iii.   The Emergency Preparedness and Response Plan of March 2009.

According to the key informants that were interviewed, the above policies cover what is needed by the hospital in terms of emergency preparedness of the health sector. These policies are discussed in the next chapter in which the researcher will provide a critical review of the policies.

5.3.1 National Health Emergency Preparedness and Response Plan (NHEPRP) (2003)

This plan came about because of epidemics that had recently occurred prior to 2003. That was because of the need to ensure appropriate response in times of emergency to prevent the unnecessary loss of lives (NHEPRP, 2003:4). The plan called for the establishment of committees in all regions responsible for the development of emergency preparedness and

response plans at all levels of the Ministry of Health and Social Services (MoHSS). The main objectives that were listed in the plan included (NHEPRP, 2003:4-5):

- Define the roles and responsibilities of each level in the MoHSS.

- Identify required resources for preparedness and response to implement the Integrated Disease Surveillance (IDS) in the MoHSS.

- Making budget projections for the operation of the health emergency management system.

- Reduction of the impact of emergencies in all centres.

- Ensuring that appropriate action is taken during emergencies to reduce mortality and morbidity.

- Minimize the effects of hazards by ensuring precautionary measures are in place to prevent further damage and spread of diseases.

The plan focused mainly on disease surveillance and management of epidemics. This plan will be reviewed Chapter 6.

5.3.2 Emergency Preparedness and Response Plan (EPRP, 2009)

This plan came about as an amendment of the 2003 NHEPRP. It was because of the need to have a coordinated response to flood disasters. The objective of the plan was to prepare for and conduct a timely, consistent and coordinated response to minimize the humanitarian consequences of the flood on the Namibian people (EPRP, 2009: 11). In addition, the MoHSS was called upon to offer humanitarian assistance to the affected population and to assist in vulnerability reduction. The plan focused mainly on flood disasters and the role of the MoHSS.

5.3.3 Namibia National Disaster Risk Management Policy (NDRM, 2009)

The NDRM is the policy that governs disaster risk management in Namibia for all sectors. That is because currently the country did not have a disaster management Act. It is still in the process of being formulated. In the absence of a legal framework governing disaster risk management in

Namibia, the Government of Namibia has committed itself to the establishment of a National Policy for disaster risk management "to effectively give direction and define the parameters for the implementation of the concept of total disaster risk management" (NDRM, 2009:6). The goal of the policy is to strengthen the national capacities for the reduction of disaster risk and in building community resilience to disasters.

5.4 Vulnerability Assessment

The research looked at the disaster risk profile of the hospital. Key informant interviews were conducted to find out about the disaster risk profile and how the profiling had been done. According to key informants, the hospital relied on a vulnerability assessment done by the WHO in 2009. The hospital had since then not conducted any assessments of its own. For planning purposes, the hospital relied on information from the management information systems (MIS) in which the cases seen at the hospital within in a year were ranked according to frequency. When the cases were ranked, the hospital would prepare and plan for the cases depending on the results. Statistics revealed that the emergency department saw mostly cases because of motor vehicle accidents. The hospital disaster plan listed the following possible hazards in Table 9.

TABLE 9: ONANDJOKWE HOSPITAL DISASTER RISK PROFILE

Disaster	Likelihood	Occurrence status in past five years	Current response level/ experience
MVA- mass casualties	Very likely	Frequent more than three times per year	good
Flooding	Likely	Twice	fair
Fire and lightning	Likely	Small occasions only	fair
Gastroenteritis Food poisoning	Very likely	Frequent in winter and festive season	Fair
Measles or infectious disease outbreak	Likely	more than once a year	Fair
Building collapse	Possible	Not yet	Unknown

(Source, Onandjokwe Hospital draft disaster plan, 2011: 2)

The respondents were asked whether they were aware of any disasters that occurred in their area in the past five years. That was done in order to assess their knowledge on disasters and to find out whether they would concur with the disaster risk profile of the hospital presented in Table 9. The results are shown in Table 10.

TABLE 10: DISASTER AWARENESS

Current Position	Are you aware of any disasters that have occurred in your area in the past 5 years?		
	Yes	No	Total
Medical Officer	77.8%	22.2%	100.0%
Registered Nurse	80.0%	20.0%	100.0%
Pharmacist	100.0%	.0%	100.0%
Laboratory scientist	71.4%	28.6%	100.0%
Enrolled Nurse	72.0%	28.0%	100.0%
Other	83.3%	16.7%	100.0%
Total(all categories)	**78.0%**	**22.0%**	**100.0%**

Most of the respondents (78%) indicated that they were aware of disasters that occurred in their area in the past five years. All of the staff categories had greater percentages of those who knew, than those who did not know (for example of the medical officers who completed the questionnaire 77.8% indicated that they were aware while 22.2 % of them were not aware). The respondents were asked to list the disasters that occurred in the area. The disasters listed by the respondents included floods, fires and motor vehicle accidents. That might be because the region in which the hospital was located had experienced floods in the past four years and that most of the emergency cases that were seen at the hospital were motor vehicle accidents. Furthermore, there had been a fire at the hospital a week prior to the administering of the questionnaires.

The respondents were asked to list disasters that they thought were likely to occur in their area. The disasters listed by most of the respondents included floods, motor vehicle accidents, disease epidemics and fire. Some of the respondents included chemical spills as possible disasters that could occur in the region. That might be because of the proximity of the hospital to the main road, which was used by heavy vehicles some of which might be carrying harmful chemicals. The disasters mentioned by the respondents were also similar to those listed in the disaster plan. That meant that the respondents had the knowledge of hazards that might affect the hospital.

The respondents were further asked whether they thought the disasters were likely to affect the hospital. That was in an effort to determine their attitudes. The results are shown in Table 11.

TABLE 11: LIKELIHOOD OF DISASTERS OCCURRING IN THEIR AREA

Current Position	The hospital is unlikely to be affected by disasters.			
	Agree	Not Sure	Disagree	Total
Medical Officer	11.1%	11.1%	77.8%	100.0%
Registered Nurse	14.3%	.0%	85.7%	100.0%
Pharmacist	.0%	.0%	100.0%	100.0%
Laboratory scientist	28.6%	.0%	71.4%	100.0%
Enrolled Nurse	20.0%	8.0%	72.0%	100.0%
Other	33.3%	8.3%	58.3%	100.0%
Total(all categories)	**18.7%**	**4.4%**	**76.9%**	**100.0%**

Table 11 indicates that most of the respondents were aware that the hospital could be affected by disasters. All the staff categories had higher proportions of staff that disagreed with the statement that the hospital was unlikely to be affected by disasters (for example of all the enrolled nurses who filled out the questionnaire, 72.0% of them disagreed while 8.0% were not sure and 20% agreed). That meant that the healthcare workers at Onandjokwe Hospital were aware of the hazards that surrounded them, and they were aware that those hazards could affect the hospital. That would make them have a positive attitude towards disaster preparedness.

5.5 Hospital Disaster Planning

When disasters occur, hospitals are among the first institutions to be affected. That is why they need to have disaster plans in place to manage possible large influx of victims seeking help. In addition, an important element in the maintenance of a high level of preparedness is the maintenance of adequate staff that is knowledgeable and capable of responding to disasters. The respondents were asked about the preparedness of their hospital for emergencies and disasters as well as what they felt about the staff compliment.

TABLE 12: RESPONDENTS ATTITUDES ON STAFF LEVEL AND HOSPITAL PREPAREDNESS

	Agree	Disagree	Not sure
1. The hospital is adequately prepared to manage any type of disaster or emergency in which there is a large influx of patients.	19.8%	56.0%	24.2%
2. The hospital has an adequate staff compliment to deal with a sudden large influx of patients during disasters or emergencies.	38.5%	39.6%	22.0%

Table 12 shows that the respondents were not confident about their hospital's preparedness for disasters as only 19.8% of them agreed that the hospital was adequately prepared. The key informants were of the opinion that their hospital was adequately prepared. The respondents did not think that their hospital had an adequate staff complement to manage disasters. According to

the Onandjokwe Health District Annual Report (2009:12), the hospital had a staff shortage of 6.8 % and even if the posts were filled there would still be a shortage of staff at the hospital. In terms of staff responding to emergencies and disasters, the key informants were of the opinion that they had adequate staff as they would move staff from other duty stations. That had the potential of creating a gap in the other duty stations limiting their response capacity as well as their capacity to continue with their day-to-day activities.

This research also determined the knowledge and attitude of health staff regarding disaster preparedness. It also looked at the Onandjokwe Lutheran Hospital disaster plan. Presented in the next section are the results of the knowledge and attitudes of health staff regarding the disaster planning process. The section also presents the Onandjokwe Hospital Disaster plan.

5.5.1 Knowledge

5.5.1.1 The role of hospitals in disasters

It is important that staff become familiar with their role during disasters. The respondents were asked about the role of hospitals in disasters. The results are indicated in Table 13.

TABLE 13: AWARENESS OF THE ROLE OF HOSPITALS DURING DISASTERS

Current Position	Are you aware of the role of hospitals during disasters/emergencies?		
	Yes	No	Total
Medical Officer	66.7%	33.3%	100%
Registered Nurse	65.7%	34.3%	100%
Pharmacist	100.0%	.0%	100%
Laboratory scientist	42.9%	57.1%	100%
Enrolled Nurse	52.0%	48.0%	100%
Other	66.7%	33.3%	100%
Total(all categories)	**61.5%**	**38.5%**	**100%**

In Table 13 most of the respondents (61.5 %) were aware of the role of hospitals during disasters. Comparing the various staff categories showed that the pharmacists were the majority who said they were aware of the role as all of the respondents who completed the questionnaire in the pharmacist category indicated that they were aware of the role of hospitals during disasters and emergencies. Most of the respondents who completed the questionnaire in the laboratory scientist category (51.7%) were not aware of the role of hospitals during disasters while 42.9%

of them were aware of the role of hospitals in disasters and emergencies. Those who were aware of the role of hospitals were asked to list what they thought the role of the hospital would be during disasters. The main role listed was that of treating the casualties, while some mentioned provision of psychosocial services to the disaster victims.

5.5.1.2 Knowledge about the disaster plan

The respondents were asked whether their hospital had a disaster plan and if they knew it had a plan they were asked about the contents of the plan. The results are shown in Table 14.

TABLE 14: KNOWLEDGE ABOUT THE DISASTER PLAN

Current Position	Does your hospital have a disaster plan?			
	Yes	**No**	**Don't know**	**Total**
Medical Officer	33.3%	.0%	66.7%	100.0%
Registered Nurse	42.9%	2.9%	54.3%	100.0%
Pharmacist	.0%	.0%	100.0%	100.0%
Laboratory scientist	.0%	14.3%	85.7%	100.0%
Enrolled Nurse	24.0%	8.0%	68.0%	100.0%
Other	8.3%	25.0%	66.7%	100.0%
Total	**28.6%**	**7.7%**	**63.7%**	**100.0%**

Most of the respondents (63.7%) did not know whether their hospital had a disaster plan or not. That might be because the disaster plan was at the draft stage and had been at that stage for more than two years (Onandjokwe Health District, 2009:55). The entire pharmacist category (100%) and most of the laboratory scientists (85.7%) did not know whether the hospital had a disaster plan or not. Some of the respondents (7.7%) indicated that the hospital did not have a disaster plan. In the enrolled nurses' category 24.0%, thought there was a plan. It could not be ascertained whether they knew for sure that the hospital did not have the plan or they said 'no' because they did not know about the hospital disaster plan.

Of those who had indicated that the hospital had a disaster plan, 82.4 % of them indicated that they were not familiar with the contents of the plan, while 17.6 % indicated that they were familiar with the contents. Only 22.2% of the medical officers, 25.7% of the registered nurses, 12% of the enrolled nurses and eight per cent in the 'other' staff category knew about the

contents of the disaster plan, while none of the pharmacist and laboratory scientists knew about the hospital disaster plan. The results show poor knowledge of the hospital disaster plan.

The respondents were asked whether they knew what a hospital disaster plan should contain. The results are indicated in Table 15, which shows that most of the respondents (70.3%) did not know about what a hospital disaster plan should contain, while 29.7 % of the respondents indicated that they knew what a hospital disaster plan should contain.

TABLE 15: AWARENESS OF MAJOR COMPONENTS OF A DISASTER PLAN

Current Position	Are you aware of the major components/issues that must be included in a hospital disaster plan?		
	Yes	**No**	**Total**
Medical Officer	33.3%	66.7%	100.0%
Registered Nurse	42.9%	57.1%	100.0%
Pharmacist	.0%	100.0%	100.0%
Laboratory scientist	.0%	100.0%	100.0%
Enrolled Nurse	24.0%	76.0%	100.0%
Other	16.7%	83.3%	100.0%
Total	**29.7%**	**70.3%**	**100.0%**

According to Table 15 most of the staff categories had higher proportions of respondents who were not aware of the components of a disaster plan than those who were aware (for example of all the registered nurses who completed the questionnaire 57.1 % of them were not aware while 42.9% of them indicated that they were aware). The poor knowledge was recorded in all of the staff categories as most of them indicated that they did not know what a disaster plan should contain. Those who had indicated that they knew what a disaster plan should contain were asked to list the contents. The following are the contents that the respondents suggested:

- The plan should contain hazards such as fire, floods and motor accidents.

- There should be management of disaster victims.

- There should be evacuation of staff and patients.

- The plan should contain issues of training and education.

While the majority of the respondents did not know what disaster plans should contain, those who indicated that they knew, showed that they had the knowledge by listing the components as shown above.

The poor knowledge about the plans may be because it is still in the draft stage and because the majority of the staff had never participated in the drafting or reviewing of the plan as shown in the results below:

TABLE 16: PARTICIPATION IN DEVELOPING THE HOSPITAL DISASTER PLAN

Current Position	Have you participated in developing or reviewing the hospital disaster plan?		
	Yes	**No**	**Total**
Medical Officer	.0%	100.0%	100.0%
Registered Nurse	11.4%	88.6%	100.0%
Pharmacist	.0%	100.0%	100.0%
Laboratory scientist	.0%	100.0%	100.0%
Enrolled Nurse	.0%	100.0%	100.0%
Other	.0%	100.0%	100.0%
Total	**5.5%**	**94.5%**	**100.0%**

The results in Table 16 indicate that most of the staff (94.5%) had not participated in the development or reviewing of the hospital disaster plan. Only some of the registered nurses indicated that they had participated in the development of the hospital disaster plan. Those could have been members of the hospital disaster committee.

