# DISASTER PREPAREDNESS AND MANAGEMENT PLAN FOR THE HOSPITALS WITHIN ADDIS ABABA ADMINISTRATION HEALTH BUREAU, ETHIOPIA

by

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submitted in accordance with the requirements for the degree of

**DOCTOR OF PHILOSOPHY**

in the subject

PUBLIC HEALTH

at the

**UNIVERSITY OF SOUTH AFRICA**

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OCTOBER 2022

# DECLARATION

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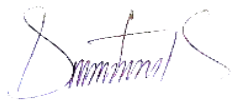
I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.



11 November 2022

**SIGNATURE** **DATE**

Dereje Derbew Damete

# DEDICATION

*To my lord and saviour, all the honour and glory*

*To my wife, Mentewab, for all her love, support, and encouragement*

*To my children, Abemelake Dagim and Yafet*

*To my parents, for their support*

# ACKNOWLEDGEMENTS

First, praise and thanks be given to the Almighty God, the son of the Virgin Mary, who created everything.

I wish to express my sincere gratitude to those who assisted me with the compilation of this thesis.

- My supervisor, Prof. RM Mmusi-Phetoe, for her enthusiasm, advice, motivation, and assistance. My gratitude goes out to her for responding timely to my queries, encouraging me, and providing the direction which ultimately led to the completion of this thesis.
- The Addis Ababa City Administration Health Bureau gives ethical clearance and permission to conduct the study in public hospitals.
- For the positive and enthusiastic support of the hospital's chief executive officers, medical directors, heads, and staff.
- Data collectors, for their assistance in distributing and collecting questionnaires.
- I appreciate my wife, Mentewab Worknhe, and my sons, Abemelek Dereje, Dagim Dereje, and Yafet Dereje, who have shown continuous support, understanding, and tolerance throughout the study time.
- Lastly, I would like to take this opportunity to thank all those who contributed to this study in different ways.

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# ABSTRACT

The study aimed at developing a disaster preparedness and management plan for the hospitals in Addis Ababa Administration Health Bureau. The objectives of the study were to explore and describe the nature and types of disasters encountered in the hospitals, hospitals' response to the disaster, ensuring preparedness for and management of disasters, the challenges facing hospitals in disaster management, and the effects of disasters in hospitals.

The mixed-methods research design was used to conduct the study. The data were collected from hospital staff working under the Addis Ababa City Administration Health Bureau. A questionnaire and individual in-depth interviews were employed to collect the data.

A simple descriptive statistic was used to analyse the data for the quantitative phase, as well as frequency distribution tables and graphs. Qualitative data were analysed using thematic analysis.

The study revealed that, for most people, 40.7% of the incidents that occur in hospitals result from transportation accidents. Only 11.9% of hospital employees in the study area were members of disaster management committees; emergency supplies were not readily available for immediate distribution, there was a poor security service, and only 23.8% had received disaster management training. This study concludes that Addis Ababa city administration hospitals are below standard regarding disaster preparedness and disaster management.

Finally, the study recommends that government officials and policymakers should design appropriate policies and interventions to empower hospital staff to fill gaps by themselves, particularly managers living in administrative areas in the hospital.



**Key terms:** Disaster, disaster preparedness, management plan, Addis Ababa city administration, hospitals, hospital staff, developed plan, mixed methods

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| | |
|---|---|
| DM | Disaster Management |
| DMP | Disaster Management Plan |
| DRM | Disaster Risk Management |
| ED | Emergency Department |
| FEMA | Federal Emergency Management Agency |
| HDP | Hospital Disaster Preparedness |
| ICU | Intensive Care Unit |
| MOH | Ministry of Health |
| PPE | Personal Protective Equipment |
| SPSS | Statistical Package for Social Sciences |
| TPB | Theory of Planned Behaviour |
| UNISA | University of South Africa |
| WHO | World Health Organization |

# CHAPTER 1
# ORIENTATION TO THE STUDY

## 1.1. INTRODUCTION

The world, including Ethiopia, has been affected by the increasing incidence of major disasters, such as earthquakes, hurricanes, floods, and tsunamis (Ahayalimudin & Osman 2016:203). The Global Facility for Disaster Reduction and Recovery (GFDRR), a global partnership that helps developing countries better understand and reduce their vulnerability to natural hazards and climate change, has identified Ethiopia as one of the 20 countries chosen for assistance in disaster risk reduction, thus protecting lives and livelihoods (Budusa 2014:20). The choice of Ethiopia was because it is prone to natural disasters. In addition, Ethiopia has also been found wanting in disaster preparedness.

According to Habte, Addisie, and Izzah (2018:39-48), very little has so far been done in the area of disasters and disaster preparedness in Ethiopia, even though disaster risk is always high for Ethiopian hospitals, and many of them are not adequately equipped for emergencies (Woyessa, Teshome, Mulatu, Abadiga, Hiko and Kebede 2020:219). It is against this background that this research was undertaken to develop a disaster preparedness and management plan for the hospitals within Addis Ababa, Ethiopia.

## 1.2. BACKGROUND

Ethiopia has been found to be vulnerable to natural and man-made disasters mainly due to floods, drought, landslides, earthquakes, volcanic eruptions, and disease epidemics (Nofal, Alfayyad, Khan, Al Aseri & Abu-Shaheen 2018:1124). The magnitude, frequency, and type of disasters vary by geographical location, ethnicities, and economic capacities (Nofal et al 2018:1124). Ethiopia repeatedly suffers from disasters – complex emergencies, droughts and floods are prevalent. These areas are characterised by low and irregular rainfall as well as periodic droughts (Venton, Fitzgibbon, Shitarek, Coulter & Dooley 2012:10-12).

The occurrence of disastrous events causes massive loss of life, physical injuries, as well as social and economic damage (Food and Agriculture Organization (FAO) 2017:7-9). During disaster events, hospitals play key roles by providing essential care to the community (Ibro,

Heye & Beza 2017:1-7). In Ethiopia, estimated losses from drought disaster are quite extensive, including needs, damages, reconstruction costs and a quantification of lost animals (Venton et al 2012:72).

Natural and man-made disasters occur daily in the biological environment, causing serious injuries, deaths, and disruptions of infrastructure and facilities (Nofal et al 2018:1125). Globally, water pollution accidents in the past decade were the most frequent in all continents except Oceania, where all meteorological disasters were reported in 2016. Flooding is the most frequently reported in all regions of the UN, along with the Caribbean, North America, East Asia, Western Europe, and Polynesia, where high storms occur (Guha-Sapir, Hoyois & Below 2016:3).

The share of disasters in Asia, Europe, and Oceania has been around the years 2006-2015. However, in Africa the share of people killed by disasters increased to 14.7%, compared to an annual average of 4.4% between the years 2006 and 2015. In contrast, the share of Asia in 2016 in respect the total number of deaths due to disasters was 20% and this was clearly below its annual average of 34.2% (Guha-Sapir et al 2016:3).

In Africa, in almost each year, droughts affect hundreds of thousands or millions of people in every region. This was still the case in 2016, with a total of more than 41 million people affected, which is 1.74 times the annual average. In East, North, and South Africa, the impacts of drought were severe: the number of people affected represented 2, 3 and 7 times, respectively, the 2006-2015 annual averages (Guha-Sapir et al 2016:4).

Koka, Sawe, Mbaya, Kilindimo, Mfinanga, Mwafongo, Wallis and Reynolds (2018:2) highlighted that 23 (92%) of the regional hospitals reported experiencing a disaster in Tanzania in the past five years. The top three causes of disasters were major road traffic crashes, which were about 20 (87%) (Koka et al 2018:2). Six studies in the United States of America associated previous disaster response experience with a higher perceived level of disaster preparedness (Labrague, Hammad, Gloe, Mcenroe-Petitte, Fronda, Obeidat, Leocadio, Cayaban & Mirafuentes 2018:49).

The magnitude and intensity of disasters have been noticeably rising due to natural and human forces over the past decade in Ethiopia (Berhanu, Abrha, Ejigu & Woldemichael

2016:416). Like in other developing countries, Ethiopia faces several challenges in applying disaster preparedness strategies, due to the complexity of socio-economic, environmental, political, and technological challenges (UNISDR 2011:11-15). Hence training in disaster medicine as part of efficient disaster preparedness is vital for health professionals to prevent and alleviate disaster complications (Berhanu et al 2016:417).

In southwest Ethiopia, a study was conducted in the Jimma Zone in 2012 to assess the knowledge and attitudes of health professionals regarding disaster preparedness to identify the gaps in addressing training needs (Hajito, Gesesew, Bayu & Tsehay 2015:2-3). The findings suggested that the majority of health professionals were agreeing that disaster has direct public health consequences by causing physical disability and psychological stress, thus increasing vulnerability to various contagious diseases (Hajito et al 2015:2-3).

A National Policy on Disaster Prevention Management was developed for Ethiopia in 1993, followed by the development of the National Disaster Risk Management and Strategy in which all concerned bodies participated. The aim of the policy and strategy was to provide direction on how to manage disasters and emergencies (Government of Ethiopia 2009:4-5). However, the existing National Disaster Risk Management and Strategy is yet to be translated to operationalisation by lower structures of administration and identified government hospitals in Addis Ababa city administration. The existing National Disaster Risk Management and Strategy was also found to be lacking the strategic and infrastructural preparedness for disasters (Ibro et al 2017:1-7).

### 1.3. RESEARCH PROBLEM

A research problem is an ambiguous or problematic state of research in which the goal is to "solve" or contribute to the possible solution by collecting relevant data (Polit & Beck 2018:152). A research problem is an awareness of current issues in the subject and requires an inquisitive and questioning mind and an ability to express clearly to find and formulate a problem that is suitable for a research project (Walliman 2010:32).

Addis Ababa, as in Ethiopia, is exposed to both riverine and flash floods due to river overflows caused by extreme rainfall events and upper catchment activities. The vulnerability to flooding is intimately linked to encroaching housing development along the riverbanks, the

use of vulnerable housing material such as mud and wood, and the poor drainage systems along roadways (World Bank 2015:33).

Addis Ababa is further exposed to fires caused by, among others, unsafe cooking practices (use of kerosene and open fires) and unsafe electrical wiring. The fire hazard in the city is exacerbated by the density of neighbourhoods (mostly informal settlements or slum areas such as Merkato), poor housing quality, and lack of road access and traffic congestion which prevents mobility of people, including emergency responders, making Addis Ababa highly vulnerable to fire disasters (World Bank 2015:34). Lives have been lost and properties damaged worth trillions of Ethiopian birr. Mururi (2014:414-415) confirms that a disaster is an overwhelming event that leads to destruction, injuries and loss of lives (Mururi 2014:414-415).

The existing interventions generally respond to drought and are not detailed and specific to other disasters which have affected Ethiopia as indicated above (Tadesse & Ardalan 2014:3). Tadesse and Ardalan (2014:5) note that the existing disaster management (DM) system integrates elements of mitigation, prevention, and preparedness phases into a response and recovery approach particularly for drought only since associated health risks such as malnutrition are declining. Consequently, the lower structures of administration and the identified government hospitals in Addis Ababa administration have been found to be lacking strategic direction as well as infrastructural preparedness for other disasters (Tadesse & Ardalan 2014; Ibro et al 2017:1-7).

Having worked for more than six years in emergency situations, I concur with studies that point to challenges such as poor emergency coordination in the hospitals and underdeveloped triage skills when disaster strikes (Fleet, Dupuis, Mbakop-Nguebou, Archambault, Plant, Chauny & Légaré 2017:70; Kerie, Tilahun & Mandesh 2018:5). There are differences in social and behavioural knowledge and other gaps in how individuals and hospitals manage threats and respond in a disaster or emergency (Hajito et al 2015:4).