The respondents were also asked to rate their current knowledge in managing emergencies and disasters. The results are indicated in Table 17. As shown in the table, only 3.3% of the respondents indicated that they had excellent knowledge while 31.4% rated their knowledge as good, 42.9% rated their knowledge as fair and 19.8% indicated that they had poor knowledge. Most of the staff categories had higher proportions of respondents who indicated that they had a fair amount of knowledge regarding the management of emergencies and disasters. Only some of the registered nurses (2.9 %), enrolled nurses (4.0%), and the 'other' staff category (8.3%) indicated that they had excellent knowledge on managing emergencies and disasters. The results indicate that most of the staff categories had some respondents who were of the opinion that their knowledge was poor.

TABLE 17: RATING OF KNOWLEDGE BASED ON CURRENT POSITION

Current Position	How would you rate your current knowledge regarding the management of situations in which there is a sudden influx of a large number of patients at the hospital due to an emergency or disaster?				
	Excellent	**Good**	**Fair**	**Poor**	**Total**
Medical Officer	.0%	44.4%	44.4%	11.1%	100.0%
Registered Nurse	2.9%	28.6%	54.3%	14.3%	100.0%
Pharmacist	.0%	50.0%	50.0%	.0%	100.0%
Laboratory scientist	.0%	14.3%	42.9%	42.9%	100.0%
Enrolled Nurse	4.0%	36.0%	28.0%	32.0%	100.0%
Other	8.3%	41.7%	41.7%	8.3%	100.0%
Total	**3.3%**	**34.1%**	**42.9%**	**19.8%**	**100.0%**

The results in the knowledge section indicate that the respondents knew about the role of hospitals in disasters. Most of them, however, did not know whether their hospital had a disaster plan or not, and most of those who knew about the hospital's disaster plan were not familiar with its contents. Most of them indicated that they did not know what a hospital disaster plan should contain. The respondents had a fair amount of knowledge about disaster and emergency preparedness. All this indicated the need for training and education on hospital emergency and disaster preparedness.

5.5.2 Attitudes and willingness to report for duty

This section is on the attitudes of the healthcare workers regarding hospital disaster planning. It also highlights the willingness of the healthcare workers to report for duty during infectious disease outbreaks, and some of the concerns that the healthcare workers may have about working during disasters and especially when the disaster involves an infectious disease.

5.5.2.1 Attitudes

The respondents were presented with various statements to respond to. The results of their responses are shown in Table 18.

TABLE 18: ATTITUDES OF RESPONDENTS

	Agree	Disagree	Not sure
Hospitals should have disaster plans to manage situations in which there is a large influx of patients.	90.1%	1.1%	8.8%
Only Doctors and nurses need to know about disaster plans.	5.5%	92.3%	2.2%
Disaster planning is only for the hospital's administrative staff	5.5%	93.4%	1.1%
I do not need to know about disaster plans	12.1%	84.6%	3.3%
The hospital is unlikely to affected by disasters	18.7%	76.9%	4.4%
Healthcare workers need training and education on how to manage situations in which there is a large influx of patients during disasters/emergencies	91.7%	0.0%	8.3%
Hospitals should conduct regular drills/exercises on how to manage a sudden large influx of patients during disasters or emergencies	85.7%	7.7%	6.6%

The results in Table 18 indicate a positive attitude towards the disaster planning process by the majority of respondents who either agreed or disagreed. Most of the respondents agreed that:

- Hospitals should have disaster plans (90.1%).

- Healthcare workers needed training and education on how to manage emergencies and disasters (91.7%).

- Hospitals should conduct regular drills/exercises.

The respondents also knew that:

- Not only doctors and nurses needed to know about disaster plans.

- Disaster planning was not only for administrative staff.

- The hospital could be affected by disasters.

- They needed to know about disaster plans.

5.5.2.2 Willingness to report for duty

Staff that was willing to report for duty during disasters or emergencies had to indicate whether they would. It is important in the planning phase so that there could be predictions of the probable human resource capacity during disasters. The research looked at the willingness of healthcare workers to be called for duty during disasters and emergencies. The results are discussed in this section.

The respondents were asked the following question: *"If you were not on duty and were asked to come to work because the hospital has had a large number of casualties to take care of as a result of a disaster, would you be willing to do so?"* The majority of the respondents (95.6%) indicated that they would be willing to report for duty. The reason given for their willingness was that as healthcare workers, they had a moral duty to take care of patients. Those who indicated that they would not be willing did not give reasons for their unwillingness.

The willingness to report for duty changed when the respondents were given a scenario that," in the event of an infectious disease with an increased risk of contacting the diseases", would they be willing. The results are shown in Table 19.

TABLE 19: WILLINGNESS TO RESPOND DURING AN INFECTIOUS DISEASE OUTBREAK

Current Position	Willing to work even at risk of contracting the disease.			
	Agree	**Not Sure**	**Disagree**	**Total**
Medical Officer	55.6%	22.2%	22.2%	100.0%
Registered Nurse	65.7%	14.3%	20.0%	100.0%
Pharmacist	.0%	.0%	100.0%	100.0%
Laboratory scientist	28.6%	.0%	71.4%	100.0%
Enrolled Nurse	56.0%	12.0%	32.0%	100.0%
Other	50.0%	.0%	50.0%	100.0%
Total	**54.9%**	**11.0%**	**34.1%**	**100.0%**

Table 19 shows that only 54.9% of the respondents would be willing to work during an infectious disease outbreak. It shows that none of the pharmacists would be willing to work during an infectious disease outbreak. The registered nurses had the highest proportion of respondents who would be willing to work (65.7% of the registered nurses who completed the questionnaire). Of the medical officers who completed the questionnaire, 55.6% indicated that they would be willing to work during an infectious disease outbreak. The willingness to come to work was also compared with perceived knowledge and the results a shown in Table 20.

TABLE 20: WILLINGNESS TO REPORT FOR DUTY BASED ON CURRENT KNOWLEDGE

Current knowledge of management during emergency or disaster	Willing to work based on current knowledge			
	Agree	**Not Sure**	**Disagree**	**Total**
Excellent	100.0%	.0%	.0%	100.0%
Good	55.6%	11.1%	33.3%	100.0%
Fair	54.8%	6.5%	38.7%	100.0%
Poor	51.3%	15.4%	33.3%	100.0%
Total	**54.9%**	**11.0%**	**34.1%**	**100.0%**

Table 20 shows that all of those with perceived excellent knowledge on management of disasters and emergencies were willing to come to work. The willingness to respond during an infectious disease also decreased with perceived knowledge. The table indicates 55.6% with good knowledge, 54.8% with fair knowledge, and 51.3% with poor knowledge agreed that they would be willing to respond to infectious disease outbreaks. This shows that knowledge might affect the willingness of healthcare workers to respond to emergencies and disasters.

Using the same scenario of infectious diseases the respondents were presented with statements and asked to agree or disagree, trying to determine their attitude and concerns about responding to emergencies and disasters involving infectious diseases. The results of are shown in Table 21.

TABLE 21: PERCEPTIONS AND WILLINGNESS TO REPORT DURING INFECTIOUS OUTBREAK

In the event of an infectious disease with an increased risk of contracting the disease:	MO Agree (%)	RGN Agree (%)	PH Agree (%)	LS Agree (%)	EN Agree (%)	OT Agree (%)	Total Agree (%)
I am willing to work even if am at risk of contracting the disease	55.6	65.7	0.0	28.6	56.0	50	54.9
I accept that the risk is part of my job	88.9	74.3	50	28.6	76.0	50.0	69.2
I am confident that the hospital will offer me adequate protective measures to reduce the risk of contracting the disease	55.6	57.1	50.0	57.1	60.0	75.0	60.4
I am confident that the hospital management will take care of my medical needs if I contract the disease	44.4	37.1	50.0	14.3	48.0	83.3	45.1
I accept that as a healthcare worker it my duty to take of patients	100	97.1	100	100	100	91.7	97.8
I am afraid that if I do not come to work I will lose my job	22.2	54.3	100	85.7	84.0	50	62.2
I will not come to work because I am afraid of falling ill	33.3	11.4	0.0	14.3	8.0	25.0	14.3
I will not report for duty because am afraid of spreading the disease to my family and friends	11.1	8.6	0.0	0.0	8.0	16.7	8.8

Key: MO (Medical Officer); RGN (Registered Nurse); PH (Pharmacist); LS (Laboratory Scientist); OT (other); EN (Enrolled Nurse)

In Table 21 the total column represents respondents who agreed with the statement. The table shows that the majority of the respondents accepted that the risk of getting an infection was part

of their job (69.2%), and were confident (60.4%) that the hospital would offer them personal protection during infectious disease outbreaks. However, though the majority accepted the risk and were confident, there were also those who were not sure or disagreed with the statements. They might form a significant proportion, particularly when they were not willing to report for duty because they did not accept the risk, and were not convinced that they would have protective clothing. That could be significant for a hospital that was already short of staff like Onandjokwe Hospital.

Only 45.1% of the respondents were confident that the hospital would take care of their medical needs if they were to contract an infectious disease during response, which could significantly influence their willingness to report for duty. Though some might not be willing to report for duty, the majority of the respondents (62.2%) might come to work because they were afraid of losing their jobs. However, there was still a proportion of those who were either not sure (9.9%) or unwilling (27.5%). Most of the respondents (97.8%) accepted that they should take care of patients, and that it was their duty to do so. That was a welcome positive attitude, which could influence the respondents' willingness to report for duty.

The majority of the respondents (79.1%) indicated that they were not afraid of falling ill, while a certain proportion of the respondents (14.3%) might not come to work because they were afraid of falling ill, and those who were not sure whether they would come to work or not (6.6%). Some of the respondents (8.8%) indicated unwillingness to respond because of fear of spreading the disease to their family and friends, while 4.4% of the respondents indicated that they were not sure, and 86.8 % would be willing. The willingness to respond for duty is important for planning purposes, particularly when planning for staff. Comparing the various staff categories Table 21 shows that:

- The registered nurses (65.7%) were more willing to report for duty.

- The Medical Officers (88.9%) were more willing to accept the risk of contracting the disease as part of their job. The registered nurses (74.3%) and enrolled nurses (76%) were also willing to accept the risk.

- Most of the staff categories had 60% or less of the respondents who were confident that the hospital would offer them adequate personal protective equipment. That might influence their willingness to report for duty during infectious disease outbreaks.

- Most of the staff categories had 50% or less of the respondents who were confident that the hospital would take care of their medical needs when they were infected by an infectious disease during response.

- All of the staff categories accepted that they had the duty to take care of patients during disasters.

- Very few of the medical officers (22.2%) were afraid that if they did not come to work they might lose their jobs.

- Though only 14.3% of the healthcare workers would not come to work because they were afraid of falling ill, about one third of the medical officers might not come because they were afraid of falling ill. That might be a significant proportion especially at a hospital with a shortage of staff.

TABLE 22: PERCEPTIONS AND WILLINGNESS TO REPORT FOR DUTY BASED ON GENDER

In the event of an infectious disease with an increased risk of contracting the disease	Male Agree (%)	Female Agree (%)
I am willing to work even if am at risk of contracting the disease	45.8	58.2
I accept that the risk is part of my job	79.2	65.7
I am confident that the hospital will offer me adequate protective measures to reduce the risk of contracting the disease	58.3	61.2
I am confident that the hospital management will take care of my medical needs if I contract the disease	54.2	41.8
I accept that as a healthcare worker it my duty to take of patients	100	97.0
I am afraid that if I do not come to work I will lose my job	62.5	62.7
I will not come to work because I am afraid of falling ill	29.2	9.0
I will not report for duty because am afraid of spreading the disease to my family and friends	8.3	9.0

Table 22 shows the results of the perceptions and willingness of the respondents to report for duty based on gender and it shows that there were more females (58.2%) who were willing to report for duty than males (45.8%); more males (79.2%) accepted the risk of getting an infection

as part of their job than females (65.7%). The results show that 58.3% of the males and 61.2% of the females were confident that the hospital would offer adequate personal protection, while 54.2% males and 41.8% females were confident that the hospital would take care of their medical needs if they were to be affected by an infectious disease. Both males (100%) and females (97%) accepted that as healthcare workers it was their duty to take care of patients; more males (29.2%) than females (9%) were afraid of falling ill. There were no significant differences in terms of fear of spreading the disease to family and friends and fear of losing jobs.

5.5.3 Onandjokwe Lutheran Hospital disaster plan

The research also looked at the Onandjokwe Lutheran Hospital disaster plan. A checklist was used in order to find out whether the plan contained the recommended issues. The results are presented below.

5.5.3.1 General considerations

- The disaster plan was still at the draft stage. That was reflected in the Onandjokwe Health District annual reports (2008, 2009). It meant that the plan had been at that stage for over a year. However, the draft plan presented during the Tuesday clinical meeting in October 2011 was in the process of being finalised.

- The hospital had a multidisciplinary disaster committee, which included members of most of the departments at the hospital.

- The draft plan covered only external disasters but not internal disasters.

- The plan had not yet included the response to different hazards. However, it listed the hazards that the hospital should prepare for: motor vehicle accidents, flooding, fire, gastrointestinal diseases, other disease outbreaks and collapse of building.

- The plan did not show which of the hazards had the highest risk score. The hazards were not ranked according to risk.

- There were agreements with other hospitals. Those were based on a mutual understanding and there were no written agreements.

5.5.3.2 Command and control

When responding to disasters, one of the first aspects is to establish a command and control centre from where all the coordination of the response would take place. The draft plan was checked for issues related to command and control. It was found that:

- The command and control centre was located in the administration block away from casualty.
- The form of communication from the command centre was through the hospital fixed phone.
- There was no area, which had been designated as an alternative command and control centre.
- The members of the command and control centre included the control officer, Nurse Manager and the medical superintendent.