The establishment of hospital plans that embrace identification, assessment, monitoring and mapping disaster health risks at all levels to prepare for disasters and mitigate the effects of a disaster is essential. Hence Addis Ababa hospitals need a sound disaster preparedness

and management plan in place to ensure timely and appropriate response to save lives, reduce poor health outcomes and ensure safety of the public.

## 1.4. AIM/PURPOSE OF THE STUDY

### 1.4.1. Research aim/purpose

The aim/purpose of the study was to develop a disaster preparedness and management plan to support hospitals in Addis Ababa Administration Health Bureau.

### 1.4.2. Research objectives

**Phase one**

**Part 1: Quantitative**

- To explore and describe the nature and types of disasters encountered in the hospitals in Addis Ababa Administration Health Bureau
- To explore and describe the existing interventions to respond to disasters that have been encountered in the hospitals in Addis Ababa Administration Health Bureau.
- To establish measures to be put in place to ensure that disasters are prepared for and managed in the hospitals in Addis Ababa Administration Health Bureau.

**Part 2: Qualitative**

- To explore and describe the challenges facing hospitals in Addis Ababa Administration Health Bureau, Ethiopia, in disaster preparedness and management.
- To establish the effects of disasters in hospitals in Addis Ababa Administration Health Bureau
- To propose plans to ensure disaster preparedness and management in the hospitals in Addis Ababa Administration Health Bureau in case of a disaster.

**Phase Two**

Part 1 Mixed methods or integration

To develop disaster preparedness and a management plan for the hospitals in Addis Ababa Administration Health Bureau Hospitals.

### 1.4.3. Research questions

**For the quantitative phase**

1 What are the nature and types of disasters encountered in the hospitals in Addis Ababa Administration Health Bureau?

2 What have been the responses to disasters that have already been encountered in the hospitals in Addis Ababa Administration Health Bureau?

3 What measures have been implemented to ensure that the disasters are prepared for and managed in the hospitals in Addis Ababa Administration Health Bureau?

**For the qualitative phase**

1 What are the challenges facing hospitals in Addis Ababa Administration Health Bureau, Ethiopia, in disaster preparedness and management?

2 What are the effects of disasters in hospitals in Addis Ababa Administration Health Bureau?

3 What are the plans to ensure disaster preparedness and management in the hospitals in Addis Ababa Administration Health Bureau in a case of a disaster?

**Phase 2. For mixed methods or integration**

What disaster preparedness and management plan should be developed to support hospitals in the management of disaster in Addis Ababa Administration Health Bureau hospitals?

## 1.5. SIGNIFICANCE OF THE STUDY

The findings will assist policy makers in disaster preparedness and management law is implemented at federally funded healthcare facilities, regional health bureaus, and the Addis Ababa City Administration Health Bureau. The goal of the study is to give government and decision-makers with useful information such as:

- Addis Ababa City Fire and Emergency Prevention and Rescue Agency:
  The disaster preparedness and management study will provide the Addis Ababa City Fire and Emergency Prevention and Rescue Agency with improved knowledge,

training, and coordination in responding to natural disasters, ensuring that the agency is better equipped to protect the city's people and assets in the event of an emergency.

- Educational institutions such as colleges, universities, and other training and teaching institutions:
  The disaster preparedness and management study will allow educational institutions to enhance their curricula, develop research opportunities, and expand their overall knowledge on this topic. This will lead to better-prepared graduates who are more knowledgeable about disaster response and management.

- Non-governmental organizations (NGOs) such as professional associations:
  The disaster preparedness and management study will enable NGOs to develop a greater understanding of best practices in disaster response, driving innovation and collaboration among stakeholders. This will support advocacy efforts and programming around disaster preparedness and management in the community.

- Private health institutions:
  The disaster preparedness and management study will help private health institutions improve their ability to respond to disasters by providing guidance on preparedness planning and staff training for mass casualty incidents. This will support more effective coordinated responses with other healthcare facilities and emergency service providers.

This study has significance for patients and the community at large, such as the development of more effective disaster response systems and better coordination between healthcare institutions and local emergency responders. Identifying vulnerabilities in healthcare infrastructure can make hospitals more resilient in the face of disasters, and effective collaboration between healthcare providers, government agencies, and community groups is vital for successful disaster preparedness and management.

## 1.6. OPERATIONAL DEFINITIONS

### 1.6.1. Disaster

Disaster refers to an event that severely disrupts a community or civilization's ability to operate and results in significant human, material, economic, or environmental losses that outweigh the capacity of the affected community or society to manage using its own resources (Kiongo 2015:11).

### 1.6.2. Disaster management

Disaster management (DM) is a collective term, encompassing all aspects of and responding to emergencies and disasters including both pre, during and post activities; as well as the management of risk and consequences (Palttala, Boano, Lund & Vos 2012:11).

### 1.6.3. Preparedness

These are actions and steps planned in advance to enable a successful reaction to dangers, such as the provision of timely and efficient early warnings and the temporary removal of persons and property from dangerous areas (Kiongo 2015:11).

### 1.6.4. Disaster risk

Disaster risk means potential disaster losses in lives, health status, livelihoods, assets and services, which could happen to a community or a society over some specified future time (Cui, Peng, Shi, Tang, Ouyang, Zou, Liu, Li & Lei 2021:217).

### 1.6.5. Disaster preparedness plan

It consists of a collection of procedures that have been agreed upon for anticipating, responding to, and recovering from emergencies. It also includes the assignment of roles, the development of management plans, the management of resources, and the management of information. (Muzhikov, Vershinina, Muzhikov & Nikitin 2018:41).

### 1.6.6. Hazard

A procedure or occurrence that can result in human death, bodily harm, other health effects, property destruction, social unrest, economic hardship, or environmental deterioration. Hazards can be categorized as either natural, anthropogenic, or socio-natural. (FAO 2017:9).

### 1.6.7. Resilience

Resilience is the ability of people, communities, institutions, enterprises, and systems within a city to endure, adapt, and advance regardless of the types of acute shocks and chronic pressures they encounter. (World Bank 2015:18).

### 1.6.8. Vulnerability

Vulnerability is when a single or group of elements, such as people, buildings, goods, services, or economic or social capital, are exposed to risk and refers to the potential amount of loss that they could sustain as a result of the likely occurrence of a tragic event. (Muzhikov et al 2018:41).

### 1.6.9. Health bureau:

Health bureau will refer is the administrative office of the Addis Ababa City Administration that oversees all health facilities (Sintayehu, Zeleke, Temesgen, Kifle, Assefa, Zenebe, Kassahun & Yimer 2022:1).

### 1.6.10. Hospital:

Hospital is a structure that is designed, staffed, and equipped to diagnose disease, treat sick and injured people, and house them while they are undergoing treatment (Nugroho, Hernoko, Yudianto & Prasetyawati 2022:361).

### 1.6.11. Potential disaster

Potential disaster refers to a system, society, or community loss of life, injury, or destroyed or damaged assets determined according to hazard, exposure, vulnerability, and capacity over a specified period (Rahmat, Widana, Basri & Musyrifin 2021:40).

### 1.6.12. Hospital response

Hospital response is measures include activating the emergency operations centre, evacuating threatened people, opening shelters, providing medical aid, firefighting, and providing urban search and rescue services (Jannat, Khorasani-Zavareh, Allahbakhshi, Aghazadeh-Attari, Nateghinia & Mohebbi 2021:128).

## 1.7. THEORETICAL FOUNDATIONS OF THE STUDY

Theory is defined as an abstract generalisation that explains how phenomena are interrelated with each other (Polit & Beck 2018:191). A framework is the overall conceptual underpinnings of a study and sometimes the underlying conceptual rationale for the inquiry is not explained (Polit & Beck 2018:193). A theoretical framework is a conceptual representation of how a researcher interprets the connections among several variables that have been determined to be crucial to the topic (Ncube & Chimenya 2016:24).

Ezeanolue, Pharr, Patel, Obiefune, Ogidi and Ehiri (2019:941) add that a theoretical framework acts as a blueprint for a specific health promotion strategy to be introduced and applied; is used to test hypotheses; and directs the strategy review and evaluation. On the other hand, some researchers have found that many factors influence disaster preparedness, such as critical knowledge, perception of risk, perception of preparedness, self-effectiveness, anxiety and past experience of catastrophe (Najafi, Ardalan, Akbarisari, Noorbala & Elmi 2017:4).

Disaster preparedness is further influenced by social norms, sense of community, positive group involvement and empowerment and standardisation biases, social faith, perceived responsibility, coping responsibilities towards others, and available resources (Najafi et al 2017:4). It was for this reason that this study used the theory of planned behaviour (TPB). This theory was found to be applicable in preparing for natural disasters such as floods and earthquake hazards which are common in Ethiopia. The choice of TPB was further informed by its concern with individual motivational factors which determine the likelihood of specific behaviour during disasters (Montano & Kasprzyk cited in Glanz, Rimer & Viswanath 2015:120). TPB has also been found to be associated with its preparedness for diverse hazards (Ejeta, Ardalan & Paton 2015), hence its relevance in the development of a disaster management plan (DMP) for hospitals within the Administration of Health Bureau Hospitals in Addis Ababa, Ethiopia. The TPB was used in conjunction with the health belief model (HBM), which suggests that a person's belief in a personal threat together with a person's belief in the effectiveness of the recommended action will predict the likelihood that the person will adopt the anticipated behaviour.

Additionally, the application and the influence of the choice of the Theory of Planned Behaviour (TPB) and the Health Belief Model (HBM) as a framework for this study is an indication of the interest in exploring the perspectives and behaviours of people affected by disasters (Begum, Masud, Alam, Mokhtar & Amir 2022:2-3). The TPB posits that people's attitudes, subjective norms, and perceived behavioural control impact their decision to engage in specific behaviours (Begum et al 2022:3).The HBM, on the other hand, suggests that people will take action to prevent or treat a given health concern if they believe they are susceptible to it, view it as a serious threat, and perceive that the benefits of taking action outweigh the costs (Patwary, Bardhan, Disha, Hasan, Haque, Sultana, Hossain, Browning, Alam & Sallam 2021:3). By using these models, will examine how individuals' attitudes and beliefs affect their preparedness behaviours and decision-making during natural disasters (Patwary et al 2021:3). Additionally, these models may be used to align preparedness efforts with the disaster management continuum.

### 1.7.1. Disaster management continuum

There are different phases in a disaster: preparation, mitigation, response, and recovery, each with its own characteristics and challenges (Khorram-Manesh 2017:23). Attention should be given particularly to the response and recovery phases, which may occur simultaneously in the same entity (Khorram-Manesh 2017:23). Figure 1 below depicts phases in the disaster management continuum.