- The duties of those in the command and control centre were described in the disaster plan.

5.5.3.3 Communication

Communication is of paramount importance during disasters as failure to communicate can hamper the response. At Onandjokwe Hospital:

- Communication was mainly through the hospital fixed phone and cellular phones.
- There was an established system of communication between the command centre and the staff members in various departments.
- Alternative communication in the event of failure of the normal channels would be by using a runner. There were no radio systems for use during power outages or when the system was overloaded.
- Activation of the disaster plan would be done by the Medical Superintendent or supervisor on duty, in consultation with a member of the management committee.
- Once activated the various staff departments would then be notified by the members of the incident command.

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│         ║ Hospital Disaster Response         ║               │
│         ║ Coordination                       ║               │
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│  │ Information source,   │  │ Medical Superintendent/  │     │
│  │ anybody who receives  │→ │ Acting/Control Officer/  │     │
│  │ information (verifies │  │ Nurse Manager            │     │
│  │ and confirm)          │  │ (2nd verification)       │     │
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│         ║   Control Centre Established       ║               │
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Casualty   Lab/Blood bank and Pharmacy   X-ray   Theatre ICU   All wards and Units

Each unit staff count

Bed count

Resources available check list

Casualty supervisor/Dr in charge

Decide on staff call back

External support (RMT)
Oshakati
Medipark
PV+ Doctors
Medical, Councillor, Church, Police

Figure 15: Onandjokwe Lutheran Hospital disaster response channel (Source: Draft disaster plan, 2011)
5.5.3.4 Safety and security

This is another important aspect of a disaster plan. The Onandjokwe disaster plan shows that:

• Staff should wear identification badges.

- The police and hospital security should act as traffic controllers.

- The plan did not have details of entry and exit points of ambulances.

- Staff should wear personal protective equipment.

The plan showed that staff should wear protective equipment when attending to patients. Respondents to the questionnaire were asked about the hospital's provision of adequate personal protective equipment and the results are in Table 23.

TABLE 23: PROVISION OF ADEQUATE PERSONAL PROTECTIVE EQUIPMENT

Current Position	The hospital provides adequate personal protective equipment for staff members during infectious disease outbreaks			
	Agree	**Not Sure**	**Disagree**	**Total**
Medical Officer	66.7%	22.2%	11.1%	100.0%
Registered Nurse	61.1%	10.3%	28.6%	100.0%
Pharmacist	.0%	.0%	100.0%	100.0%
Laboratory scientist	14.3%	14.3%	71.4%	100.0%
Enrolled Nurse	60.0%	20.0%	20.0%	100.0%
Administrator	100.0%	.0%	.0%	100.0%
Other	58.3%	16.7%	25.0%	100.0%
Total	**54.9%**	**16.5%**	**28.6%**	**100.0%**

Table 23 shows that only 54.9% of the respondents thought that the hospital provided adequate personal protective equipment, while 16.5% were not sure and 28.6% disagreed. The majority of the laboratory scientist (71.4%) and pharmacist (100%) did not think that the hospital offered adequate personal protection during disasters. One of the pharmacists commented, "The masks are only for doctors and nurses". That might account for the reason why the staff categories had higher proportions of respondents who thought that the hospital offered adequate personal protective equipment.

5.5.3.5 Selection of key areas

It is also important to select key areas, which are critical for the management of victims during disasters. The key areas described in the Onandjokwe Lutheran Hospital are shown in Table 24 and are based on the recommended key areas by Carley and Mackway-Jones (2005:27-28).

TABLE 24: KEY AREA SELECTION AT ONANDJOKWE LUTHERAN HOSPITAL

Recommended key areas	Characteristic
1. Staff Reporting	This area has not been identified in the disaster plan but should ideally be near the casualty department.
2. Discharge/reunion	This area has been identified and is separated from the general public and press as recommended in MIMMS.
3. Body holding	This area is mentioned in the plan, but no exact location has been identified.
4. Hospital command and control room	The area is mentioned in the plan and is away from casualty. Recommendations are that it should be near or within the casualty area.
5. Volunteer reporting	Volunteer reporting areas have been identified and they are near the casualty area
6. Hospital enquiry	Not assigned but should be near discharge/reunion area.
7. Press	Press area identified and is away from casualty and all other critical areas for treatment of patients.
8. Relatives	Area has been identified and is the same as the discharge area.
9. Triage	Area has been identified and is within casualty department. Area marked for temporary expansion is also near the casualty department.
10. Treatment	Treatment areas for various categories of patients are not separated. They are within the casualty department

In addition to the above areas, it is important to have a decontamination area. At Onandjokwe Lutheran Hospital, there was an isolation area with a separate entry point. The area did not have a decontamination device or water supply, which had a run-off for the separate collection of water. It did not have a separate ventilation system. The area was suitable, mainly for isolation but not for decontamination purposes.

5.5.3.6 Key staff selection and tasking

The disaster plan identified:

- Duty cards for the various key positions.

- Formation of triage and treatment teams for care of patients.

- The positions of the key personnel and their contact details, although not listed. These key personnel included incident commander, public information officer, safety and security officer, logistics officer, medical care director, nursing care director, general

staff director, finance chief and planning chief. Though they were mentioned in some parts of the plan, they needed to be listed with their contact details.

5.5.3.7 Infrastructure and equipment

From the key informant interviews, it was noted that there is currently lack of space in the casualty department for the optimal care of patients. There is also lack of privacy in the consultation areas. The disaster plan has made provisions for the creation of space for treatment and admission of patients. The plan also has areas for extra where extra equipment for use will be stored. The plan also has provisions for stockpiling of drugs though it does not mention what drugs are to be kept for use in emergencies and disasters.

5.6 Training and Education

This is another important component of the disaster preparedness process. From the key informant interviews it was noted that there has not been any formal training or workshops conducted for hospital staff in terms of the management of emergencies and disasters. This was noted by the respondents who filled in the questionnaire. The respondents were asked whether the hospital has conducted any workshops/training related to disasters. Only 9.9% of them indicated that the hospital had conducted workshops/training, while 44% did not know and 46.1% indicated that they hospital had not conducted workshops/training.

 When asked to comment on the preparedness of their hospital for disasters and emergencies, most of the respondents commented on the need for training and education in issues involving emergencies and disasters. According to the key informants, currently the hospital relies on the weekly clinical meetings conducted at the hospital as a way of educating staff. However, these meetings are attended mainly by doctors, management staff, and in-charge nursing staff.

The respondents were asked whether they had attended any workshops/training related to disasters/emergencies. The results are shown in Table 25.

TABLE 25: ATTENDANCE OF WORKSHOPS/TRAINING RELATED TO DISASTERS

Current Position	Have you attended any workshops/training related to disasters/emergencies?		
	Yes	**No**	**Total**
Medical Officer	22.2%	77.8%	100.0%
Registered Nurse	17.1%	82.9%	100.0%
Pharmacist	.0%	100.0%	100.0%
Laboratory scientist	.0%	100.0%	100.0%
Enrolled Nurse	4.0%	96.0%	100.0%
Administrator	100.0%	.0%	100.0%
Other	25.0%	75.0%	100.0%
Total	**14.3%**	**85.7%**	**100.0%**

The results show that only 14.3% of the respondents attended workshops/training related to disasters/emergencies. None of the pharmacists and laboratory scientists indicated that they attended workshops. Only four per cent of the enrolled nurses, 17.1% of the registered nurses, and 25% of the other staff category attended workshops/training related to disasters and emergencies.

Most of those who attended workshops indicated that they had learnt about disasters as part of their studies at nursing or medical school. Some attended workshops related to disasters not in Namibia, but in other neighbouring countries. There was no mention of the topics covered in these workshops.

The research also determined the attitudes of the respondents towards training and education related to disasters and emergencies. Results are presented in Table 26. As shown in the table most of the respondents (91.7%) indicated that healthcare workers needed training and education related to disasters and emergencies. It showed a positive attitude of the healthcare workers towards training and education related to disasters and emergencies. The draft disaster plan did not mention:

- Who was responsible for training and educating staff.

- What methods would be used to familiarise staff with the contents of the disaster plan.

- What areas of training were needed by health care staff in terms of managing disasters and emergencies.

TABLE 26: ATTITUDE TOWARDS THE NEED FOR TRAINING AND EDUCATION

Current Position	Healthcare workers need training and education on how to manage situations in which there is a sudden large influx of patients during disasters/emergencies.			
	Agree	**Not Sure**	**Disagree**	**Total**
Medical Officer	100.0%	.0%	.0%	100.0%
Registered Nurse	97.1%	.0%	2.9%	100.0%
Pharmacist	100.0%	.0%	.0%	100.0%
Laboratory scientist	85.7%	.0%	14.3%	100.0%
Enrolled Nurse	96.0%	.0%	4.0%	100.0%
Administrator	100.0%	.0%	.0%	100.0%
Other	**91.7%**	**.0%**	**8.3%**	**100.0%**

5.7 Monitoring and Evaluation

The emergency preparedness process needs a system of continuous monitoring and evaluating the components of the process with a view of fine tuning and closing the identified gaps. The Onandjokwe Lutheran Hospital disaster plan had provisions for conducting disaster drills and exercises as a way of monitoring and evaluating their disaster plan and their preparedness for emergencies and disasters. The plan showed that there should be simulations on a yearly basis after which the disaster plan would be updated. There should be a minimum of quarterly meetings regarding the preparedness of the hospital for disasters.

According to the key informants, the hospital participated in disaster drills organised by the Namibia Airports Company (NAC). The informants remarked that those drills involved few patients, and were not enough to test the hospital. It was not clear whether the NAC would be testing its own system or both its system and that of the hospital. Furthermore, there had not been any follow-up meetings or feedbacks from NAC when those drills had been conducted.

The hospital had not organised its own drills. That, according to the key informants, was because drills were expensive and at the same time they ended up annoying the community. The informants, however, noted that it was important to conduct drills to test whether the system was

prepared or not. As a way of evaluating, the hospital management conducted monthly meetings. The key informants were of the opinion that their hospital was well prepared as they handled motor vehicle accidents, busloads of sick schoolchildren who were brought to the hospital and other cases involving multiple victims. According to them, those were handled well. It was not clear whether there had been reviews or how long the hospital took to respond, what systems of the hospital were affected, and how the hospital handled its normal functions as well as the emergencies simultaneously. All this showed the need for conducting drills.

The respondents were asked whether their hospital conducted drills or not. The results are shown Table 27.

TABLE 27: RESPONDENTS KNOWLEDGE ON DRILLS CONDUCTED AT THE HOSPITAL

Current Position	Does the hospital conduct disaster drills or exercises regarding disaster situations?			
	yes	No	Don't know	Total
Medical Officer	.0%	55.6%	44.4%	100.0%
Registered Nurse	5.7%	54.3%	40.0%	100.0%
Pharmacist	.0%	100.0%	.0%	100.0%
Laboratory scientist	.0%	14.3%	85.7%	100.0%
Enrolled Nurse	.0%	28.0%	72.0%	100.0%
Other	.0%	33.3%	66.7%	100.0%
Total	2.2%	42.9%	54.9%	100.0%

Table 27 shows that only 2.2% of the respondents indicated that the hospital conducted drills related to disasters. That might account for those who participated in the drills conducted by NAC. Only the registered nurse category had respondents who knew about the disaster drills that had been conducted by the hospital. Based on the duty station of the respondents, those who knew about the disaster drills were mainly in the casualty department (75.8%) while some were stationed in the wards (24.2%). It was also noted that of all those who were stationed in the casualty department only 7.7% of them knew that there had been disaster drills at the hospital. Of all the respondents based in the wards, only 3.8% of them knew about disaster drills being conducted at the hospital. It was not ascertained whether those who indicated that the hospital had conducted drills/exercises, knew what drills/exercises were.

TABLE 28: ATTITUDE TOWARDS CONDUCTING OF DISASTER DRILLS

Current Position	Hospitals should conduct drills/exercises on how to manage a sudden, large influx of patients during disasters/emergencies			
	Agree	Not Sure	Disagree	Total
Medical Officer	88.9%	11.1%	.0%	100.0%
Registered Nurse	94.3%	2.9%	2.9%	100.0%
Pharmacist	100.0%	.0%	.0%	100.0%
Laboratory scientist	85.7%	14.3%	.0%	100.0%
Enrolled Nurse	80.0%	4.0%	16.0%	100.0%
Other	66.7%	16.7%	16.7%	100.0%
Total	**85.7%**	**6.6%**	**7.7%**	**100.0%**

Table 28 shows that most of the respondents (85.7%) had a positive attitude towards conducting disaster drills/exercise as they agreed with the statement presented to them. Most of the staff categories had a higher proportion of respondents who agreed with the statement. The 'other' staff category had the lowest proportion of respondents who agreed that hospitals should conduct drills/exercises on how to manage a sudden large influx of patients.

5.8 Conclusion

In this chapter the results of the study were presented. The results were based on the key informant interviews, disaster plan checklist and questionnaires administered. The presentation of the results was done in line with the disaster and emergency preparedness process discussed in Chapter 3 and it included results on policies; hospital disaster risk profile; the hospital disaster planning issues; training and education; and monitoring and evaluation of the disaster planning process. The results showed that:

There were policies that governed emergency and disaster preparedness at Onandjokwe Lutheran Hospital. There was a disaster risk profile that showed the hospital's main hazards. The hazards had not been ranked based on a calculated risk. The last time a vulnerability assessment was done was in 2009 and it was conducted by WHO. Most of the staff members (78%) were aware of those hazards. About 76.9% of the healthcare workers understood that the hospital could be affected by disasters.

The hospital had a draft disaster plan. The plan had been at that stage for the past two years. It was expected to be finalised in 2011. Most of the staff members did not know about the plan, had

not participated in the drafting of the plan. They did not know what major components should be included in that plan. Most of those who knew about the plan were not familiar with its contents.

Planning for staff was made easy by the general positive attitudes of the staff members towards the disaster planning process who knew that hospitals should have disaster plans (90.1%).Knowledge about disaster plans was not only for doctors and administrative staff, but for all of them.