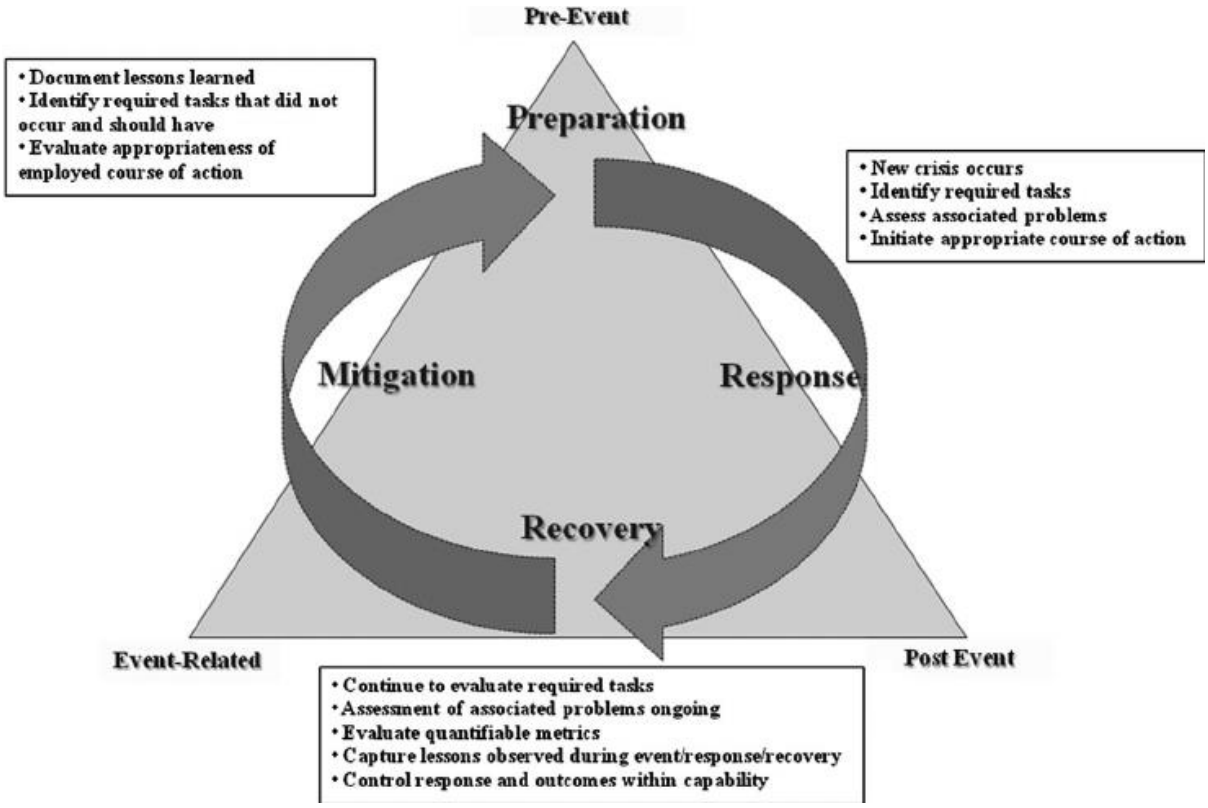


**Figure 1.1: Different phases in the disaster management continuum**

*Source: Adapted from Federal Emergency Management Agency (FEMA)*

#### *1.7.1.1. Preparation phase*

The preparation phase includes steps taken to reduce the expected damage, injuries and subsequent mortality. Organising transportation operations for individuals from threatened positions to other positions is part of the preparation phase (Khorram-Manesh 2017:23).

#### *1.7.1.2. Disaster mitigation*

In this phase, measures are employed to eliminate or reduce the impact and risks associated with a disaster, before the disaster occurs (Barnes, Dunn & Wilkinson 2019:1). In cases where individuals have sustained injuries, it can be claimed that the facility had a duty to mitigate certain conditions that allegedly led to the injuries during the disaster (McCourt, Sunshine & Rutkow 2019:244).

#### *1.7.1.3. Response phase*

The phase refers to measures taken immediately after the tragedy happens and involves rescue operations, locating survivors, and addressing the basic needs of the victims (Khorram-Manesh 2017:23).

#### *1.7.1.4. Recovery phase*

This phase involves decisions taken after the disaster happens and intends to restore the population to pre-disaster status (Khorram-Manesh 2017:24).

## 1.8. RESEARCH METHODOLOGY AND RESEARCH DESIGN

### 1.8.1. Study approach

A mixed methods study approach was followed in this study. The approach was chosen based on the research problem, the objectives, and the research questions, as it allowed the benefits of both the quantitative and qualitative methods to answer the research questions (Creswell & Creswell 2018:180).

### 1.8.2. Study design

A research design refers to a plan, structure, and strategy of investigation so conceived as to obtain answers to research questions (Kumar 2012:95). An explanatory sequential mixed method design was envisaged for this study. The explanatory sequential mixed methods design is characterised by an initial quantitative phase of data collection and analysis followed by collecting qualitative data to help explain or elaborate on the quantitative results (Polit & Beck 2018:312; Subedi 2016). The rationale for this approach is that the quantitative data and results provide a general picture of the research problem, while more analysis, specifically through qualitative data collection, is needed to refine, extend or explain the general picture. The final phase comprises integration or linking of data from the two separate strands of data (Creswell & Creswell 2018:181).

## 1.9. STRUCTURE OF THE DISSERTATION

This research is presented in six chapters (please refer to Table 1.1 below).

Chapter 1 provides an overview and introduction to the study as well as an orientation to it.

Chapter 2. Discusses the review of pertinent literature on the study topic that has been done, as well as appropriate research methods.

Chapter 3. Study design and methodology: In this chapter, the researcher discusses the research design and methodologies used to carry out the study. There includes a presentation and justification of the design type, population, sample, sampling techniques, data collection tool, and data analysis.

Chapter 4. Analysis, presentation and discussion of the research findings: The chapter used for data analysis, sample realization, data management and analysis, data presentation, a description of the research findings, and a summary of the study findings are all covered in this chapter.

Chapter 5. Proposed plan: This chapter presents a plan for disaster preparedness and disaster management.

Chapter 6. This chapter presents a summary and interpretation of the research findings, conclusions, contributions, recommendations and the limitations of the study.

## 1.10. SUMMARY

This chapter has introduced disaster preparedness of hospitals within the administration of the health bureau in Addis Ababa. It has also presented the background to the research problem, presented statement of the problem, the theoretical basis of the study, the aim and objectives of the study, and definitions of main concepts that were used in the study.

Chapter 2 presents a discussion of the literature review conducted for the study.

**TABLE 1.1: STRUCTURE OF THE THESIS**

| Chapter | Title | Descriptions |
|---|---|---|
| 1 | Orientation to the study | The Introduction, research problem, purpose, and research question. The objectives, significance, definition of terms, theoretical foundation, research design, methods, and trustworthiness have been briefly explained. |
| 2 | Literature review | Literature consulted in relation to the study's topic is presented. |
| 3 | Research design and methodology | Research design, methods used to achieve the objectives of the research, ways of ensuring validity and reliability/trustworthiness, and ethical considerations are discussed. |
| 4 | Analysis, presentation, discussion, and description of the research findings | Analysis, presentation, interpretation, and discussion of the research results are presented in this chapter. |
| 5 | Proposed disaster preparedness and management plan | A proposed disaster preparedness and management plan for the hospitals within Addis Ababa Administration Health Bureau, Ethiopia, is presented in this chapter. |
| 6 | Conclusions and recommendations | The conclusions, contribution, and recommendations based on the key findings of the study are considered. |

# CHAPTER 2
# LITERATURE REVIEW

## 2.1. INTRODUCTION

An overview of relevant literature is presented in this chapter on the disaster preparedness of hospitals. A literature review is a structured written description of what has been published on the topic and helps to familiarise the researcher with the existing body of knowledge relating to the topic under study, to provide an understanding and clarification of the topic area (Vaughan 2019:18). This chapter will therefore present literature on disaster preparedness globally, regionally, and in Ethiopia, focusing on disasters and the disaster preparedness of hospitals. The chapter will also discuss the lessons from various settings to inform the envisaged disaster preparedness plan for the hospitals within Addis Ababa City Administration Health Bureau, Ethiopia.

This section defines disasters, types of disaster that occur in hospitals and which specific types frequently happen in hospitals. The literature provides several definitions for disaster. There are two parts in the word disaster: the prefix "dis-", meaning bad or unfavourable, and "aster", meaning star. The literal meaning of the word, therefore, has an astrological context, in which unfavourable positions of planets or stars result in calamity (Haque, Berkes, Fernández-Llamazares, Ross, Chapin III, Doberstein, Reed, Agrawal, Nayak, Etkin & Doré 2021:4). The linguistic definition of the word disaster is “a sudden calamitous event bringing great damage, loss or destruction” (Al-Jazairi 2018:94).

A disaster, also called “calamity” and “catastrophe”, can be described as a sudden, devastating event that causes a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses (Zamree, Said & Sibly 2018:69; Khorram-Manesh 2017:17). The Centre for Research on the Epidemiology of Disasters (CRED) defines a disaster as “a situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering” (Khalili, Harre & Morley 2018:103). Disasters are increasing in frequency and intensity across the world, causing significant destruction to

individuals and communities. Yet many professionals are ill-prepared for the demands of this field of practice (Alston, Hazeleger & Hargreaves 2019:9).

Disasters impact on and exceed the ability of the affected community or society to cope, using its resources (Zamree et al 2018:69). The impact of the disaster on the safety, health, and economic well-being of the community further affects the preparation for and response to disasters as an ongoing public health issue (Monahan 2019:48). By providing timely health services, hospitals can play a critical role in disaster management by reducing mortality and increasing the number of survivors, minimising the effect of disabilities, and relieving physical and mental illnesses (Omidi, Omidi & Asgari 2019:80). Natural disasters and man-made incidents affect a large number of people worldwide and their impact has increased over the past decade (Incident 2018:208).

There are different phases in a disaster; each with its own characteristics and challenges. The phases are mitigation, preparation, response, and recovery (Khorram-Manesh 2017:23). Hospital disaster preparedness (HDP) refers to the steps taken by the hospital's stakeholders to plan for a disaster, mitigate its consequences, and ensure effective coordination throughout the response (Samsuddin, Takim, Nawawi, Rosman & SyedAlwee 2018:1). HDP and management are important efforts that need to be closely monitored and evaluated (Zamree et al 2018:69). Disaster preparedness in hospital activities have been developed over the past 30 years around the world, beginning with the World Health Assembly in 1981, demonstrating the necessity of preventative measures and preparedness (Samsuddin et al 2018:1). There is a critical role in disaster management, as its insights can mitigate the damage caused by a disaster, and emergency medical personnel should be involved (Ahayalimudin & Osman 2016:203-204). Disaster management (DM) relies on a complex set of interrelated activities, and these activities are often knowledge intensive and time sensitive (Beydoun, Dascalu, Dominey-Howes, & Sheehan 2018:649).

Disaster preparedness includes a range of activities to protect communities, property, and the environment, and hospitals are critical to disaster preparedness. They should have a dedicated hospital DMP and surge capacity to allow them to quickly expand to accommodate the additional patients affected by a given emergency (Koka et al 2018:1). Deficient HDP and planning are more pronounced in developing countries as compared to developed

countries (Alsalem & Alghanim 2021:2669). The provision of medical care to the community can be maintained if disaster preparedness is in place. Every year, hospitals are required to perform a hazard vulnerability analysis (HVA), which assesses the facility's health hazards, risks, and its ability to provide healthcare to the community (Blake, Wilson & Meyer 2019:7). Measuring the disaster preparedness of hospitals makes administrators aware of the performance, weaknesses, and strengths of units in case of disasters (Omidi et al 2019:80).

Disaster preparedness is also important for health professionals to prevent and alleviate disaster complications (Hajito et al 2015:2). Disaster preparedness is one of the basic components of disaster risk reduction (Sundar, Stratman & Sundar 2017:155). In the health sector, disaster emergency preparedness requires a logical process and a number of tasks, from policy formation to ongoing monitoring and evaluation (Ncube & Chimenya 2016:2). Hospitals must be prepared for an all-hazards response that might push healthcare systems to their limits and interrupt crucial healthcare services. Regardless of how big or small the event is, it has the potential to isolate, incapacitate, and raise vulnerability in communities (Halterman 2018:7).

During recent decades, the world's top high-income or developed countries/territories like the United States of America (USA), France, Germany, Italy, and Japan have faced absolute losses from a greater frequency and impact of disasters such as earthquakes, floods, droughts, storms and extreme temperatures (UNISDR 2011:3-4). Similarly, a paradigm shift in the types of disaster and the possible risks that constitute a threat to human well-being, including climate change, rapid and unmanaged urbanisation, lack of resources, poverty, and loss of biodiversity have been witnessed (Aitsi-Selmi, Egawa, Sasaki, Wannous & Murray 2015:166).

In the United States, preparedness has been made an important aspect of the hazard cycle and a rising topic of disaster research. Tasks, activities, and actions that may lessen the loss of life or property in the case of a disaster are included in disaster preparedness, yet the general public's disaster readiness remains low (DeYoung, Lewis, Seponski, Augustine & Phal 2019:427). Families and households in the United States should keep enough supplies to sustain them through a disaster for up to 72 hours in accordance with the FEMA, because this is the time it may take for disaster responders to reach communities in severe disasters

or devastating occurrences (DeYoung et al 2019:427). A study in the United States found that Alexandria university hospitals had a low level of disaster preparedness and a moderate level of resilience (Elsayed, Bassiouni, Abdo & Atalla 2020;477). They had several challenges in their disaster preparedness, particularly in disaster training and drills, disaster leadership and governance, communication, and disaster planning. When disasters strike, these weaknesses prevent the hospital from gaining resilience (Elsayed et al 2020:477). According to the authors, this needs immediate reform steps to reduce the impact of disasters.

Disasters are still a challenge, and they will continue to occur throughout the world, including in Europe and Germany (Grochtdreis, Schroder-Back, Harenberg, Gorres & De Jong 2020:3). When evaluating European disasters in previous years and comparing the preceding circumstances to the current health and climatic situation, it is evident that disasters are likely to occur again all over the world, and the situation in Germany may set an example for other European countries (Grochtdreis et al 2020:3). The findings on vulnerabilities in German hospitals reveal a major challenge: a large number of outdated, sometimes proprietary systems that are difficult to patch, whether due to mandatory re-certification or software end-of-support, paired with a lack of IT security financing (Klick, Koch & Brandstetter 2021:18).

According to the study by Ingrassia, Mangini, Azzaretto, Ciaramitaro, Costa, Burkle, Della Corte and Djalali (2016:1259), the vast majority of Italian hospitals surveyed are unprepared to deal with possible disasters. Furthermore, many critical aspects of hospital preparedness, such as the command system, surge capacity, and safety have not been implemented properly, and to strengthen HDP in Italy, national standards, rules, and procedures are required (Ingrassia et al 2016:1259).

Some developing countries such as Iran have also been studied. The literature reveals Iranian disaster preparedness of hospitals is still in an early stage of development. Some critical activities and measures related to disaster preparedness such as isolation, decontamination, and syndromic surveillance are underdeveloped (Borhannejad, Madah, Baqer, Khankeh, Falahi, Khoshknab, Rezasoltani, & Ahmadi 2019:106). According to the study in Iran, one of the challenges of disaster preparedness was the inability to quickly

mobilise human resources in disaster situations, as well as the impracticality of using bystanders and uninvited volunteers (Salmani, Seyedin, Ardalan & Farajkhoda 2019:1). A study conducted in the Jeddah region of the Kingdom of Saudi Arabia revealed that although the hospital possessed the necessary equipment and quality control measures for emergency preparedness, the employees lacked adequate training and disaster management abilities (Nofal et al 2018:1124). Most floods have been reported in continental sub-Saharan countries. South Africa has faced the highest number of reported flood events, followed by Kenya, Somalia, Mozambique, and Ethiopia (Bischiniotis, Hurk, Jongman, Perez, Veldkamp, Moel, & Aerts 2018:276).

South Africa, a country in Sub-Saharan Africa, was ranked 12th in the list of countries sorted and listed by the number of reported damages. As a country, South Africa is increasingly vulnerable to natural and man-made disasters, including floods, landslides, windstorms, hailstorms, bush and informal human settlement fires, rapid population movement (Vaughan 2019:15). Health disasters such as cholera, Rift Valley fever, and human pandemics have also been reported (Vaughan 2019:15). In light of the vulnerability of South Africa to disasters, the hospitals in this country must have clear disaster preparedness policies in place that identify potential disasters in the area in which they are located, as well as explicitly state the roles of all health professionals in the event of a disaster (Vaughan 2019:18).

According to a study conducted in Kenya, disaster preparedness attributes such as slow procurement processes have influenced the majority of hospitals in preparedness as the process undergoes several steps before completion (Kahare, Mwangi & Njuguna 2020:145). Kenyan Hospitals have been unable to plan for disaster preparedness as they lack the proper equipment to aid in the planning of the activities and this has resulted in the provision of health care services leading to loss of life in hospitals (Kahare et al 2020:145). Additionally, there is a lack of staff participation in a disaster plan, guidelines, and lobbying for disaster preparedness. The study found that policy formulation and implementation, commodities, and finances significantly influenced disaster preparedness (Kahare et al 2020:145).

In Tanzania, all regional hospitals experienced a disaster in the past five years, exposing several gaps in disaster preparedness in regional hospitals, further demonstrating the importance of preparedness to ensure resilience in emergencies and disasters (Koka et al

2018:5). The study found that disaster preparedness in Tanzanian regional hospitals was lacking, and that the human resources available for health care delivery at each regional hospital were below the recommended ratio for all staff, and that some highly skilled workers tended to be in administrative positions at the hospital, limiting their clinical roles (Koka et al 2018:4).

Disaster training is crucial across the world, especially in regions like Africa that are prone to natural disasters such as floods, droughts, and earthquakes (Orimoloye, Olusola, Belle, Pande & Ololade 2022:1085). In Ethiopia, disaster management training is provided by the National Disaster Risk Management Commission (NDRMC), which is responsible for coordinating and implementing disaster prevention, preparedness, response, and recovery efforts (Ayenew, Tassew & Workneh 2022:245). The NDRMC has developed a comprehensive disaster management policy to guide its activities, which includes provisions for training and capacity-building of relevant stakeholders at all levels of government and society (Ayenew et al 2022:246).

In terms of the classification of mobile accidents as disasters, there is evidence to support this view. The United Nations Office for Disaster Risk Reduction (UNDRR), for example, defines disasters 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." Mobile accidents have the potential to cause such disruptions and impacts, especially in densely populated areas where traffic congestion can exacerbate the situation (Mizutori 2020:147). Therefore, it is important that emergency responders and disaster management authorities are trained and equipped to handle mobile accidents as potential disasters (Dakeev, Pecen & Yildiz 2020:2).

In Ethiopia, the study showed how conflict (including inter-communal violence, regional political unrest, ethnic tensions, and localized conflicts) and climate-related causes (landslides, flooding, starvation, and drought) led to significant disruption (Yigzaw & Abitew 2019:32). Additionally, drought and food insecurity: Between 2015 and 2018, much of Ethiopia experienced severe drought conditions, leading to widespread food insecurity. According to the United Nations, an estimated 9.5 million people required food assistance in

2018 (Tora, Degaga & Utallo 2021:2). Cyclone Sagar: In May 2018, Cyclone Sagar made landfall in Djibouti and Somalia, causing widespread damage and flooding in parts of Ethiopia as well. The storm led to several deaths and the displacement of thousands of people (Gure 2021:18-91).

Ethnic violence: In 2018 and 2019, there were several cases of inter-communal violence in Ethiopia, particularly in the Oromia and Amhara regions. This violence has resulted in thousands of deaths and the displacement of hundreds of thousands of people (Yusuf 2019:5). Desert locust outbreak: Starting in late 2019, Ethiopia has been experiencing its worst desert locust outbreak in decades. These insects can cause significant damage to crop and grazing land, posing a threat to food security in affected areas (Kassegn & Endris 2021:9). In Ethiopia, the Ministry of Health has developed a national disaster management policy outlines their approach to disaster management and emergency response (Mbaeze & Eneasato 2019:221). Hospitals are required to have an emergency management plan in place which includes identifying potential hazards, assessing risk, planning for specific response actions, and developing procedures for communication and coordination (Mbaeze & Eneasato 2019:221).

There are different types of experts involved in disaster management at hospitals in Ethiopia (Firew, Gebreyesus, Woldeyohannes, Ebrahim & Patel 2020:53). The first type is the disaster manager or coordinator who is responsible for overall planning and coordination of the hospital's emergency response (Getu, Tsegaw, González & Delgado 2023:3). The second type is the medical expert who provides clinical care to those affected by the disaster. The third type is the logistic expert who manages the supply chain and resources needed to respond to a disaster (Getu et al 2023:3).

Hospitals need to have an effective organizational structure or organogram to ensure that there is clear communication, accountability, and transparency during disaster management (Alemu, Bezabih, Amsalu, Hassen, Haile & Abite 2022:2-3). This can help prevent confusion, avoid duplication of efforts, and ensure that resources and personnel are utilized effectively and efficiently (Alemu et al 2022:3).

Ethiopia has been found to be suffering low practice (8.3%) of disaster preparedness and planning in their hospitals, as reported by Habte et al (2018:45). Even though it needs more research and resources, hospitals' disaster preparedness has received very little attention (Woyessa et al 2020:220). Thus, evidence is scarce on the current state of HDP, particularly the administrators' perception of the risk of disaster events (Woyessa et al 2020:220). One of the major challenges that disaster preparedness may encounter is logistic shortages, lack of funds, and inadequacy of appropriate places to provide health services, as well as a shortage of human resources (Woyessa et al 2020:224). Another study has shown, at Amhara Regional State Referral Hospitals in Ethiopia, that disaster preparedness, knowledge, and familiarity levels are lower than expected and it is necessary to develop capacity through training, education, and simulation (Tilahun, Desu, Zeleke, Dagnaw & Andualem 2021:221).

### 2.1.1. Types of disaster

Disasters are broadly divided into two types, comprising natural and man-made (technological) disasters.

#### *2.1.1.1. Natural disasters*

Natural disasters occur because of the action of natural forces and tend to be accepted as unfortunate, but inevitable. Natural disasters result from forces of climate, geology and are perhaps the most “unexpected” and overall costly in terms of loss of human lives and resources. In the last few years, natural disasters have claimed 100,000 lives, costing above 140 billion US dollars (Sena & Woldemichael 2010:10-12). Earthquakes, extreme heat or cold, winter storms, floods, hurricanes, tornadoes, tsunamis, volcanoes, and mudslides are all examples of natural disasters that can cause injury and death (Vaughan 2019:15). Below, Figure 2.1 depicts global natural disasters from 1900 to 2019.