Some of the staff members might not be willing to respond to infectious disease outbreaks. Only 54.9% were willing to report for duty during an infectious disease outbreak. The registered nurses were more willing to report for duty than the other staff categories. A higher proportion of females (58.2%) than males (45.8%) were willing to respond to duty. Willingness to report for duty was related to perceived knowledge, and it decreased with a decrease in perceived knowledge. The willingness to report was high for mass casualty incidents (95.6%).

Some of the perceptions that might affect the willingness to report for duty were that 69.2% of the workers were willing to accept the risk of contracting an infection as part of their job. The medical officers were more willing than the other staff members (88.9%). The males (79.8%) were more willing to accept the risk. There was little confidence that the hospital would take care of their medical needs in the event that a worker contracted the disease during an infectious disease outbreak. Most of the workers might come to work because they were afraid of losing their jobs, but few of the medical officers were afraid of losing their jobs if they did not come to work. No gender differences in fear of losing jobs. Most of the medical officers accepted that it was their duty to take care of patients.

The hospital did not conduct workshops and training related to disaster preparedness, although the healthcare workers had a positive attitude towards training and education in disasters and emergencies.

The hospital had been involved in simulations organised by NAC, but they did not involve mass casualties, however, the hospital did not conduct its own simulations. The healthcare workers were willing, so if simulations were to be organised they would be met with a positive attitude and a likelihood of succeeding.

CHAPTER 6

EMERGENCY AND DISASTER PREPAREDNESS PROCESS

6.1 Introduction

The previous chapter focused on the presentation of results. This chapter focuses on discussing the results and applying them to the emergency preparedness process that was discussed in Chapter 3. This research focussed on emergency and disaster preparedness at Onandjokwe Lutheran Hospital, and looked at all the components of the emergency preparedness process using key informant interviews, disaster plan checklist and questionnaires. The processes involved in emergency preparedness as discussed in Chapter 3 are shown in Figure 16.

Figure 16: Processes involved in health sector emergency preparedness
(Source WHO-WPR, 2006:1)

As seen in Figure 16, there is the need for policy development, vulnerability assessments, planning for emergencies and disasters, training and education, and monitoring and evaluation. Following these processes will ensure that the healthcare facility covers all the important aspects of emergency preparedness. This study used these various components in order to find out the readiness of Onandjokwe Hospital for emergencies and disasters. This chapter applies the emergency preparedness process of Onandjokwe Hospital using the results presented in the previous chapter.

The processes involved in emergency preparedness at Onandjokwe Lutheran Hospital are summarised in Figure 17.

Emergency Preparedness and response policies
- National Health Emergency Preparedness and Response Plan of April 2003.
- The Namibia National Disaster Risk Management Policy (NDRM) of 2009.
- The Emergency Preparedness and Response Plan of March 2009.

Vulnerability assessment
- Disaster risk profile done by the WHO in 2009. Since then no other profiling done.
- Hazards listed in the disaster plan-motor vehicle accidents, flooding, fire and lightning. gastroenteritis, measles or infectious disease outbreaks, building collapse.
- Relies on ranking according to frequency of occurrence based on the Management Information system.
- Staff members aware of the hazards and know that the hospital can be affected by disasters.

Planning for disasters
- Draft disaster plan. Most healthcare workers not aware of the plan.
- The hospital has inadequate staff and space.
- Healthcare workers aware of the role of hospitals during disasters.
- Healthcare workers had poor knowledge on what should be included in a disaster plan as most had not participated in the drafting or reviewing of the plan.
- Most healthcare workers perceived their knowledge to be either poor or fair.
- Healthcare workers had positive attitude towards disaster planning.
- Only 54.9% of them were willing to work during an infectious disease outbreak while 95.6 % were willing to be called for mass casualty incidents.
- Willingness was related to gender, perceived knowledge, risk perception but not to work experience or age of respondents.
- Risk perception related to gender, and current position at work.

Training and education
- No formal training and education.
- No workshops but relied on meetings to educate staff.
- Healthcare workers had a positive attitude towards training and education.

Monitoring and evaluation
- Drills conducted by Airports Company but deemed inadequate.
- Healthcare workers had positive attitudes towards the conducting of drills.

Figure 17: Processes involved in emergency preparedness at Onandjokwe Lutheran Hospital

6.2 Emergency Preparedness and Response Policies

Policy is strategic in nature and is required to ensure that common goals and common practices are pursued within and across organisations (WHO, 1999:20). Policies are also required in order to ensure coordination of activities thereby guaranteeing good results. They are formal statements of a course of action governing emergency preparedness and response whose functions are to establish long-term goals, assign responsibilities for achieving the goals, establish recommended work policies and determine the criteria for decision making (WHO, 1999:20).

WHO through the WHA, has shown its commitment towards the reduction of the impact of disasters and emergencies. This has been through a number of resolutions passed by the WHA aimed at strengthening emergency and disaster preparedness of the health sector in member states. Through resolutions WHA 58.1 of May 2005, and WHA 59.22 of May 2006, there were calls for countries to enhance the level of emergency preparedness programmes and for the WHO to support countries in this particular issue (WHO/HAC, 2008:59).

Further proof of the commitment of WHO to disaster risk reduction, is the conducting of the global assessment of national health sector emergency preparedness and response. The majority of the countries that participated in the survey reported the existence of national emergency preparedness policies, with the African region having the fewest countries with these policies. The policies governing emergency preparedness and response in Namibia include:

- National Health Emergency Preparedness and Response Plan of April 2003.

- The Namibia National Disaster Risk Management Policy (NDRM) of 2009.

- The Emergency Preparedness and Response Plan of March 2009.

6.2.1 National Disaster Risk Management Policy (NDRM) of Namibia

The Namibian constitution requires the Government to protect the welfare of its people and places the primary responsibility on Disaster risk management upon the Government (Namibia, 2009:1). Based on this constitutional requirement, the Namibian Government promulgated the

Namibian National Disaster Risk Management Policy (NDRM) of 2009. This policy showed a strong commitment by the Namibian Government to disaster risk reduction.

Key Performance Area 1(KPA1) of the policy calls for the "establishment of a sound, integrated and functional legal and institutional capacity for total disaster risk management in Namibia" and one of the ways to achieve this is through the development of, and promulgation of a Disaster Risk Management Act for Namibia (NDRM policy, 2009:43). At the time of writing this chapter (November 2011), the process of coming up with this Act was at the Bill stage.

The policy is important as it gives direction to disaster risk management in Namibia. Though the policy is comprehensive in terms of the need for disaster risk management in Namibia, there are no guarantees that it would be followed by all sectors. That is why there should be the speeding up of the process of coming up with a disaster risk management Act with requirements for disaster risk reduction activities in all sectors. Lessons could be learnt from South Africa with a Disaster management Act of 2002, which is a legal framework governing disaster risk management. Without a legal framework, there can be limited control over disaster risk management, with no requirements for action and this may stall the disaster risk reduction initiatives.

KPA4 calls for "strengthening of disaster preparedness for effective emergency response and recovery practices at all levels" (NDRM Policy, 2009:59). One of the key sectors for the realisation of this KPA is the health sector, which has the duties of treatment and care of those affected as well as offering psychosocial services. For that sector to work effectively and efficiently, it should also have emergency preparedness plans. The NDRM recognises this and so it compliments and supports the National Health Emergency Preparedness and Response Plan (NHEPRP) of 2003.

6.2.1 Namibia Health Emergency Preparedness and response plans (2003 and 2009)

The Namibian Ministry of Health and Social Services (MoHSS) came up with a National Health Emergency Preparedness and Response Plan in 2003, and following the 2008 and 2009 floods, it came up with the Emergency preparedness and response plan of 2009.

The MoHSS of Namibia has the mandate to adequately prepare and coordinate all health related emergencies through making appropriate policy decisions, mobilizing resources, and provision of necessary support to communities during emergencies (NHEPRP, 2003:4). As a result of this mandate, the MoHSS established a National Health Emergency Management Committee (NHEMC) with the main function of coordinating health related emergencies.

In 2003 the NHEMC came up with the National Health Emergency Preparedness and Response Plan (NHEPRP) aimed at reducing the impact of emergencies in Namibia (NHEPRP, 2003:4). This plan facilitated the formation of various Emergency Management Committees at Regional and District level, whose function was to prepare and coordinate emergency management programmes at their levels of jurisdiction. The other components of the plan included the preparedness and response functions of the various committees at National, Regional and District level including the responsible officers and the training needs for the various officers.

This plan showed a commitment by the Namibia Government to reduce the effect of health related emergencies and saving as many lives as possible. The main areas of focus of this plan were disease surveillance and epidemics. Though the plan was mainly centred on disease epidemics, it could be adapted for use in other health related emergencies. There was the need to incorporate those emergencies into the plan in line with the "all hazards, whole health" approach as recommended by WHO.

The 2009 Emergency Preparedness and Response Plan focused on one hazard only (that is floods). This plan came out because of the 2008-09 floods and it contained information about the health care system preparedness and response to floods. An opening statement in that plan was "*Namibia is not prone to natural hazards*". However Namibia's hazard profile, as described in the National Disaster Risk Management Policy of 2009 (NDRM, 2009:14-17) showed that Namibia experienced severe droughts in 1992/93, 19994/95, 19997/98, 2002/03, 2006/7. The other hazards listed in the profile-include floods, epidemics, environmental degradation, livestock epidemics, forest and veldt fires and road and rail traffic accidents. The main objective of the plan was to prepare for and conduct a timely, consistent and coordinated response to minimize the humanitarian consequences of the flood on the Namibian people (EPRP, 2009: 11).

A notable omission in these plans is how hospitals and other health care centres can prepare for and respond to mass casualty producing events. The hazards listed above, especially the road and rail traffic accidents, have the potential of producing mass casualties requiring medical attention. This means that hospitals need to prepare for those events in order to save as many lives as possible.

6.3 Vulnerability Assessment

Vulnerability was defined in Chapter 2 as the characteristics and circumstances of a community, system or asset arising from various physical, social, economic and environmental factors that made it susceptible to the damaging effects of a hazard (ISDR, 2009:30). A vulnerability assessment identifies hazards, determines their possible effects on a community, activity or organization, and provides information that is essential for emergency prevention, mitigation, preparedness, response and recovery as well as sustaining and protecting development (WHO, 1999:30; WHO/HAC, 2008:24).

The information is essential for emergency and disaster planning and for protection of healthcare facilities from the hazards identified in their areas. It is also important for the prioritisation of hazards during the planning process, as it would be expensive and impossible for the healthcare facilities to prepare for all the hazards that could be identified in their areas. The process should also be dynamic, involving continuous and frequent assessments to identify new threats and new vulnerable conditions. An example is in the US, prior to the September 11 attacks, hospital disaster preparedness focussed mainly on natural hazards. That, however, changed as there was recognition that acts of terrorism had become new threats and healthcare facilities had to prepare for such acts.

A survey conducted by WHO in 2006 showed a low reporting of vulnerability assessments by the countries surveyed with a third of the countries reporting that they did not have national emergency profiles or national and provincial hazard maps. The African region had the least proportion (40%) of countries that reported having national emergency profiles. Furthermore, only one third of the countries surveyed in the African Region had national hazard maps. (WHO/HAC, 2008:24-25). Emergency profiles and hazard maps show the types of risks in a community or country and are therefore essential for emergency and disaster planning.

Namibia is one of the countries in Africa that has an emergency profile. The profile is shown in the Namibia disaster risk management policy of 2009 and the hazards listed in the profile include: drought, flooding, epidemics, climate change, environmental degradation, livestock epidemics, forest and veldt fires, and road and rail traffic accidents. One of the important aspects highlighted in the policy under KAP 2 is the establishment of mechanisms for conducting multi-hazard disaster risk assessments in Namibia and this would be done through the establishment of Namibia vulnerability assessment committee (NamVac) whose role is to conduct vulnerability assessments in Namibia (NDRM, 2009:25,44). That is an important move towards disaster risk reduction in Namibia and shows seriousness on the part of the Government towards the protection of its people from the various hazards.

In the USA, the JCAHO made it a requirement that hospitals should conduct vulnerability assessments and have a formal document known as a Hazard Vulnerability Analysis (HVA) (Hoyle, 2010:290). In Namibia, the NHEPRP of April 2003 called for vulnerability assessments to be conducted in epidemic prone areas. The plan did not include the need for multi-hazard assessments to be conducted by hospitals. The gap might be covered by the NDRM discussed above.

Onandjokwe Lutheran Hospital is in Oshikoto Region of Northern Namibia. The disaster risk profile of Oshikoto region showed that the region is exposed to floods, drought, veldt fires and epidemics. The hospital's disaster risk profile showed that the hospital planned for motor vehicle accidents, flooding, fire and lightning, gastroenteritis food poisoning, measles or infectious disease outbreaks, and building collapse. Motor vehicle accidents were listed as the most frequent and the likeliest of these hazards.

There were differences between the Oshikoto region's profile and Onandjokwe Lutheran Hospital. While the region showed drought as a possible hazard, the hospital did not list the same hazard. The hospital listed motor vehicle accidents and collapse of buildings, which did not appear in the regional disaster risk profile. The hospital is located in Oshikoto region and serves the population of Oshikoto, and should be preparing for the hazards in that region. It was not clear whether there is a vulnerability assessment committee, which is multi-sectoral and multidisciplinary and incorporates the community, the hospital, as well as members of the

Oshikoto regional council. Furthermore, the risk profiles did not show which factors make the community vulnerable, and what the possible impacts of the hazards were.

There are no tools developed for the assessment of vulnerability and disaster risk in the health sector. The hospital relies on an assessment done by WHO in 2009. It further relies on information regarding the number of cases seen at the hospital and recorded in the management information systems. However, the information only lists the most frequent hazards and does not show the vulnerability of the hospital and community to the listed hazards. It is a process of hazard identification and not necessarily a vulnerability assessment.

The healthcare workers at the hospital were aware of disasters that occurred in their area, and they understood that the hospital could be affected by disasters. That awareness and positive attitude could assist the hospital when planning for disasters. It means that disaster planning might be met with a positive attitude from the healthcare workers who understand and are aware of disasters affecting the area.

6.4 Planning for Emergencies and Disasters

A vulnerability assessment generates important information for the planning process. It shows the current threats that are likely to be faced by a community and it is those threats that the hospital should plan for. Those threats are unpredictable, and would certainly occur somewhere in the world. When they occur, there is widespread destruction and loss of lives and victims who would require medical attention. Hospitals should be prepared. Despite knowing that the victims would seek life-saving care, comfort and relief at hospitals, many hospitals continue to prepare for disasters as though they would never happen to them (Chaffee & Oster, 2006:34). Hospital disaster planning has been relegated to low priority and is often viewed as an unnecessary chore (Hoyle, 2010:285).

Some believe that disasters and emergencies are unpredictable and rare in their areas such that it is difficult to prepare for them. It is because of the unpredictable nature of disasters that hospitals should be on the highest alert and well prepared. It is important to know that the only way to prepare for rare, uncommon and un-repetitive events is to think about them, to attempt to generalise the problems they cause, and to try and develop a system that could respond to

unknown and not previously experienced events (Rosen, 2006:xiii). There is need for a change in attitude towards hospital disaster preparedness.

Most of the healthcare workers at Onandjokwe Lutheran Hospital did not think that their hospital was well prepared for mass casualty events. The management, however, differed in this regard and they viewed their hospital as being well prepared. Their view was that they managed events before and there were no gaps in their response. The hospital only had a draft disaster plan, and many of its workers did not know about it and had not participated in its drafting or review. Having a disaster plan does not equal preparedness, it is part of the preparedness process, but the plan would help assign roles and responsibilities. Thus, a disaster plan is essential in ensuring that the hospital is well prepared. In this regard, Onandjokwe Lutheran Hospital could not be viewed as being well prepared, but a hospital in the process of preparing for emergencies and disasters.

6.4.2 Onandjokwe Lutheran Hospital draft disaster plan

A disaster plan was defined in Chapter 3 as an agreed set of arrangements for preparing for, responding to, and recovering from emergencies, and involves the description of responsibilities, management structures, strategies, and resource and information management with a view of protecting life, property and the environment (Keim & Giannone, 2006:167).

The plan is only one of the outcomes of the disaster planning process. Having a disaster plan does not mean that the hospital is prepared and there are no guarantees that the plan is anything more than a "shelved paper" that has to be dusted off when a crisis occurs (Manley *et al.,* 2006:81). However, that does not make the plan less important in preparing for disasters and emergencies. Hospitals still need a well-documented and tested plan in order to respond effectively and efficiently to disasters. The need for hospitals to have disaster plans can be seen in the US, where the JCACHO made it mandatory for hospitals to have disaster plans as a prerequisite for accreditation. Despite this requirement, few of the hospitals have made efforts to have realistic plans that can be followed during disasters and most of them do not have planners who are experienced in disasters (Kaji & Lewis, 2006:1199).

At the time of the research Onandjokwe Lutheran Hospital had a draft disaster plan. There was a multidisciplinary disaster committee responsible for the disaster planning process. The disaster

plan included the major components recommended in current literature, which include: incident command and control structure, communication methods, safety and security, selection of key areas, selection and tasking of key staff, provision of equipment and maintenance of infrastructure. The plan included a system of calling in more staff, cancelling electives and discharging patients to create more space for disaster victims. Most of these major components were also shown in a survey involving Los Angeles County hospitals conducted by Kaji and Lewis (2006: 1198-1203) in which most of the hospitals had a hospital incident command system, protocol for cancelling of elective surgery, designated victim overflow areas and early discharge protocol.

Though the plan covered most of the major components, some components had been left out. They included an evacuation plan for patients and staff; managing internal disasters; provision of decontamination facilities; accreditation of volunteers in the planning phase; provision of training and education of staff in disaster management. In terms of decontamination facilities, the hospital had an isolation room with a separate entrance from the rest of the casualties. The isolation room could be used for infectious disease outbreaks. However, they did not make provision for hot and cold water, separate ventilation, separate drainage system, all of which are important characteristics of a decontamination area. Despite the deficiencies, the disaster plan could be used for responding to mass casualties.

6.4.3 Human Resources

Disaster response requires an adequate human resource level. This includes personnel who are trained in emergency and disaster preparedness and have the necessary skills for managing disasters and emergencies. In a global survey conducted by WHO in 2006, most of the countries that responded were found to be lacking in trained human resources in emergencies and disasters. The lack of skilled staff showed the need in investing in training and educating healthcare workers on the management of emergencies and disasters. This part of the discussion focuses on human resource capacity at Onandjokwe Lutheran Hospital. It explores issues of staffing levels, knowledge, attitudes and perceptions of healthcare workers regarding emergencies and disasters. The African region already has a pronounced shortage of healthcare staff as shown in Table 29.

TABLE 29: DENSITY OF HEALTH CARE WORKERS PER WHO REGION

Region	Physicians (Density per 10 000 population)	Nursing and Midwifery Personnel (per 10 000 population)	Pharmaceutical Personnel (per 10 000 population)
African	2.3	10.9	0.8
the Americas	22.5	61.9	6.9
South-East Asian	5.4	13.3	3.8
European	33.3	74.7	5.4
Eastern Mediterranean	11.0	15.4	4.0
Western Pacific	14.5	20.3	3.9

Source: *World Health Organisation Report 2011.*

Table 29 shows that the African Region has the lowest densities of physicians, nursing and midwifery staff and pharmaceutical personnel. Namibia has low densities of physicians (3.7 per 10 000 population), nursing and midwifery staff (27.8 per 10 000 population) and pharmaceutical staff (1.8 per 10 000 population) compared to Sweden that has much higher densities of physicians (35.8 per 10 000 population), nursing and midwifery staff (98.2 per 10 000 population) and pharmaceutical staff (8.8 per 10 000 population) (WHO, 2011:116-123). Contributing to the shortage of staff is that some countries have one medical school while some do not even have a medical school, which has been made worse by the migration of healthcare workers to countries like the United Kingdom (Naicker *et al.,* 2009: S1-62). The shortage of staff has a negative impact on the preparedness of healthcare systems for disasters and emergencies.

Onandjokwe Lutheran Hospital already has a shortage of staff. In the 2009-2010 Onandjokwe Health District reported that there were 6.8% vacant posts and that even if they were filled there would still be a staff shortage at the hospital. Most of the healthcare workers who completed the questionnaire did not think that the hospital had adequate staff to manage a mass casualty incident. The key informants were of the opinion that no extra staff members were needed to manage a disaster or emergency. This shortage of staff means that those available are already overwhelmed by work and if an emergency or disaster occurred, more burdens would be put upon their shoulders. This could have a negative effect on their response due to exhaustion and being overwhelmed. Even if there is calling in of other staff from other departments of the hospital, there would be a danger of creating a gap in those departments hampering the disaster response and compromising the routine care of patients. The casualty staff might have managed

in cases of motor vehicle accidents whereby few casualties are brought to the hospital, but in mass casualties, they might not be able to cope.

The lack of staff is not unique to Onandjokwe Lutheran Hospital, but also other hospitals throughout the world. Various surveys in the US showed that their emergency departments were understaffed and overwhelmed and might not be able to cope during disasters and emergencies (Spranger *et al.*, 2007:82). In Canada, a report by the Ontario Health Coalition to the SARS commission, after the SARS outbreak showed inadequate hospital capacity and understaffed facilities (Krajewski *et al.*, 2005:3). Lack of staff negatively affects the preparedness and response to disasters and emergencies.

Off-duty personnel can be called in to assist during disasters. Almost all of the respondents (95.6%) who completed the questionnaire indicated their willingness to be called to assist during mass casualty incidents. It could be beneficial in events that would not produce further casualties after 24 hrs (for example in motor vehicle accidents). In such events, the hospital's functions would only be disrupted for a few hours and called-in staff might be able to rest after the incident. However, the calling in of staff might have little benefit in dynamic events, which might last for more than 24 hours, subsequently leading to exhaustion of the entire workforce within 24 hours (Welzel *et al.*, 2010:193).

Effective and efficient health and medical response requires qualified and competent healthcare workers who are available and willing to respond to an emergency or disaster (Mehta, 2006:90). According to Slepski (2007:10), competencies are the knowledge, skills, abilities and behaviours needed to carry out a job. This study determined the knowledge of the healthcare workers in relation to emergencies and disasters. Most of the respondents who completed the questionnaire were quite knowledgeable about the disasters that could occur in their area and the role of hospitals during disasters, while a significant proportion had poor knowledge about what should be included in a hospital disaster plan. The majority of the respondents did not know about the hospital disaster plan and most of those who knew about the disaster plan were not aware of its contents. This showed that the respondents had poor knowledge on disaster and emergency preparedness.

The majority of the respondents (62.7%) perceived their knowledge on managing mass casualty incidents as being "fair - poor". The same was also found in a study conducted by Spranger *et al.* (2007:82-86) in the US in which most of the respondents reported their knowledge to be "fair-poor". Various other studies in the US indicated that healthcare personnel lacked the knowledge and management skills that were required to feel competent in handling mass casualties, particularly those related to terrorist attacks (Spranger *et al.*, 2007:82). Poor knowledge showed the need for training and education of healthcare workers in the management of emergencies and disasters.

There have been concerns that healthcare worker absenteeism during emergencies and disasters could act as significant barriers to response because of the unwillingness or inability of healthcare workers to respond. It was found that most of the healthcare workers (95.6%) were willing to be called for a mass casualty incident, while only 54.9% were willing to respond during an infectious disease outbreak. This confirmed findings by Qureshi *et al.* (2005:378-388) who showed that most of the healthcare workers were willing to respond during a snow storm (80%), mass casualty incident (86%) and environmental disaster (84%), while they were least willing during SARS outbreak (48%).

The willingness to respond during an infectious disease seemed to be related to perceived knowledge. All of those who perceived their knowledge to be excellent were willing to respond while 55.6% with good knowledge, 54.8 % with fair knowledge, and 51.3% with poor knowledge were willing to respond to an infectious disease outbreak. This showed a decrease in the willingness to respond, with a decrease in perceived knowledge. Similarly, a study by Rokach *et al.* (2010:637-643) on the effect of knowledge on the willingness to treat patients infected with anthrax found a relationship between knowledge and willingness to respond. The reluctance to report for duty was due to lack of knowledge about the hazard.

Demographic characteristics such as age, sex, occupation and number of years of experience could be significant factors in the willingness to respond for duty. In this study a higher proportion of females than males were willing to report for duty during an infectious disease outbreak, while there were no significant differences in willingness in other demographic characteristics. In a study by Rokach *et al.* (2010:637-643) none of the demographic groups had

a significant impact on willingness to report for duty. The results were in contrast to findings by Bar-Dayan *et al.* (2011:184-187) who found that females of a younger age were less willing to report for duty during the H1N1 outbreak in Israel.

Though this research did not ask the respondents to volunteer reasons for their unwillingness, it determined their concerns regarding reporting for duty during an infectious disease outbreak. Few of the respondents (14.3%) were concerned about falling ill, while 8.3% were concerned about spreading the disease to family and friends. These issues were demonstrated as barriers to willingness to report for duty during an infectious disease outbreak in which Qureshi *et al.* (2005:378) and Nickell *et al.* (2004: 795) demonstrated that the reasons for unwillingness to report for duty included fear and concern over self, family and personal health problems. The lower proportions of respondents that were concerned about self and others in this study might be because the respondents had not been exposed to an infectious disease of the magnitude of the SARS virus, while the respondents in the other studies had been exposed to SARS in which many healthcare workers were affected.

Risk perception can also be of concern during an infectious disease outbreak. Most of the respondents (69.2%) seemed to accept the risk of infection as part of their job. Medical Officers and the male gender seemed to accept the risk more than the other groups. These findings were also demonstrated by Koh *et al.* (2005:676-682) who found that most of the respondents were ready to accept the risk as being part of their job and that doctors were more prepared to accept the risk than the other categories of healthcare workers. The acceptance of risk is important in that it can influence the willingness to report for duty, with those who accept being more willing than those who do not accept.

This study, like other studies discussed above, predicted staff absenteeism during infectious disease outbreaks due to unwillingness of the staff to report for duty for the various reasons discussed. These rates are, however, theoretical and do not predict the actual behaviour during a catastrophic event. It does not mean that these issues should be ignored by planners, for a healthcare institution faced with a shortage of staff like Onandjokwe Lutheran Hospital; a small rate of staff absenteeism could affect the disaster response. When faced with catastrophic events of magnitudes such as those of Hurricane Katrina or the SARS virus, all of the healthcare

workers are needed and should be available. This means that planners should not ignore these predicted rates of staff absenteeism, and should aim to improve the healthcare workers' willingness to report for duty. It can be done through training and education, provision of appropriate personal protective equipment (PPE) and assurance of effective environmental control (Qureshi *et al.*, 2005:386).

Despite these predicted rates of absenteeism, it was pleasing to note that most of the respondents who participated in the study accepted that as healthcare workers it was their duty to take care of patients. However, despite the moral and ethical duty would it be fair for them to be heroic and work in a system in which they were not protected and were at risk of contacting an infection? On the other hand, would it be right or wrong for them to refuse to respond because their lives were at risk? Such issues might need to be tackled by planners and researchers.

While healthcare workers are expected to take care of patients during catastrophic events, the healthcare institutions are expected to protect them and give them the necessary psychosocial support. Approximately 60.4% of the respondents who completed the questionnaire were confident that the hospital would offer them adequate protective measures during infectious disease outbreaks, while only 45.1% were confident that the hospital would take care of their medical needs if they contracted a disease during response. It showed a lack of confidence in the hospital's support during infectious disease outbreaks.