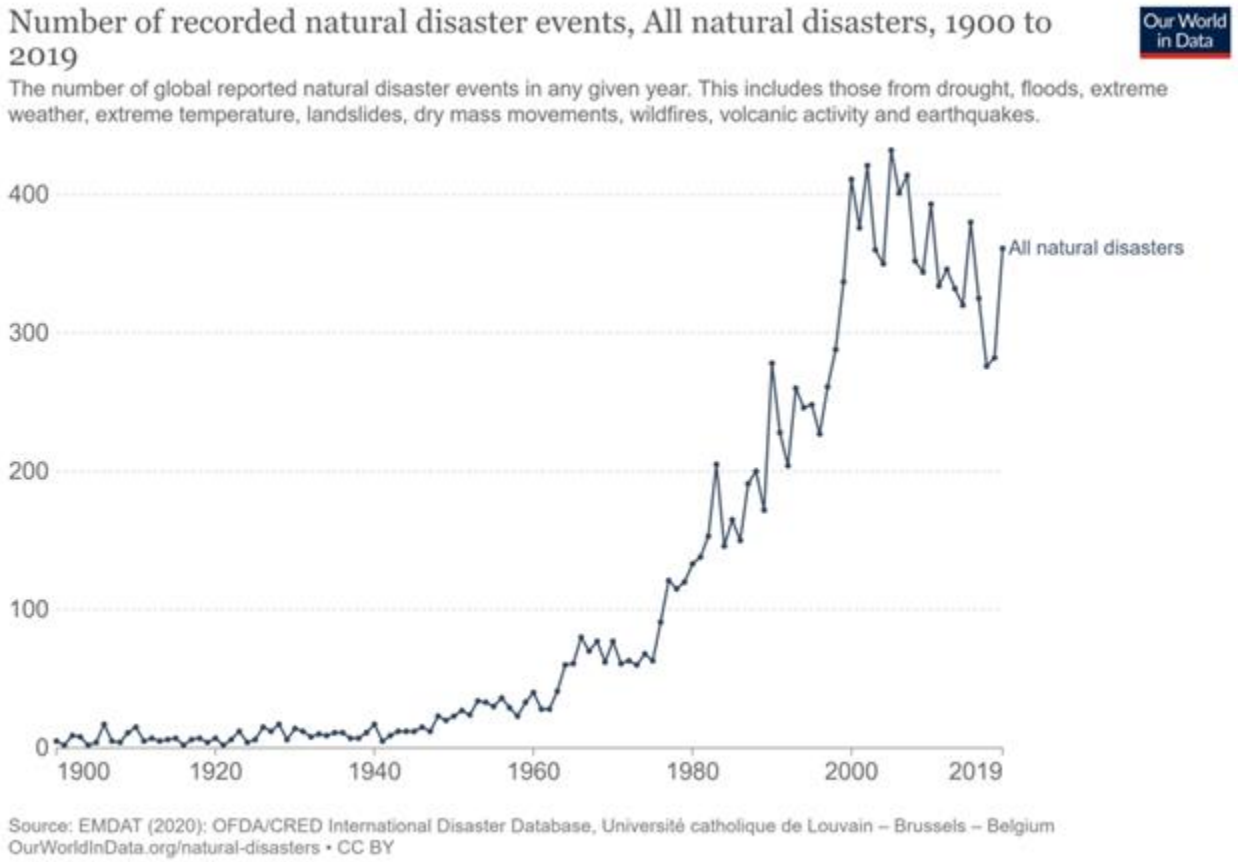


**Figure 2.1: Number of recorded natural disaster events, 1900–2019**

*Source: EMDAT 2020. OFDA/CRED International Disaster Database, Université catholique de Louvain – Brussels – Belgium. From: https://ourworldindata.org/natural-disasters (accessed 14 October 2021).*

#### *2.1.1.2. Man-made*

Man-made or technological disasters result from human activities, such as explosions, fires, the release of toxic chemicals or radioactive materials, bridge or building collapse, crashes, dam failure, nuclear reactor accidents, breaks in water, gas, or sewer lines, deforestation, war, etc. Man-made disasters tend to involve many more casualties than natural disasters of the same magnitude of energy release (Sena & Woldemichael 2010:14-16).

## 2.2. PHASES OF DISASTER MANAGEMENT

The four phases of disaster management, either natural or manmade, are mitigation, preparedness, response and recovery (Vaughan 2019:15).


**Figure 2.2: Phases of disaster management/cycle**

*Source: A Global Public Health Curriculum; 2nd Edition 2016. Edited by Ulrich Laaser and Florida Beluli. From: https://www.seejph.com/index.php/seejph/issue/view/178 (accessed 15 October 2021).*

### 2.2.1. Mitigation

Disaster mitigation refers to changes made before a potential disaster occurs to reduce or eliminate vulnerability. It begins with the identification of potential hazards that could affect an organisation's operations or demand for its services, followed by the implementation of strategies to assist the organisation's perceived weaknesses (Vaughan 2019:16). This includes all procedures conducted before the occurrence of the disaster, as well as preparations that aim to reduce the rate of threats (Khorram-Manesh 2017:23). Disaster mitigation needs more action including risk assessment, structural and non-structural prevention, and preparedness for contingency planning, warning and evacuation (Alsalem & Alghanim 2021:2668).

### 2.2.2. Preparedness

Preparedness is a key component of effective disaster mitigation (Laaser 2016:127). Disaster preparedness is the systematic process of using administrative measures, organisations, and operational skills to implement strategies, policies, and improved coping

capacities in order to lessen the negative impacts of hazards and minimise the opportunity for the development of disasters (Laaser 2016:127).

### 2.2.3. Response

The third phase of the disaster cycle refers to activities such as search and rescue, medical care, taking action to contain ongoing threats, evacuating threatened populations, and providing emergency food and shelter, that is undertaken during and immediately after the disaster impact to address the situation to the extent possible (Vaughan 2019:16).

### 2.2.4. Recovery

The fourth phase of the disaster cycle, recovery, refers to continuing until all systems have returned to normal or have progressed; and returning vital life support systems to minimal operating requirements. Temporary housing, public information, health and safety education, reconstruction, counselling programs, and economic impact studies are among the short and long-term recovery efforts (Haigh 2017:7). Data collecting for rebuilding and documentation of lessons learned are examples of information resources and services (Haigh 2017:7).

## 2.3. POTENTIAL THREATS TO HOSPITALS

Currently, the vast majority of organisations are vulnerable to several internal and external security risks, including data manipulation and theft, natural disasters, and unintentional computer user errors that can have disastrous impacts (Ayatollahi & Shagerdi 2017:37). Cyberattacks are only expected to increase over the next five years. Patient care is put at risk during each of these attacks and it is essential for healthcare organisations to be better prepared for this new hazard to keep the organisation's patients, workers, and community safe (Branch 2018:3-4). As a general rule, health information security consists of three components: protecting patient confidentiality, ensuring data integrity, and ensuring data availability. If any of these factors are ignored, hospitals and healthcare providers may face legal issues and financial losses (Ayatollahi & Shagerdi 2017:37).

## 2.4. KNOWLEDGE AND RISK PERCEPTION ON DISASTER

Risk perception, knowledge of new fire hazards, and response were limited among the rural Dong ethnic minority community in China despite socioeconomic development (Chan, Lam, Chung, Huang, Yung, Ling, Chan & Chiu 2018:316). The expectation that flood disaster

damages may increase over time has increased policymakers' awareness of the need for changes in risk management strategies. For instance, the importance of achieving a technical understanding of physical phenomena with the assessment of stakeholders' goals, knowledge, and risk perception is becoming increasingly crucial in Slovenia (Santoro, Pluchinotta, Pagano, Pengal, Cokan & Giordano 2019:199). Risk perception and a sense of place are important factors that affect the disaster preparedness behaviour of farming households (Xu, Peng, Liu & Wang 2018:178).

## 2.5. TRAINING AND EDUCATION ON DISASTER

The World Health Organization (WHO 2015) has recommended that all nations should have their hospitals and health care workers prepared for disasters, no matter the frequency of occurrences in their country. Furthermore, the literature indicates that hospitals are still inadequately prepared for disasters and education and training are the key to providing hospital employees with the essential information, skills, and competencies for disaster preparedness and response (Messe 2017:22).

According to research conducted in Saudi Arabia, 60-70% of hospitals have a specific disaster plan training program in place and educate new employees about the institution's disaster plan (Alshaabani 2019:23). According to a study in England, more than 93% of health officials emphasised the significance of a disaster and emergency training program, even though only 41% of doctors and managers were trained to deal with such situations. On the other hand, 86.2% believed that "healthcare staff has unconditional responsibilities to work with potential life risk," and 75.9% believed that more training is needed (Sharma & Sharma 2020:146-156).

## 2.6. HEALTH SECTOR EMERGENCY PREPAREDNESS

Disaster is one of the direct impacts on health sectors and has a profound effect on health sector personnel, which implies that consideration to health issues and disaster preparedness as part of mitigation and adaptation efforts has become a pressing issue (Anabaraonye, Ajator, Otti, Ewa & Anukwonke 2021:2).

## 2.7. VULNERABILITY ASSESSMENT

A vulnerability assessment is an important step for ensuring the safety of people and properties in urban areas and it is defined as the potentiality of a hazard and the characteristics of a community, a system, or an asset that makes it susceptible to the damaging effects of the hazard. The overall vulnerability of a community can be determined by assessing physical, social, economic, and environmental damage occurring from a potential hazard (Prama, Omran, Schröder & Abouelmagd 2020:2). Vulnerability assessments identify and prioritise potential hazards affecting communities and provide a foundation for recovery efforts. Communities and governments are then able to make informed decisions about prioritising hazards in view of limited resources (Ncube & Chimenya 2016:4).

## 2.8. STRUCTURAL VULNERABILITY

Structural vulnerability refers to the effects of the natural phenomena on the physical integrity of a structure. It quantifies the structure's potential of losing a specific functionality. Fragility curves provide a visual and efficient way of representing the structural vulnerability, and structural fragility usually refers to a specific structural limit state (De Risi, Jalayer, De Paola, Carozza, Yonas, Giugni & Gasparini 2020: 391). The parameters used in a rapid visual screening (RVS) for disaster vulnerability are the following: year built, building height, column spacing, separation gap, number of bays, vertical irregularity, plan irregularity, and material (Ilumin & Oreta 2018:235).

## 2.9. HEALTH FACILITIES' PREPAREDNESS FOR DISASTERS

In a study by Xu et al (2018:178), disaster preparedness awareness was relatively low, and participants' disaster preparedness behaviours were mainly based on their own learning. Disastrous events pose a threat to health sectors and ultimately to entire health systems, when demand for services quickly exceeds prepared local capacity and this rapid imbalance usually develops within the first 48 to 72 hours of an occurrence, before support from regional, national, and international institutions become available (Wuthisuthimethawee, Rojsaengroeng & Krongtrivate 2021:3465).

### 2.9.1. Networking organisational structures

The term "network" has numerous definitions, but in its simplest form, it is a governance structure designed to achieve a common purpose that a single organisation could not accomplish efficiently on its own (Zhang, Ma, Wu & Wang 2022:1). Organisational networks are a widely utilised strategy for dealing with disasters, and in the study by Zhang et al (2022:1), were found inadequate in analysing what strategies organisations use to select partners in a complex disaster environment, particularly in the centralised administrative context.

#### *2.9.1.1. Damage assessment to the hospitals*

Monitoring and assessing the impact of disasters continues to be difficult, and a lack of timely information is particularly problematic in terms of quick and efficient emergency responses, minimising human losses, and other expenses (Malmgren-Hansen, Sohnesen, Fisker & Baez 2020:2409). The destructive impact of a disaster can be difficult to measure, inaccuracies are unavoidable when an assessment is done manually due to human-in-the-loop errors, and to successfully deploy resources to hard-hit areas, timely and accurate assessments of the degree of damage are required (Oludare, Kezebou, Panetta & Agaian 2021).

#### *2.9.1.2. Drills*

A drill is a supervised, controlled technique of practising or testing a single disaster management task or function and works best when it mimics real-life scenarios (Laaser 2016:127). A tabletop exercise is designed to allow disaster management personnel to rehearse complete activation of the preparedness plan in a controlled, low-stress situation conducted by a facilitator (Laaser 2016:127). Disaster drills aim to improve the knowledge and attitudes of the hospital staff in disaster preparedness and responses and is required to ensure they perform their roles in disasters and disaster management, where hospital staff have a major role. However, Husna, Kamil, Yahya, Tahlil & Darmawati (2020:186) found that if there was no special action for a DMP to face disasters, it resulted in an inefficient performance in handling the disaster survivors. Although disaster drills can assist the identification of problems in a disaster plan by observing the operation and implementation of response measures, not all disaster plans are suitable for drills because the high expense makes them impractical (Zhao, Li, Zhang & Zeng 2021:2).