Studies have shown that a distrust or lack of confidence in the provision of support and protection by the employer leads to poor motivation and unwillingness to report for duty (Stratton, 2010:26). In a study by Tippet *et al*. (2010:20-25) the findings were that confidence in the employer was significantly related to willingness to work during an infectious disease outbreak. Planners should look at ways of improving the confidence of healthcare workers to increase their preparedness to work during disasters. Examples of measures that could curb absenteeism during catastrophic events were seen in various US hospitals where some hospitals started or planned to start the provision of shower facilities, hygiene kits, communication resources, psychosocial support, and provision of day-care, food and housing for staff's children (NAPH, 2007:3). In addition to these measures, healthcare institutions should train and educate

staff on the appropriate use of PPE and on infection control measures. Training and education of healthcare workers will be discussed in the next section.

6.5 Training and Education

Preparedness without proper education and training is no preparedness (Lennquist, 2005:300)

Healthcare Institutions may have disaster plans, and all the important and sophisticated equipment and infrastructure, but this may be of little or no benefit if the staff is not properly trained in emergency and disaster management (Lennquist, 2005:300). Training and education is one of the important components of the emergency preparedness process. This is because training and education enables emergency management personnel to carry out the tasks allocated to them (WHO, 1999:108). Healthcare workers may have the knowledge and skill in the day to day management of trauma victims, but they also need knowledge, skills, and abilities to manage situations whereby there are multiple casualties during emergencies and disasters.

Various strategies for training and education proposed by WHO (1999:300) were shown in Chapter 3 of this study and included:

- Workshops, seminars, formal education programmes, or conferences

- Self-directed learning

- Individual tuition

- Exercises

- Pamphlets, videos, media advertisements, newsletters, or journals

- Informal or formal presentations

- Public displays or public meetings.

Onandjokwe Lutheran Hospital relies mainly on informal and formal presentations as ways of training and educating staff. Management has not conducted any workshops involving the management of disasters and emergencies. Most of the respondents who completed the questionnaire had not attended any workshops/training in the management of emergencies and disasters. The few who had done so attended maximum one-week training workshops and they

did not list the topics covered in the workshops. Some of the respondents learnt about disaster and emergencies as modules in their training at nursing or medical school. More needs to be done in terms of training and educating staff at Onandjokwe Lutheran Hospital. The hospital might have a disaster plan or might have gone through all the other aspects of the preparedness process, but without training and education, the staff who are supposed to use the disaster plan fall short in terms of being prepared for emergencies and disasters.

6.6 Monitoring and Evaluation

The preparedness process is not complete without a system of monitoring and evaluation. Monitoring and evaluation enables planners to measure progress towards fulfilment of the objectives through analysing causes of deviation and determining corrective action. It enables healthcare institutions to determine how well the preparedness programmes are being developed and implemented and what needs to be done to improve the process (WHO,1999:113).

Simulation exercises can be used for monitoring and evaluation of the emergency and disaster plans and may give a good indication of the preparedness of a healthcare institution (WHO/HAC, 2008: 27). The Onandjokwe Lutheran Hospital draft disaster plan has provisions for conducting simulations as a way of monitoring and evaluation. The hospital relies on exercises conducted by the Namibia Airports Company (NAC). These exercises do not provide any feedback and are not able to test the preparedness of the hospital adequately.

Most of the workers at the hospital did not know about the simulation exercises that were conducted at the hospital. The few, who knew, were mainly in the casualty department. That might be because the simulation exercises were on such a small scale that they did not catch the attention of healthcare workers. The healthcare workers had a positive attitude towards the conducting of drills and they knew that hospitals should conduct them. It is a positive sign that if a large-scale exercise was to be conducted there might be full participation with no resistance from the healthcare workers as they know and appreciate the importance of such exercises.

The hospital did not conduct its own simulation exercises as those were deemed to be expensive and might 'annoy' the community. There is a need for change in attitude regarding the importance of these exercises. Training and education of the community and healthcare workers might be helpful in terms of showing the importance of such exercises.

While some authors have suggested that simulation exercises have little benefit in training and educating healthcare workers on disasters and emergencies, it does not make these simulations less important in the disaster preparedness process. The simulations should not only be viewed as a way of training and educating staff, but as a way of testing the preparedness of the whole healthcare system for emergencies and disasters and identifying gaps and problems which might need to be resolved.

6.7 Conclusion

This chapter provided a discussion of the Onandjokwe Lutheran Hospital emergency and disaster preparedness process based on the results of the study. It showed that:

- There were policies governing emergency and disaster preparedness.
- The hospital needed to conduct regular vulnerability and risk assessments.
- The hospital had a draft disaster plan.
- There was a shortage of staff at the hospital and that might be made worse during infectious disease outbreaks due to possibilities of absenteeism.
- There were inadequate training methods at the hospital.
- Monitoring and evaluation of the preparedness process at the hospital were inadequate.

The next chapter will conclude the study and provide possible recommendations based on the results of this study.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

We live in a hazardous world and it is not known when these hazards will combine with our vulnerable conditions to become disasters. Though this is not known, it is known that disasters will certainly occur somewhere in this world and they will not seek for permission to occur. When these occur there is pandemonium as a result of disruption of livelihoods, destruction of property and environment and most of all injury and death of human beings. When disasters occur, healthcare institutions will be among the first to respond. People will look up to the healthcare institutions as sanctuaries where they are safe and well taken care of. The injured will expect prompt treatment while those with no physical injuries may still seek long-term psychosocial support. This is why healthcare institutions should always be available and prepared for disasters in order to save as many lives as possible.

It is with this in mind that the researcher conducted a study of hospital emergency and disaster preparedness. This study was conducted at Onandjokwe Lutheran Hospital, which is situated in Oshikoto region of Northern Namibia. The hospital is situated in a region that experienced flooding for the past four years. In addition, there was an increase in the number of emergencies that were attended to at the hospital, particularly motor vehicle accidents. Despite that the hospital only had a draft disaster plan. Hence, it prompted the researcher to study emergency and disaster preparedness at the hospital. In an effort to study all aspects of the hospital's emergency and disaster preparedness, the research used the emergency preparedness processes as a framework of the study.

The emergency preparedness process shows that there should be development of policies, assessment of vulnerability, emergency and disaster planning, training and education, and monitoring and evaluation. The study set its objectives around these components and looked at the policies governing emergency and disaster preparedness at the hospital. A review was done of the hospital's disaster plan, and the knowledge, attitudes and practices of the healthcare workers regarding healthcare emergency and disaster preparedness.

In order to achieve the objectives and answer the research questions to provide a clear picture of the Onandjokwe Lutheran Hospital emergency and disaster preparedness process, the study used a literature study, questionnaires, disaster plan checklist and did a physical check of the hospital, and held interviews with key informants.

This study found that there were government policies that governed emergency and disaster preparedness. The Ministry of Health and Social Services had emergency preparedness plans that provided for emergency preparedness in healthcare institutions. One of these plans focused mainly on disease surveillance and epidemic response. This plan could, however, be useful for formulating policies and plans for other hazards. The 2009 plan set its objective in relation to floods. It would, however, not adequately cover the "all hazards" process as recommended by WHO and might need to be reviewed in order to incorporate other aspects like motor vehicle accidents.

WHO had done vulnerability assessments in 2009. The disaster risk profile of the hospital listed the hazards that were likely to occur in the area. These assessments needed to be conducted in conjunction with the regional council and the community surrounding the hospital. The hazards had not been ranked in order of importance or in order of the ones with the most risk. The hospital relied on the management information systems to find out the most important frequent cases that were seen in casualty. Motor vehicle accidents had been increasing. However, that does not equal a vulnerability assessment as it only showed that motor vehicle accidents were a hazard that the hospital should deal with.

The hospital has a draft disaster plan, which might account for the high proportion of workers at the hospital who did not know about the plan, and who did not know what a hospital disaster plan should contain. Despite the poor knowledge about the disaster plan, the healthcare workers had the right attitude towards hospital emergency and disaster preparedness.

The hospital experienced a shortage of staff. A threat to the preparedness of the hospital was that while there was a staff shortage, almost half of the staff members might not be willing to report for duty during infectious disaster outbreaks, because of the perceived risk of infection, lack of confidence in the hospital's protection and support of staff members. It was, however, pleasing to note that while the workers might not be comfortable in reporting for duty, they knew and

understood that it was their duty to take care of patients. Those issues might need to be addressed by planners through training and education and reassuring the staff in terms of the hospital's commitment towards their safety and support.

The hospital was found to have weaknesses in terms of training and education, and monitoring and evaluation. Those were weaknesses, which could be worked on in conjunction with the MoHSS and the Office of the Prime Minister that were responsible for emergency and disaster preparedness in the country. Based on the results of the study the recommendations are discussed in the next section.

7.2 Recommendations

7.2.1 Recommendations to the Office of the Prime Minister

The Office of the Prime Minister is responsible for the National Disaster Risk Management System of Namibia (NDRM, 2009:22), and it is recommended that:

- The Office should speed up the process of the Disaster Risk Management Act of Namibia. The work done by the Office regarding disaster risk reduction measures is commendable. The Namibia National Disaster Risk Management Policy shows a strong political commitment by the Namibian government towards the protection of its people from the adverse impact of disasters and emergencies. This commitment should go further in coming up with the Disaster Risk Management Act, which was, then at the Bill stage. The Act would provide a legal framework for disaster risk reduction in all sectors. Though the policy is comprehensive in this regard, it acts as a guideline, which sectors could choose either to follow or not to follow. The Act would provide a backbone for risk reduction measures through mandatory risk reduction measures across all sectors in order to protect the Namibian people.

- There should be allocation of financial resources to the Ministry of Health and Social Services aimed at improving the national emergency and disaster preparedness programmes. That would enable the MoHSS to conduct vulnerability assessments, training and education of healthcare workers and in monitoring and evaluating the healthcare emergency preparedness process.

- Assistance of the MoHSS in improving the human resource capacity by recruitment of specialists in disaster and emergency response.

- Support and assistance to the health sector in the whole process of emergency and disaster preparedness which includes:

  o Policy development in emergency and disaster preparedness.

  o Vulnerability assessments of all health institutions in order to protect them for disasters. The use of the Hospitals Safe from Disasters initiative can be helpful in this regard.

  o Health sector emergency and disaster planning using the 'all hazards' and "whole health" approach as recommended by the WHO.

  o Training and education of health personnel who can become specialists in emergency and disaster preparedness.

  o Conducting simulation exercises in the health sector, which would also involve all other sectors to establish proper and working relationships among the various stakeholders involved in emergency and disaster preparedness.

7.2.2 Recommendations to the Ministry of Health and Social Services

The MoHSS is the parent ministry that takes care of the health sector. This is why it should also be responsible for the preparedness of the health sector for emergencies and disasters. It is recommended that:

- The formulation of emergency and disaster preparedness policies, which use the 'all hazards" and "whole health" approach as recommended by WHO. These polices should have provisions for:

  o Vulnerability assessments of all the health institutions and the protection of hospitals from disasters as recommended by the Hospitals Safe from Disasters initiative. This is because of the importance of the health sector in emergency and

disaster response. There can also be development of tools for the vulnerability assessments of healthcare institutions that can be used by the various institutions across the country.

- o Emergency and disaster plans in all healthcare institutions. Hospitals in the US are required to have these plans in place for accreditation. The same principle can be used for hospitals in Namibia in that there should be encouragement of hospitals to have disaster plans, and incentives offered to those hospitals that have plans. These incentives could be in the form of extra funding for emergencies or prizes offered to the hospital that was the most prepared for emergencies and disasters.

- o Training and education of healthcare personnel in emergency and disaster management. This will improve the human resource capacity of the healthcare system in terms of emergencies and disasters.

- o Conducting of simulation exercises to monitor and evaluate the emergency preparedness process of the healthcare institutions.

- The review of the National Health Emergency Preparedness and Response Plan of 2003 and the Emergency Preparedness and Response Plan of 2009 so that they are based on an "all hazards" process.

- The formulation of guidelines for healthcare institutions for the management of mass casualty incidents. Disasters have a potential of producing mass casualties that need to be taken care of. There can be national guidelines for hospitals to follow during mass casualty incidents. All hospitals and other healthcare centres would have to produce their own plans based on the prescribed guidelines. Tools or checklists could also be developed for use by the healthcare institutions for checking their preparedness for mass casualty incidents. An example is the mass casualty disaster plan checklist developed by the Association for Professionals in Infection Control and Epidemiology (APIC).

- The MoHSS should also support the healthcare institutions in their emergency and disaster preparedness programmes in terms of technical and financial support.

- Training and education at Onandjokwe Hospital is inadequate. The hospital relies mainly on formal and informal presentations. While this research was in progress, there was a disaster management conference in Northern Namibia. The hospital could not send a representative because the costs were too prohibitive. In this regard, the MoHSS could conduct its own training and education workshops for the health sector. The MoHSS should request funding from various sponsors and the government for use in training and education initiatives. The MoHSS could also work with other sectors to conduct training, needs analyses, and development of sets of competencies for healthcare workers who were involved in disaster and emergency response. This would enable the MoHSS to model their training and education process in line with the required competencies and the training needs of the healthcare workers.

- The recruitment of emergency and disaster management specialists to advise the MoHSS on the emergency preparedness process. The MoHSS can also offer scholarships and support for those healthcare workers who are willing to have formal training in disaster management. Examples of courses available in Disaster management include: Masters in Disaster Management at The University of the Free State in South Africa; European Masters in Disaster Medicine in Italy; International Disaster Medical Sciences Fellowship in the US. This will enhance the human resources capacity in emergency and disaster management in Namibia.

- Issues in emergency and disasters should be included in all curricula in the nursing and medical schools and in all schools that train healthcare workers. This would go a long way in improving knowledge and skills related to disasters. It might also improve the willingness of the healthcare workers to report for duty during emergencies and disasters.

- Owing to the shortage of staff at Onandjokwe Lutheran Hospital, disaster response can be compromised. Staff shortage is not only because of unfilled posts, but available posts at the hospital are not adequate for a hospital of its status. The MoHSS should look at increasing the number of available posts and also assist and support the hospital in recruiting the qualified staff.