### 2.9.2. Network leadership

During a disaster, leaders must set the tone for their team, ensuring that everyone involved performs at the highest level possible. Leaders are individuals who employ advanced skills such as communication, organisational, problem-solving, analytical, and interpersonal qualities to influence others' behaviour (Grossman 2020:156). In recent decades, both researchers and physicians have renewed their interest in the impact of leadership and management on the health system and organisational performance (Al-Habib 2020:69).

## 2.10. SUMMARY

A literature review was conducted for this study, which has been presented in this chapter. The researcher started off by defining disasters and disaster preparedness. The literature review further comprised disaster preparedness in hospitals globally including developed countries and developing countries. The types of disasters and the phases were discussed. The chapter concluded by discussing health facilities' preparedness for disasters

Chapter 3 will describe the research design and methodology employed in the study.

# CHAPTER 3
# RESEARCH DESIGN AND METHODOLOGY

## 3.1. INTRODUCTION

This chapter presents the research design and methods employed in the study. The study used a mixed methods research design, hence both quantitative and qualitative research methods were employed to explore the research problem.

In this section, the researcher provides a detailed description of the research setting, research design, method, and ethical considerations. Sampling and data collection methods are thoroughly explained in the section on research methods. This methodology chapter therefore describes the means the researcher employed to fulfil the set research objectives, which were to:

- Explore and describe the nature and types of disasters encountered in the hospitals in Addis Ababa Administration Health Bureau.
- Explore and describe the existing interventions to respond to disasters that have been encountered in the hospitals in Addis Ababa Administration Health Bureau.
- Establish measures to be implemented to ensure that disasters are prepared for and managed in the hospitals in Addis Ababa Administration Health Bureau.
- Explore and describe the challenges facing hospitals in Addis Ababa Administration Health Bureau, Ethiopia, in disaster preparedness and management.
- Establish the effects of disasters in hospitals in Addis Ababa Administration Health Bureau.
- Propose plans to ensure disaster preparedness and management in the hospitals in Addis Ababa Administration Health Bureau for responding in a disaster.

## 3.2. RESEARCH SETTING

As defined by Gray, Grove and Sutherland (2017:323), the research setting is the place where the study is conducted. This study was conducted in Addis Ababa, the capital city of Ethiopia. Addis Ababa, Ethiopia's political capital and most important commercial and cultural centre, is located at 9° 2' 9.6000'' N latitude and 38° 45' 8.2800'' E longitude, in the country's centre and close to the equator. It covers an area of about 54,000 sq. km, which

extends from 976,756.1 m to 1,005,959.8 m North and 461,504.2 m to 489,590.6 m East (Shiferaw, Shoamare & Legesse 2021:4). It has an average elevation of 2,400 metres above sea level, with the highest altitudes reaching 3,200 metres at Entoto Hills to the north. Addis Ababa is thus one of the world's high-altitude capital cities (Zewdie, Worku & Bantider 2021:5). The climate is sub-tropical, with an average temperature of 10 degrees Celsius. Temperatures are lower (10–15 degrees Celsius) beginning in mid-November, especially at night and early in the morning, rising to 20–23 degrees Celsius throughout the day (Wubneh 2013:255). The summer months of February to May are the hottest, with temperatures reaching above 23 degrees Celsius in the afternoons. The long wet season, which lasts from June to mid-September, is characterised by warm temperatures (Wubneh 2013:255). Addis Ababa has a population about ten times that of Gondar, Ethiopia's second-largest city. Addis Ababa hosts the majority of Ethiopia's administrative, diplomatic, and commercial operations and is strongly linked economically and through road infrastructure with other major urban centres of Ethiopia (Weldeghebrael 2021:3). In Addis Ababa city, the total number of hospitals is 51 (Beyene, Ferede & Diriba 2020). Out of the total, 31 hospitals are owned and managed by private investors and non–profit organisations. Of the rest, 10 are public hospitals, four are federal hospitals, and six are under the Addis Ababa Administration Health Bureau.

In this study, the study area was in the six Addis Ababa Administration Health Bureau hospitals. These hospitals serve patients from across the city and neighbouring provinces and offer a full range of tertiary and specialised services. The hospitals are also the main teaching and training hospitals for health science students of either government or private colleges and universities.

The City Administration of Addis Ababa Health Bureau owns six hospitals. The Addis Ababa Administration Health Bureau (AAHB) hospitals play a vital role in providing healthcare services to the city's community, according to a report from the World Health Organization (WHO) (Davarani, Tavan, Amiri & Sahebi, 2022: 1722). A study published in BMC Health Services Research found that AAHB hospitals are essential for ensuring access to quality healthcare services for low-income and vulnerable populations (Bhatt & Bathija, 2018: 1271). These hospitals play a critical role in promoting health and well-being in the region, providing both general and specialized services. The AAHB hospitals were further selected for this

study because of their vulnerability to disasters and their importance in providing healthcare services in the city (Moradi, Nekoei-Moghadam, Abbasnejad & Hasheminejad, 2021: 1). The number of health workers and other staff employed in the AAHB hospitals may vary depending on the size and scope of the hospital's services. However, a hospital may employ a wide range of healthcare professionals, such as doctors, nurses, midwives, pharmacists, laboratory technicians, and other allied health professionals, to ensure comprehensive health services are provided (Dassah, Dzomeku, Norman, Gyaase, Opare-Addo, Buabeng & Adu-Sarkodie, 2023: 1). The Addis Ababa city map was relevant in showing that the study had been conducted in Addis Ababa, the capital city of Ethiopia. This was because the map could help identify potential disaster risks and assist in developing effective disaster management plans for hospitals under the Addis Ababa Health Bureau.

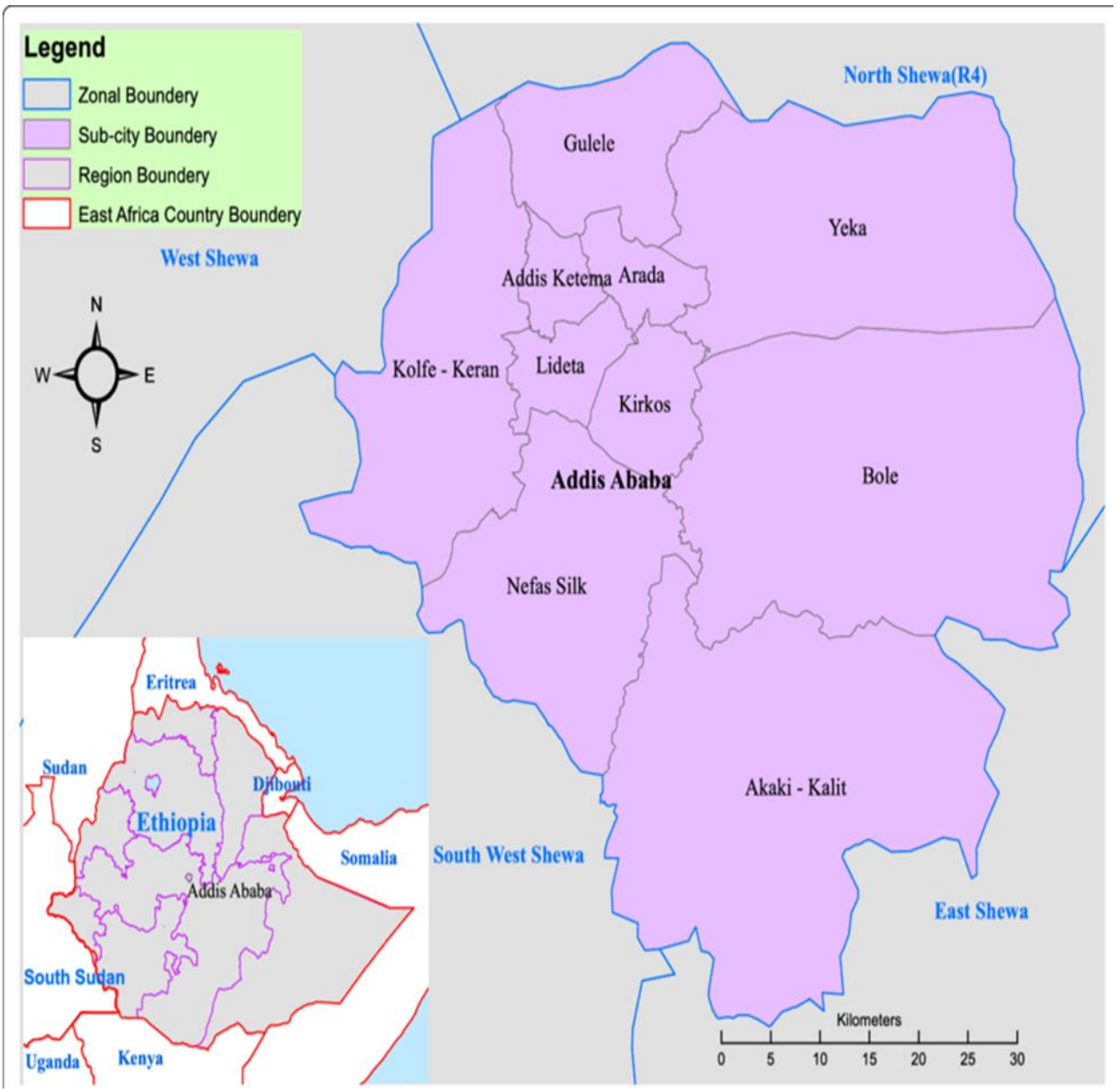


**Figure 3.1: Map of Ethiopia and Addis Ababa location of study area**

*Source: Map of Addis Ababa (From: https://www.researchgate.net/figure/Map-showing-Addis-Ababa-Sub-cities-Source-Shapefile-from-Ethiopian-Karta-Agency_fig1_327024130/download (accessed 05 February 2022).*

## 3.3. RESEARCH METHODOLOGY

In this study, the research methodology section deals with both the research design and the research methods of the study. The research design will be presented first, followed by the research methods.

### 3.3.1. Research design

Grove, Burns and Gray (2012:72-94) suggest that a study should be credible as a result of a research design. A research design is defined as a systematic process that the researcher follows as an action plan implemented to achieve the expected purpose of the study (Polit and Beck 2018:118-136). A research design is further defined as a plan, structure and strategy of investigation, so conceived as to obtain answers to research questions or problems (Kumar 2012:95). Plano-Clark and Ivankova (2016:3) inform us that a research design serves as a conceptual framework for organising, conducting, and communicating the qualitative and quantitive data collection and analysis and the integration of the two strands of mixed methods research.

#### *3.3.1.1. Mixed methods research design justification*

An explanatory sequential mixed methods design was chosen for this study. The explanatory sequential mixed methods design is characterised by an initial quantitative phase of data collection and analysis followed by the qualitative phase of collection and analysis (Polit & Beck 2018:312). The latter would help explain and elaborate on the quantitative results (Polit & Beck 2018:312; Subedi 2016). The rationale for this approach is that the quantitative data and results provide a general picture of the research problem; more analysis, specifically through qualitative data collection, is needed to refine, extend or explain the general picture (Polit & Beck 2018:313). A solid research approach and design are essential for producing reliable and valid results (Dawadi, Shrestha & Giri 2021:26). By using an explanatory mixed methods approach, this study was able to triangulate the data from different sources, increasing the accuracy of the findings (Othman, Steen & Fleet 2020:76). The study was enabled confidently draw conclusions and make recommendations based on the results (Dawadi et al 2021:27).