7.2.3 Recommendations to Onandjokwe Lutheran Hospital

It is recommended that Onandjokwe Lutheran Hospital:

- Conduct hazard analysis and vulnerability assessments that involve the Oshikoto Regional council as well as the community. This will enable a clear understanding of the vulnerability of the community that the hospital serves, and assist in disaster planning. The vulnerability assessment should also include structural and functional vulnerability of the hospital to make sure that the hospital is safe from disasters and will keep standing during disasters and emergencies when its services are needed the most. An example of a manual that can be used for such purposes is the WHO "field manual for capacity assessment of health facilities in responding to emergencies".

- Continuously assess its preparedness for emergencies and disasters. While the country does not have guidelines or tools for this assessment, the hospital can make use of the "mass casualty disaster plan checklist: a template for healthcare facilities", designed by the Centre for the Study of Bioterrorism and Emerging Infections (CSB&EI) and the Association for Professionals in Infection Control and Epidemiology (APIC) tool, for identifying problems and assigning duties to various individuals in an effort to make sure that the hospital is prepared and will be available during disasters and emergencies.

- The hospital has a draft disaster plan that is currently under review. This plan has been presented to an audience mainly made up of doctors and nurse managers. The plan needs to be circulated to other staff members for their input before it is finalised. While the plan has the major components that are important for disaster response it also needs to include:

  - Response to internal disasters such as fire, collapse of hospital, flooding and other hazards.

  - Evacuation plan for each department and ward should also be mandatory and the staff members should know the evacuation procedures.

  - A system of pre-accreditation of volunteers who may be important during emergencies and disasters. The hospital has a staff shortage and the staff may be

overwhelmed and exhausted particularly in those types of emergencies and disasters that may last for more than 24 hours.

- o Memoranda of understanding with other healthcare institutions. These should be written down memoranda. While the MohSS system of transferring patients between hospitals is appreciated and a good system, it is still important to have various agreements with not only government hospitals, but also private hospitals for support during disasters. Patients sent to private hospitals during disasters may be faced with huge hospital bills and so there is need for such agreements so that these patients are catered for during disasters without being charged the normal high fees in the private sector. These arrangements may need to be made in consultation with the MoHSS and the Office of the Prime Minister.

- Conduct training and education: This is because the research found that:

  - o There was lack of knowledge about the disaster plan and what should be included in the plan. Training and education should be conducted as a way of making the healthcare workers become familiar with the contents of the plan and get involved in the process of planning for disasters.

  - o There could be a high rate of staff absenteeism during disasters and emergencies. This is because almost half of the workers may not be willing to report for duty during infectious disease outbreaks. Some of them were not confident regarding protection and support of the workers during infectious disease outbreaks. This shows the need for training and educating the staff on the common infectious diseases and on infection control and the use of PPE so that they become more confident in its use and not be afraid to report for duty during these outbreaks.

- There are short courses available in South Africa for healthcare personnel that can be useful for enhancing the knowledge of staff. These include the hospital major incident management course, the major incident management course, and the disaster medicine course. These are of three to five days duration. Selected personnel can be sent on these courses and come back and share their knowledge and skills.

- Conduct simulation exercises. Simulation exercises can be on a large scale in which the hospital disaster plan is tested and any gaps identified and resolved. Small scale exercises can also be done in which certain elements of the plan are tested (for example while trying to test whether the staff knows how to triage). The exercises are also important to establish working relationships and agreements with the other stakeholders involved in disaster response (like the police, fire, and emergency medical services). This will ensure that all sectors know their role so that when disasters occur, there will be proper coordination of response. If there are any conflicts of roles the simulation exercises are a way of resolving such conflicts before disasters occur. Simulations have been deemed as costly and causing an unnecessary disruption of services. There are other inexpensive ways of conducting these exercises like tabletop exercises.

7.3 Conclusion

All the planning in the world will not prevent tragedy form occurring, whether it is by natural causes or man-made. There is no question, however, that the right system will alleviate the tragedy; will salvage lives and psyches, and will help us to feel less despondent about the world we have forced upon us (Rosen, 2006, xxiv).

Though we might not have the power to prevent these tragedies from occurring, we certainly have the ability to protect ourselves, and that is through anticipating, mitigating, preparing for, responding to, and recovering from disasters. Hospitals are some of the most important institutions in disaster response and so they need to be prepared.

The Onandjokwe Lutheran Hospital emergency and disaster preparedness process is still in its infancy. The efforts being made by the hospital's disaster committee towards emergency and disaster preparedness are commendable though more still needs to be done. The hospital has a draft disaster plan. However, it is important to note that having a plan is not equal to preparedness, but a plan is one of the end results of the disaster planning process. The process should involve all the components discussed in this study that include policies, vulnerability assessment, disaster plan, training and education, and monitoring and evaluation.

In terms of emergency and disaster preparedness, Onandjokwe Lutheran Hospital is moving in the right direction. They have started the process and it is up to the MoHSS and the Office of the

Prime Minister to support this process. It does not matter that the process is still starting but what matters is the direction they are moving as one unknown philosopher once said, "the greatest thing in this world is not so much where we are but in what direction we are moving". The hospital should continue with this process for it is important to be prepared because we do not know when disasters will occur. All we can do is to prepare!

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Questionnaire

__Dear Colleague__

My name is Dr Gerald Chimenya and I am a student at The University of the Free State. As part of my Studies for a Masters Degree in Disaster Management I am required to conduct a research. The topic for my research is: Hospital Emergency and Disaster Preparedness: A study of Onandjokwe Lutheran Hospital.

I am kindly asking you to be a participant in the study. If you agree, you are kindly requested to complete the questionnaire below as accurately and completely as possible. The objective of the study is to assess your knowledge, attitudes and practices with regards to the management of emergencies and disasters (for example floods, drought, and road traffic accidents). The study has been approved by the management of Onandjokwe Lutheran Hospital and the Ministry of Health and Social Services.

The information you give will be kept confidential and your name shall not appear on the questionnaire. Participation in the study is voluntary and you are under no obligation to fill the questionnaire. In addition to the fulfilment of my studies, the information gathered will be used for the provision of better emergency services not only at Onandjokwe Lutheran Hospital but also at other hospitals in Namibia.

Kindly indicate your answer with a cross (**X**) or write in the space provided.

Section 1: Demographics

1.	What is your gender?				
1. Male			2. Female		

2.	Age at next birthday.			
1. Below 20		2. 20-30	3. 31-40	
4. 41-50		5. 51-60	6. 61+	

3.	Indicate your duty station			
1. Casualty		2. Wards	3. Intensive care Unit (ICU)	
4. Theatre		5. Pharmacy	6. Laboratory	
7. Administration		8. Outpatients Department (OPD)		
9.Other (specify)				

4.	What is your current position?			
1. Medical Officer		2.Registered Nurse	3. Pharmacist	
4. Laboratory Scientist		5. Enrolled Nurse		
6. Specialist (specify)				
7. Administrator(specify)				
8.Other(specify)				

5.	How many years have you worked in your current position?			
1. Less than 1 year		2. 1-5 years	3. 5-10 years	
4. 10-15 years		5. 15-20 years	6. More than 20 years	

6.	What is the highest level of education that you have completed?			
1. No schooling		2. Primary school	3. Secondary school	
4. Certificate		5. Diploma	6. Undergraduate Degree	
7. Postgraduate Degree				
8.Other(specify)				

Please proceed to question 7 on the next page

Section 2: Disaster knowledge, awareness and experience

7.	Are you aware of any disasters that have occurred in your area in the past 5 years?	
1.Yes	2.No	
If yes, list which ones?		

8.	To your knowledge, which of the following are likely to occur in your area? *(Please check all that is applicable- more than one answer if applicable)*		
1. Natural Disasters(Floods, drought)		2. Traffic Accidents (bus, rail, car, air)	
3.Disease Epidemics		4. Fires	
5.Chemical spills		6. None of the above	
7. Not sure			
8.Other (specify)			

9.	Are you aware of the role of hospitals during disasters/emergencies?	
1.Yes	2.No	
If yes, list the roles.		

10.	Does your hospital have a disaster plan*? (if yes go to question 11,if no proceed to question 12)*				
1.Yes		2.No		3. Don't Know	

11.	If yes to question 10, are you familiar with the contents of the hospital disaster Plan?	
1.Yes	2.No	
If yes, please state them.		

12.	Are you aware of the major components/issues that must be included in a hospital disaster plan?	
1.Yes	2.No	
If yes, please list them.		

Please continue with question 13 on the next page.

13.	Have you attended any workshops/training related to disasters/emergencies?		
1.Yes		2.No	
If yes, where and when and for how long?			

14.	If yes to question 13, what topics were covered in the workshop/training?		

15.	How would you rate your current knowledge regarding the management of situations in which there is a sudden influx of large number of patients at the hospital due to an emergency/disaster?						
1.Excellent		2.Good		3.Fair		4.Poor	

Please proceed to question 16 on the next page

Section 3: Attitudes and willingness to report for duty during disasters

This section examines how you feel about disaster management in the health sector.

16.	The hospital is adequately prepared to manage any type of disaster or emergency in which there is a sudden influx of patients.					
	1. Agree		2. Not sure		3. Disagree	

17.	Hospitals should have disaster plans, to manage situations in which there is a sudden large influx of patients.					
	1. Agree		2. Not sure		3. Disagree	

18.	The hospital is unlikely to be affected by disasters.					
	1. Agree		2. Not sure		3. Disagree	

19.	Only doctors and nurses need to know about disaster plans.					
	1. Agree		2. Not sure		3. Disagree	

20.	Disaster planning is only for the hospital's administrative staff and heads of departments.					
	1. Agree		2. Not sure		3. Disagree	

21.	I do not need to know about disasters and disaster plans.					
	1. Agree		2. Not sure		3. Disagree	

22.	Healthcare workers need training and education on how to manage situations in which there is a sudden, large influx of patients during disasters/emergencies.					
	1. Agree		2. Not sure		3. Disagree	

23.	The hospital has an adequate staff compliment to deal with a sudden large influx of patients during disasters/emergencies.					
	1. Agree		2. Not sure		3. Disagree	

24.	Hospitals should conduct regular drills/exercises on how to manage a sudden, large influx of patients during emergencies/disasters.					
	1. Agree		2. Not sure		3. Disagree	

25.	The hospital provides adequate personal protective equipment for staff members during infectious disease outbreaks.					
	1. Agree		2. Not sure		3. Disagree	

Please proceed to question 26 on the next page

The following questions assess your willingness to report for duty during disasters.

In the event of an infectious disease with an increased risk of contracting the disease:	1. Agree	2. Not Sure	3. Disagree
26. I am willing to work even if I am at risk of contracting the disease.			
27. I accept that the risk is part of my job.			
28. I am confident that the hospital will offer me adequate protective measures to reduce the risk of contracting the disease.			
29. I am confident that the hospital management will take care of my medical needs if I contract the disease.			
30. I accept that as a healthcare worker it is my duty to take care of patients.			
31. I am afraid that if I do not come to work I will lose my job.			
32. I will not report for duty because I am afraid of falling ill			
33. I will not report for duty because I am afraid of spreading the disease to my family and friends.			

Please proceed to question 34 on the next page

34.	If you were not on duty and were asked to come to work because the hospital has had a large number of casualties to take care of as a result of a disaster, would you be willing to do so.		
1.Yes		2.No	
Please state your reasons.			

Please proceed to question 35 on the next page

Section 4: Practices

This section assesses disaster preparedness practices at your hospital

35.	Does the hospital conduct disaster drills or exercises regarding disaster situations?		
1.Yes		2.No	3.Don't know

36.	Does the hospital conduct training/workshops to educate staff members on disasters?		
1.Yes		2.No	3.Don't know

37.	Have you participated in developing or reviewing the hospital disaster plan?	
1.Yes		2.No
If yes what was your role?		

38.	Have you ever been involved in the care of victims as a result of the following: (*please check all that is applicable-more than one answer if applicable*)	
1.Natural Disasters		2. Traffic Accidents (bus, car, rail, air)
3. Disease Epidemics		4.Fire
5. Chemical Spills		7. None
8. Other (specify)		
If you have, please describe where and when and what role you played.		

39.	Do you have any comments on the hospital's preparedness for disasters	
1.Yes		2.No
If yes, please add		

40.	Would you like to receive information regarding disasters and the role of hospitals and healthcare workers in disasters?	
1.Yes		2.No

~Thank you~

APPENDIX 2: Key Informant Interview Guide

Name of Interviewer: Dr Gerald Chimenya

Date of Interview:

Introduction: My name is Dr Gerald Chimenya and I am studying for a Masters Degree in Disaster Management at the University of the Free State. I am carrying out a research on the emergency and disaster preparedness of Onandjokwe Lutheran Hospital. This is in partial fulfilment of the requirements of the degree. I would like to ask you some questions on disaster preparedness. The information you give will be instrumental in the strengthening of healthcare disaster preparedness not only at Onandjokwe hospital but also at other hospitals in Namibia.

Notes for Interviewer: This is an interview guideline and the questions provide the general information required for the study. The guide contains six sections: General information; policy issues; vulnerability assessment; disaster planning; training and education; and monitoring and evaluation.

Section One: General Information

1. What is your current position at the hospital?

2. How long have you been working in that position?

3. Are you a member of the Hospital's disaster preparedness committee? *(ask about their role in the committee)*

4. Have you had any direct personal or professional experience of an emergency or disaster *(ask interviewee to describe their experience, what were their concerns)*

Section Two: Disaster Preparedness Policies

5. What legislation governs disaster preparedness at Onandjokwe Hospital and the Health Sector as a whole? (*Probe: these may be in the form of Acts (Disaster management Act); or Policies within the ministry of Health; or Hospital policies; ministerial decisions or*

resolutions. If there is legislation then who formulates it and is there a process of consultation of key stakeholder. If no legislation find out whether interviewee thinks in terms of the importance of legislation.)

6. What does this legislation say about Disaster Preparedness in the health sector (*Probe: find the main issues in the legislation and find out if there are any requirements that hospitals should have preparedness plans; find out what the interviewee thinks about the legislation; does interviewee place any importance to legislation regarding disasters.).*

7. Do you have any comments on:

    i)   The hospital's policy on Disaster preparedness

    ii)   The country's health sector disaster preparedness policy.