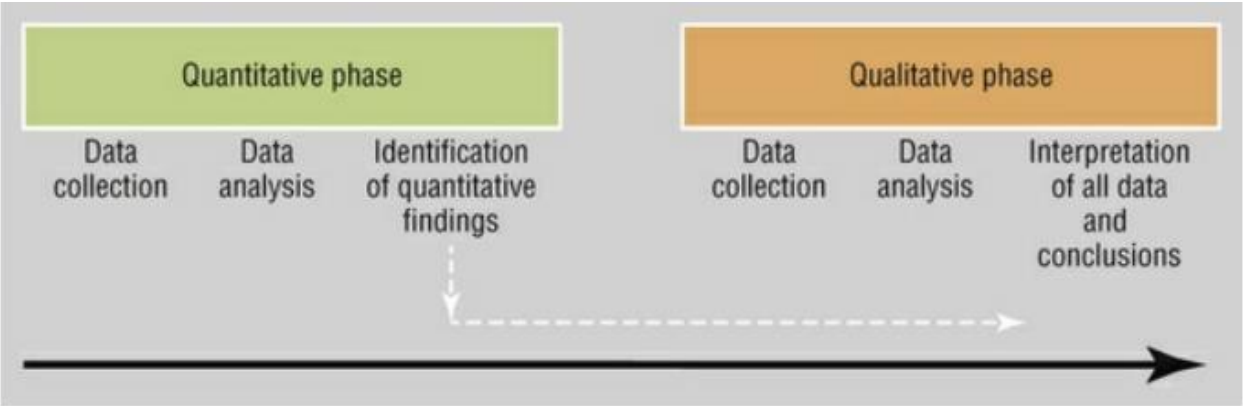


**Figure 3.2: Explanatory sequential mixed methods**

*Source: Adapted from Gray et al (2017:591).*

To accomplish the study's objectives and respond to its research questions, a sequential mixed methods strategy was found to be the most effective. A complicated phenomenon can be thoroughly comprehended if it has been studied using both quantitative and qualitative methods since they complement one another, as O'Dwyer and Bernauer (2014:36–37) point out.

The nature and types of disasters encountered in the hospitals as well as the existing interventions to respond to disasters that have been encountered in the hospitals in Addis Ababa Administration Health Bureau were empirically investigated and quantified. The challenges facing hospitals in disaster preparedness and management, the effects of such disasters, as well as plans to ensure disaster preparedness and management in the hospitals in Addis Ababa Administration Health Bureau were also explored and described. Finally, a disaster preparedness and management plan for the hospitals in the Addis Ababa Administration Health Bureau was developed following the integration of the quantitative and qualitative phases as per Creswell and Creswell (2018:181).

*3.3.1.2. Research approach*

As mentioned above, the researcher used a sequential mixed methods approach to answer the research questions. The quantitative data were collected first from hospital staff, both clinical and non-clinical, at selected hospitals by using a self-administered questionnaire (Polit & Beck 2018:312).

Similarly, qualitative data were collected by using a semi-structured interview guide, developed by the researcher through the use of relevant literature, and validated by the research supervisor. The researcher used an audio recorder and took notes to ensure that all the data collected was accurate. The findings from the quantitative and qualitative phases were synthesised, pooled together and used to develop a disaster preparedness and management plan for the Addis Ababa Administration Health Bureau hospitals.

First, a quantitative survey was to gather data on the nature of the disaster, types of disasters, and the existing interventions encountered in the Addis Ababa Administration Health Bureau. The survey could be distributed to a statistically representative sample of individuals from different hospitals involved in disaster response, asking them to rate different approaches based on their usefulness and practicality.

Next, a qualitative study using in-depth interviews with hospital administrators was conducted to gain the challenges and effects facing hospitals related to disaster preparedness and management in Addis Ababa. Open-ended questions were used to gather rich data on the challenges of effective or ineffective disaster management practices.

Finally, the study integrated these two data sources using a triangulation method that helped identify similarities and differences between the quantitative and qualitative findings and developed plans for improving disaster preparedness and management plans that were both theoretically rigorous and practically useful.

### 3.3.2. Research paradigm

A paradigm is referred to as a set of philosophical assumptions that include concepts, theories, beliefs, values, and principles that shape how the researcher understands the subject matter of the study (McEwan & Wills 2021:26). For this study, the selected paradigm was a pragmatic worldview.

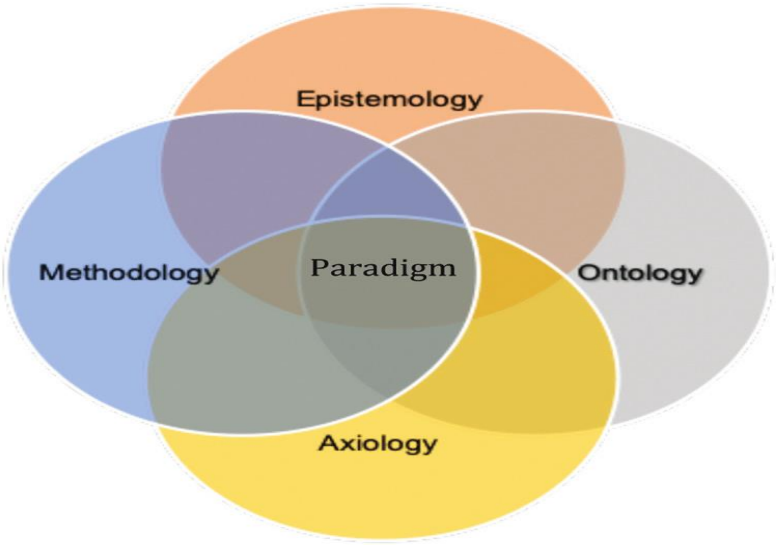


**Figure 3.3: Elements of research paradigm**

*Source: O'Brien 2019:15.*

Pragmatism, a paradigm often associated with mixed methods research, provides a basis for a position that has been stated as the "dictatorship of the research question" (Polit & Beck 2018:309). This study adopted a pragmatism paradigm, which is concerned with applications and solutions to problems. The researcher emphasises the problem and uses all available approaches to understand the problem; thus, supporting the mixed methods approach adopted in this study. Thus, for the mixed methods researcher, the "pragmatism paradigm opens the door to multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis" (Van Schalkwyk 2018:105).

### 3.3.3. Research methods

Research methods are the techniques of gathering information to answer research questions (Bryman 2012:4). The quality of carrying out a research study depends on the methods being used. Research methods also incorporate sampling procedures, data collection and analysis. Appropriate research methods guide researchers on how to draw a sample, and collecting and analysing data to be able to bring about reliable research results (Bryman 2012: xxxii). In this study, the research methods including the demographic, sample, sampling strategy, sample size, data collection, analysis, validation and verification of the quantitative data, and assessment of the reliability of the qualitative data.

*3.3.3.1. Population*

Gray et al (2017:617) define a population as a particular group of people or type of element that is the subject of the study, and a population is a complete group of individuals with a set of defined characteristics. A general, target, and accessible population are the three categories of populations used in research. as presented in Fig. 3.4.

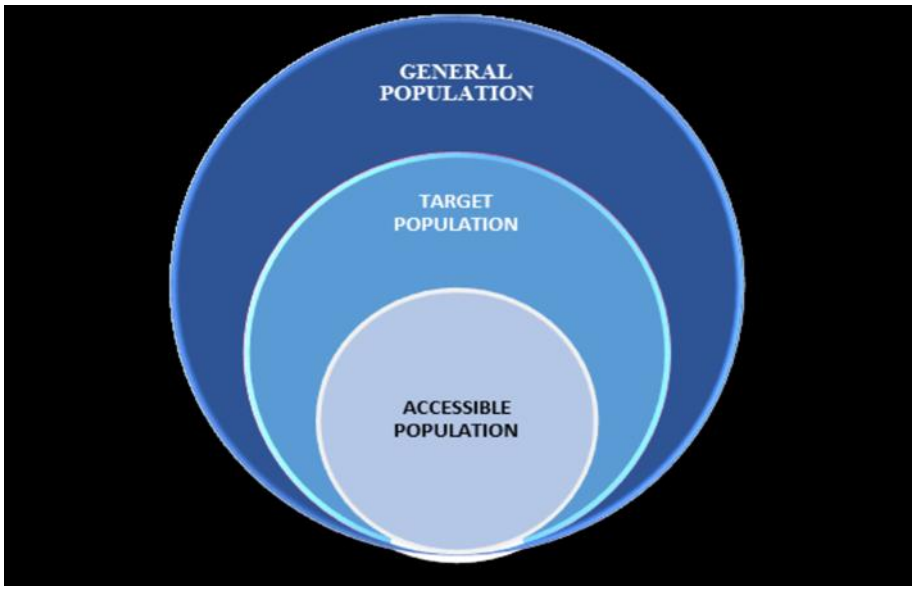


**Fig. 3.4: General, target & accessible populations and their relationship**

*Source: Adapted from Asiamah, Mensah & Oteng-Abayie 2017:1611).*

3.3.3.1.1 General population

The general population defines all individuals without reference to any specific traits or characteristics (Polit & Beck 2020:243). The general population for this study was all clinical and non-clinical staff of all hospitals in Addis Ababa, Ethiopia.

3.3.3.1.2 Target population

The target population is the entire set of individuals or items meeting the sampling criteria and from which a representative sample is drawn (Gray et al 2017:617). The target population for this study comprised all clinical and non-clinical staff at selected Addis Ababa Administration Health Bureau Hospitals in Addis Ababa, Ethiopia.

3.3.3.1.3 Accessible population

The term "accessible population" refers to the group of individuals who meet the study's inclusion criteria and are readily available for recruitment into the study. The accessible population is a subset of the target population and the larger group to which the study's findings are generalized (Gray et al 2017:617). In the current study, an accessible population was clinical and non-clinical staff during data collection.

## 3.4. SAMPLING AND SAMPLING TECHNIQUE

Study sampling is the process of choosing study participants from whom to collect data (Daniel 2015:2; Grove et al 2012:37). As it is often unrealistic to conduct a census for various reasons, samples from the population must be taken.

For this study, the researcher selected respondents based on the topic under investigation by choosing appropriate sampling techniques (Daniel 2015:2). In general, Probability sampling and non-probability sampling are the two categories of sampling procedures. According to Daniel (2015:5), probability sampling is a method of sampling where each component of the population has a known non-zero chance of being chosen for the sample. In the case of non-probability sampling, participants are purposefully chosen based on criteria that the researcher believes to be relevant (Daniel 2015:5; Grove et al 2012:281). According to Crossman (2018:38), the probability sampling approach is the best choice for a study that has to be representative. For this study on the disaster preparedness and management plan in Addis Ababa, we selected all six public hospitals under the administration of the Addis Ababa Health Bureau. The study followed a rigorous selection process to ensure that the chosen hospitals were representative of the accessible population and that the selection criteria were transparently described to reduce bias and increase the generalizability of the findings. For instance, we only selected hospitals that were easily accessible by the public, regardless of their socio-economic status or geographical location. Moreover, ensured that these hospitals had several patient flows related to disasters to facilitate data collection and analysis. By selecting all six eligible hospitals, were able to capture the full scope of the accessible population and generate reliable and valid results that accurately reflected the disaster preparedness and management plan in Addis Ababa. Below follows a discussion about sampling in respect of the quantitative and qualitative phases for this study.