    (*Probe*: *is the policy adequate in their view and are there any changes that need to be done, if the country or hospital does not have what does interviewee think should be done*).

Section Three: Vulnerability Assessment.

8. Is there an existing disaster risk profile that shows the potential hazards that may affect the Hospital? *(Probe: Find out whether there has been any vulnerability assessments done and if none does the interviewee think it is important to conduct the vulnerability assessment).*

9. If there is an existing disaster risk profile, what processes (or tools) were used to come up with this profile?(*Probe: find out how the vulnerability assessment was done and if possible get a copy of the tools used for this process)*

10. Do you have any further comments on the Hospital's vulnerability assessment?

Section Four: Hospital Disaster plan

11. Who is involved in disaster preparedness planning at the Hospital. (*Probe*: *find out if there is a multidisciplinary disaster preparedness committee.)*

12. Does your Hospital have a disaster plan? (*If yes ask for a copy and indicate that the plan will be reviewed using a checklist to find out whether the main components have been included; If no ask whether they think it is important to have one*).

13. Who was involved in the formulation of the disaster plan? *(Probe: find out if the workers at the hospital were consulted in the formulation process of the plan)*

14. What hazards are covered in this plan? *(Probe: Find out whether this plan uses the WHO "all hazard" policy or there are different plans for different hazards).*

15. Do you have any further comments on the Hospital disaster plan *(Probe: Do they think it adequately covers all issues on disaster preparedness at the Hospital).*

Section five: Training and Education

16. What measures are in place in order to ensure that the hospital's staff members know about disasters and disaster preparedness plans? *(Probe: elicit whether interviewee will volunteer information on any training and education of staff members; ask about their opinion on the importance of staff education and training)*

17. In your opinion, do you think the hospital staff members know what to do when there is a disaster or emergency?

Section six: Monitoring and Evaluation

18. What measures are in place for monitoring and evaluating the hospital disaster planning process? *(Exercises, drills).*

19. How do you assess or how are you going to assess the hospital disaster preparedness plan?

20. How often do you, or are you going to review the hospital preparedness plan? *(yearly, every 6mnths, every 2 years…and so forth)*

Conclusion

21. What challenges are faced by the hospital and its staff in terms of disaster preparedness?

22. Can you please comment on the staffing level of the hospital? *(Probe: take interviewee back to the 2009-2010 report (page 12) which stated that was a total of 6.8% vacant posts and that even if these posts were filled the staffing level was still going to be inadequate- have there been any changes since then; is the staffing level adequate for disaster response).*

23. Do you have any further comments on the Hospital's preparedness for disasters?

Thank you for your time.

APPENDIX 3: Informed Consent

I hereby consent to taking part in the research on hospital emergency and disaster preparedness at Onandjokwe Lutheran Hospital. The study investigator has explained to me the nature of the study and I understand that participation is voluntary and I can pull out of the study if I wish to do so.

I am aware that there is no direct material or financial benefit to me accruing from participation in this study. I understand that I will not lose my current privileges by participating in this study. I understand that the information I give is confidential and my name shall not appear on the questionnaire.

I have had an opportunity to ask questions and I fully understand the objectives of the study. I consent voluntarily to participation.

Name of Participant *(Please print)*: _____

Signature of Participant: _____

Date: _____

I have explained the nature of the study to the participant and have witnessed the signing of the consent form by the participant. I accept that the participant can pull out of the study if they wish to do so.

Name of Researcher *(Please print):*_____

Signature of Researcher: _____
Date: _____

APPENDIX 4: Hospital Disaster Plan Checklist

Name of Investigator: Dr Gerald Chimenya

Date:

Introduction: A disaster plan is an agreed set of arrangements for responding to and recovering from disasters and it describes responsibilities, management structures, strategies, and resources for preparing, responding to, and recovering from disasters (WHO, 1999:70). Hospitals should have a well documented and tested disaster plan in order to respond in an efficient and effective way. Without a disaster plan, hospitals may fail to respond effectively and efficiently and there may be improper use of resources. There may also be many points of command, with staff doing their work without effectively contributing to the response.

This checklist has been designed to assess the disaster plan of Onandjokwe Lutheran Hospital. It is based on the recommended components described by Carley & Mackway-Jones (2006:28) in the Major Incident Medical Management and Support (MIMMS) manual. It has also been adapted from "mass casualty disaster plan checklist: a template for healthcare facilities" designed by the Centre for the Study of Bioterrorism and Emerging Infections (CSB&EI) and the Association for Professionals in Infection Control and Epidemiology (APIC) available on http://bioterrorism.slu.edu/bt/quick/disasterplan.pdf.

Instructions: This checklist is for assessing the disaster plan of Onandjokwe Lutheran Hospital.

    i) Indicate with an **(X)** in the relevant column showing whether the component is available or not.

    ii) Write your comment in the space provided.

    iii) Where possible, conduct a physical check of the hospital to find out if the listed component or facility is available and make comments in the space provided.

1. General considerations	Yes	No	Comment
i). Does the Hospital have a disaster plan?			
ii). Is there a disaster planning Committee?			
iii). Is the committee multidisciplinary?			
iv). Does the plan cover both internal and external disasters.			
v). Is the plan available in every department of the hospital?			
vi).Is the plan based on an "all hazards" approach*?(please indicate the hazards covered by the plan)*			
vii).Does the plan detail the disaster risk profile of the hospital and the area surrounding the hospital?*(please indicate the ranks of the hazards covered, if any)*			
viii).Does the plan have details on any agreements with other Hospitals or healthcare centres who will accept patients during disasters?			

2. Command and Control	Yes	No	Comment
i). Does the plan detail who is in charge in the event of an emergency/disaster?			
ii). Is there an indication of where the incident command and control centre is located?(*physical check required-Should be preferably away from the emergency department)*			
iii). Is there an alternative location for the incident command centre?			
iv).Is there any specification of the chain of command and channels of communication?			
v).Is there any specification of standard operating procedures and standing rules for the incident command?			

3. Communication	Yes	No	Comment
i). Is there an indication of what communication systems are to be used during disasters*?(Please note which ones)*			
ii). Are there any provisions for alternative communication systems in the event that the normal systems (for example telephone, cell phones) are overloaded and are unserviceable during disasters?(*note which ones)*			

Communication (*Continued from previous page)*	Yes	No	Comment
iii).Does the plan utilise an organised runner or messenger system as back-up during disasters?			
iv).In the event of a power outage, does the plan detail what forms of communication systems will be used?			
v).Are there any arrangements with local telecommunications companies for provision of adequate uninterrupted communication systems during disasters?			
vi).Are there standardised messages for alerting hospital staff with descriptions of each stage?			
Alert — Disaster situation possible: Increased level of preparedness			
Standby — Disaster situation probable: should be available for immediate deployment.			
Call out — Disaster situation exists: Deployment of staff.			
Stand Down — Disaster situation contained.			
vii) Does the plan specify who is responsible for activation of the plan?			
viii) Are there specifications under which the plan can be activated?			
ix) Does the plan specify how staff members will be notified?			

4. Safety and Security	Yes	No	Comment
i). Does the plan indicate the points of entry and exit of ambulances during disasters?			
ii).Does the plan detail how pedestrians and vehicular traffic will be controlled?			
iii).Does the plan show how staff will be identified during a disaster?			
iv).Are there details of personal protective equipment and precautions to be taken in the event of a possible infectious disease or when victims need decontamination?			
v).Does the plan show how healthcare workers from outside the hospital will be identified and registered so as to facilitate safe and qualified patient care?			

5. Key area selection	Yes	No	Comment
i) Have the following key areas been identified and selected? *(Please indicate where they are located in relation to the emergency department)*			
a) Staff reporting area			
b) Discharge/reunion area			
c) Body holding area			
d) Hospital command and control room			
e) Volunteer reporting area			
f) Hospital enquiry point			
g) Press area			
h) Relatives area			
i) Triage area			
j) Treatment area			
ii) Decontamination area?			
a) Is there a separate entry for contaminated patients into the emergency department?			
b) Does the area have hot and cold water?			
c) Can water run-off from the decontamination area be contained?			
d) Is the ventilation system in the area isolated from the rest of the hospital?			
e) Is there a device for decontamination?			

6. Key staff selection and staff tasking	Yes	No	Comment
i) Have the following key staff been selected?*(please indicate their current positions at the hospital)*			
a) Incident commander			
b) Public information officer/media liaison			
c) Safety and security officer			
d) Logistics chief			
e) Medical care director			
f) Nursing care manager			
g) General staff director			
h) Finance chief			
i) Planning chief			
ii). Does the plan show the formation of teams for optimal patient care? *(indicate how many teams and the positions of those in these teams)*			
iii). Have duty cards been developed for the various positions?			

7. Infrastructure and Equipment	Yes	No	Comment
i). Is there stockpiling of drugs and other clinical equipment for use during disasters?			
ii). Is there supply of Personal Protective Equipment for staff members?			
iii). Are the following areas included in the disaster planning?			
a) Catering services			
b) Laundry services			
c) Supply of clinical equipment			
d) Supply of non-clinical equipment			
e) Supply of specialist equipment			
iv) Does the hospital conduct an evaluation of supply and equipment levels that are available during normal times?			

8. Training and Education	Yes	No	Comment
i). Does the plan indicate who is responsible of training and educating staff?			
ii). Does the plan show how hospital staff will be familiarised with their roles during disasters?			
iii). Does the plan indicate the need for formal training of staff in emergency medicine?			
iv). Does the hospital conduct workshops to facilitate staff awareness?			

9. Monitoring and evaluation	Yes	No	Comment
i). Does the plan show the measures for monitoring and evaluating the disaster preparedness process?			
ii).Are any of the following included in the plan?			
a) Disaster drills			
b) Tabletop exercises			
c) Drills involving other organisations in the region dealing with disasters			
iii). Does the plan show specific aspects that need to be tested?			

10. Response	Yes	No	Comment
i). Has the hospital developed plans for internal disasters?			
ii). Does the plan indicate how the hospital would respond to a large influx of patients?			
iii). Does the plan indicate how supplies of equipment and personnel will be done in response to a disaster?			
iv). Do all the departments at the hospital have their standard operating procedures in the event of a disaster?			
v). Is there a precise plan of action in which a large number of victims will be:			
a. Identified			
b. Triaged			
c. Registered			
d. Treated in designated areas			
e. Admitted or transferred.			
f. Transported to either wards or other hospitals.			
vi). Does the plan have provisions for:			
a. Clearance of non-emergency cases and visitors from the emergency department.			
b. Cancellation of elective admissions and surgery.			
c. Determination of space that can be used to accommodate patients.			
d. Determination of patients that can be transferred or discharged.			
vii). Is the receiving and sorting area accessible and is it near the emergency department or wards?			
viii) Are there provisions for the creation of extra beds when there are mass casualties?			
ix). Are there provisions for calling in extra staff in the event of mass casualties?			
x). Is there a system of pre-registration of volunteers and is there a reporting area for volunteers?			
xi). Is there a provision for safekeeping and retaining of items removed from casualties?			
xii). Does the plan include evacuation procedures in the event of an internal disaster?			
xiii). Are there assembly points following evacuation of staff and patients?			

Response (continued from previous page)	Yes	No	Comment
xiv). Are there any identified satellite locations for the accommodation of patients and staff in the event of an evacuation of the hospital?			

11. Post Disaster Recovery	Yes	No	Comment
i).Does the plan consider support for patients in the following areas:			
a. Critical incident debriefing			
b. Employee assistance			
c. Group or individual counselling services			
d. Family support programs			

APPENDIX 5: Letter to the Permanent Secretary of Health

The Permanent Secretary
Ministry of Health and Social Services
Private Bag 13198
Windhoek

P.O Box 2775
Ondangwa

02 February 2011

Dear Sir/Madam

Ref: Application for Permission to Conduct Research at Onandjokwe Lutheran Hospital

I am applying for permission to conduct research at Onandjokwe Lutheran Hospital. I am a part time student studying for a Masters in Disaster Management at the University of the Free State and am currently employed at H.L Musweu private practice in Ondangwa.

The study will focus on the emergency and disaster preparedness of Onandjokwe Hospital. It will also evaluate the hospital contingency plans and assess the knowledge, attitudes and practices of the healthcare workers in terms of disaster management. The management at Onandjokwe Hospital has been approached and they have expressed their willingness to participate in the research.

Whenever disasters occur, there is often disruption of people's livelihoods including injuries and loss of life. The health care system plays an important role in responding to disasters especially when the survivors need treatment and psychosocial services, and the dead need mortuary services. This makes it important for the healthcare system to have disaster preparedness plans in place so that the response can be effective. The study is therefore expected to assess disaster preparedness and widen the evidence-base guiding the disaster management policy and practices at Onandjokwe Hospital and other hospitals in Namibia.

Looking forward to a favourable response.

Yours faithfully

Dr Gerald Noel Tozivepi Chimenya

APPENDIX 6: Letter of permission

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REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198	Ministerial Building	Tel: (061) 2032510
Windhoek	Harvey Street	Fax: (061)272286
Namibia	Windhoek	E-mail: eshaama@mhss.gov.na
Enquiries: Ms. E. Shaama	Ref.: 17/3/3	Date: 15 March 2011

OFFICE OF THE PERMANENT SECRETARY

Dr. D.N.T. Chimenya
P.O. Box 2775
Ondangwa

Dear Dr. Chimenya

Re: An assessment of Hospital Emergency and Preparedness: A case study of Onandjokwe Lutheran Hospital.

1.   Reference is made to your application to conduct the above-mentioned study.

2.   The proposal has been evaluated and found to have merit.

3.   Kindly be informed that permission to conduct the study has been granted under the following conditions:

3.1   The data to be collected must only be used for completion of your Masters Degree;
3.2   No other data should be collected other than the data stated in the proposal;
3.3   A quarterly report to be submitted to the Ministry's Research Unit;
3.4   Preliminary findings to be submitted upon completion of study;
3.5   Final report to be submitted upon completion of the study;
3.6   Separate permission should be sought from the Ministry for the publication of the findings.

Yours sincerely,

MR. K. KAHUURE
PERMANENT SECRETARY

"Health for All"