### 3.4.1. Sampling for this study

#### *3.4.1.1. Quantitative phase*

In the first, quantitative phase, of the study, a stratified sampling method was used to select a sample. In stratified random sampling, the population is separated into two or more strata from which random elements are chosen. The goal of stratified sampling, like quota sampling, is to achieve representativeness (Polit & Beck 2020:246). The sample population was the clinical staff: physicians, nurses, pharmacists, laboratory professionals, etc., and non-clinical staff: human resources officers, porters, security, admin staff, etc., in selected Addis Ababa Administration Health Bureau hospitals.

- Eligibility criteria

Eligibility criteria are also referred to as sampling criteria, including a list of characteristics essential for membership or eligibility in the target population. It is developed from the research problem, the purpose, the literature, the conceptual and operational definitions of study variables, and the research design (Gray et al 2017:619). In this study, all clinical staff and non-clinical staff working in Addis Ababa Administration Health Bureau hospitals were invited to participate to ensure as large a representative sample as possible.

- Inclusion criteria

Inclusion criteria are sampling criteria – the characteristics that a subject or element must have in order to be included in the target population (Gray et al 2017:620). In this study the inclusion criteria for participants were that they:

  - Were registered by the Ethiopian Food and Drug Administration (EFDA) as a health professional.
  - Were registered by the Ethiopian Civil Service Commission (ECSC) as a civil servant for non-clinical staff.
  - Were working in one of the selected study sites at the selected hospital.
  - Had a duration of more than six months' experience in the selected unit.

- Exclusion criteria

Exclusion criteria are sampling criteria, i.e., the characteristics that can lead a person or element to be avoided or excluded from the target population (Gray et al 2017:620). In this

study, participants who met the exclusion criteria were enrolled, and included students, health professionals, professionals in training or practice, as well as non-clinical temporary staff and those not permanently enrolled in the hospital.

3.4.1.1.2 Sample size

Sample size is the number of study participants in a research study (Polit & Beck 2020:248). Table 3.1. details the sampling and sample size for this study.

**TABLE 3.1: SAMPLING AND SAMPLE SIZE**

| Participant /targeted for the research | Site population size | Age category of group |
|---|---|---|
| • All hospital staff, both clinical and non-clinical staff | • 4136 members of hospitals' staff | • 20-60 years of age |
| Sampling method | Sample size | Justify sample size |
| Phase one<br>Part 1 for quantitative<br>• Stratified sampling into each hospital department | 369<br>n= 384 | N = 4136<br>n = 384<br>z = 1.96 (95% confidence level)<br>P = 50%<br>E = 5%<br>Non-response rate 10% = 35 (contingency) |
| Part 2 for qualitative<br>• Purposive sampling | 15<br>(Concept of saturation) | |

**Justification for quantitative sample size determination**

$$n_o = \frac{z^2pq}{e^2} = \frac{(1.96)^2(0.5)\ (0.5)}{(0.05)^2}$$

**Where**

n= desired sample size

Z= standard normal deviate set at 1.96 at (95% confidence level)

P= proportion of the targeted population that have the characteristic focusing in the study estimated at 50%.

q=1-p

d= degree of accuracy set at 0.05/ degree proportion of error that should be accepted in the study (0.05) that is 5%

Thus n=1.962*(0.5*(1-0.5)

0.052

Hence n= (1.96*1.96) *(0.5*0.5) = 1.962*0.5*0.5

(0.05*0.05) 0.052

=3.8416*0.25

0.0025

n= 384.16

For a population of 4136 of all hospitals' staff

n= 384.16

1+384.16/4136

n= 348.35

This gives us approximately 349

The researcher added 10% (35) of the sample as for any non-response.

This gave a sample of 384

To determine the sample of each department or stratum, the researcher simply took the fraction of 1055/4136 (example: administration department) and multiplied it by the sample size of 384 i.e., 97.9 = 98.

*3.4.1.2. Sampling for qualitative data*

In the second qualitative phase of the study, purposeful sampling was used to select participants. Purposive sampling is a non-probability sampling technique – the researcher might decide purposely to select or pick from the sample of people judged to be knowledgeable about the issues under study (Polit & Beck 2020:245). The sample population was purposely selected from Addis Ababa Administration Health Bureau hospital managers in the unit and the total sample size after data saturation was reached was 15 middle and high-level hospital managers.

- The Inclusion criteria for the qualitative method:
- Middle and high-level hospital managers who volunteered to participate and who had more than two years of experience for both males or females participants aged between 30 to 60 years old. The Exclusion criteria for the qualitative method:

  Middle and high-level hospital managers who did not volunteer to participate.

**Justification for the qualitative study**

One of the criteria for guiding sample size in qualitative sampling is saturation, when everything of importance to the agenda of a research project has emerged in the data, and concepts have been obtained (Patz, Frumkin, Holloway, Vimont & Haines 2014:146). The study used non-probability purposive sampling to identify participants who are representative of diverse experiences in disaster preparedness and management plans. In justifying the sample size, the study considered the complexity and depth of the data expected to collect, as well as the feasibility of recruiting and collecting data from the selected sample. The study also considered the available resources, including time and budget, to conduct the study.

### 3.4.2. Data collection

#### *3.4.2.1. Data collection approach and method*

Data collection refers to a structured plan that indicates the gathering of information to address the research problem (Polit & Beck 2018:365). For this study, data collection was conducted in two distinct phases with rigorous quantitative sampling in the first phase followed by the qualitative phase where purposeful sampling was employed. During Phase 1 of the study, collected a self-administered semi-structured questionnaire was used on from a representative sample to understand the disaster preparedness and management plan. The quantitative data collection ed in Phase 1 allowed the researcher to explore disaster preparedness and the response of hospital staff. Information collected during this phase was used to design the qualitative data collection in Phase 2. During Phase 2 of the study, conducted individual in-depth interviews with participants to source information that would assist in developing explore the disaster preparedness and management plan During Phase 2 of the study.

**Phase one**

**Part 1 for the quantitative phase**

To address the specific objectives of the quantitative phase, a self-administered semi-structured questionnaire was used, which was designed following engagement with existing literature to identify what information was needed for this study for the Ethiopian context. The questionnaire was approved by the supervisor and the Scientific Review Committee of the university, as well as experts on the subject. Six emergency and critical care nurses were selected in addition to the researcher, and a one-day training was conducted to provide information on data collecting and familiarize the data collectors with the tool of data collection from the study area and other health facilities. The study did not limit recruitment to only the hospitals where it was conducted. The aim was to have a diverse group of participants from various healthcare facilities to ensure that our data collection was representative of the population in the study area. This approach allowed the gathering of data from a wider pool of data collectors and increased the validity of the study's findings.

**Part 2 for the qualitative phase**

The qualitative phase data was sourced through conducting individual in-depth interviews with the participants. An in-depth interview guide was used and is provided in Annexure F. In-depth interviews were conducted by the researcher alone, and he also participated in data collection for the quantitative research's self-administered questionnaire of clinical and non-clinical employees.

Data was gathered through in-depth interviews that followed an interview guide. Up until data saturation, data were gathered. Observation and field notes were used to preserve the validity of the data. The interview was also recorded on tape since doing so allowed the researcher to make notes that were useful for analysing the codes.

**For example:**

When using socio-demographics, the initial quantitative phase was that the participants in different socio-demographic levels responded differently to the dependent variables (Creswell & Creswell 2018:293). Thus, the follow-up qualitatively may group respondents to the quantitative phase into different categories and conduct qualitative data collection with

individuals representing each of the categories (Creswell & Creswell 2018:293). During this data collection time to prevent Covid-19 spread, the researcher and participants practised social distancing, by keeping a space of about one meter between the researcher and participant, not gathering in groups; staying out of crowded places; avoiding mass gatherings; not touching their faces following coughing etiquette, and the new greeting etiquette of using elbows to greet.

#### 3.4.2.1.1 Development and testing of the data collection instruments

The development of an adapted self-administered questionnaire as In order to collect data, a study tool's availability was first checked. The researcher took into account the tool's conceptual applicability as well as its capacity to generate the required data. The researcher additionally considered resource accessibility, comprehension of the tool's nature, standards and comparability, suitability of the study population, executive concerns, and reputation.

After giving the aforementioned concerns careful thought, creating criteria, and examining the literature, this study used a data collection tool to adapt it to Ethiopian customs and practices. It involved reviewing and modifying the language used to suit the target population and pre-testing it with a small group of participants to identify any areas that needed further refinement. The tool was successful in adapting to the Ethiopian context and collecting accurate data mostly emphasizing on elements like socio - demographic, type and nature of disaster, a potential disaster in hospitals, hospitals' response to the disaster, challenges that hospitals face in disaster management measures to ensure disaster preparedness and management, and hospitals' state of preparedness to manage the disaster. The questionnaire was then translated into English and submitted for approval to the supervisor and the Scientific Review Committee, as well as experts in the field. Their comments and suggestions were incorporated, and the researcher implemented the changes required. A pre-test was then conducted.

#### 3.4.2.1.2 Pre test

A pre-test was necessary to determine the content validity of the instrument's results and provide an early assessment of the items' internal consistency, to enhance questions, format, and instructions (Creswell & Creswell 2018:245). In one of the city's emergency response centres, the researcher ran a pilot study with 30 participants; however, it was excluded from

the final analysis. Following the pertest, the questionnaire was updated according to the input of the respondents (Creswell & Creswell 2018:245-246).

The purpose of the pre-testing procedure was to identify any difficulties that might be encountered during the study, and to make changes to the data collection tool if necessary. Participants indicated the language was understandable and no recommendations were made to change the tool. Each participant took an average of 10 to 15 minutes to complete the questionnaire.

3.4.2.1.3 Data collection process

- Quantitative part

Six emergency and critical nurses were enlisted for data collection, which was carried out following the pre-test, to determine the outcome variables using a self-administered tool. The manager of the hospital received a letter requesting approval to carry out the study. Prior to the researcher allowing the data gathering process to begin, all the data collectors were formally introduced to the hospital administration and personnel.

Only personnel participating in data collecting were allowed access to collected data, and completed questionnaires were stored in a locker. A safe, password-protected folder was also used to store data typed into the computer.

- Qualitative part

Detailed interviews were used to collect information from the subjects. The study subjects received complete and accurate information regarding the study. Those who agreed to take part and who agreed to have their audio recorded provided informed, voluntary, and signed consent.

In the manager's office of the hospital, data were gathered in a peaceful and private setting. The interviews took place during January 2022. A prior appointment was made concerning date and time and the interview lasted approximately for 45 to 60 minutes. No name appeared on the in-depth interview guides and memos, while pseudonyms protect the identity of the participants. Audio recorded data was only accessible to the researcher and was kept safe.

3.4.2.1.4 Ethical considerations

The ethical considerations that need to be anticipated are extensive, and they are reflected through the research process (Creswell & Creswell 2018:142). Research clearance was primarily requested and obtained from the University of South Africa's (UNISA's) Health Studies Research Ethics Committee (HSREC), UNISA's Departmental Ethical Clearance Committee, and Addis Ababa City Administration Health Bureau Public Health Research and Emergency Management Directorate. Standards of ethical research are founded on three main ethical principles: beneficence, respect for human dignity, and justice (Polit & Beck 2018:134).

Beneficence gives researchers a responsibility to minimize damage and maximize benefits. Human research should aim to benefit participants or, more commonly, other people (Polit & Beck 2018:134). In this research, the researcher ensured minimal risk during the process of the study through physical and psychological preparation before the actual data collection and using well-trained data collectors.

The principle of respect for human dignity includes the right to self-determination and the right to full disclosure (Polit & Beck 2018:135). In this research participants were assured of the right to decide voluntarily whether to participate in the study and the researcher respected self-determination throughout the process of the study. To minimize risk, it was important to ensure that participants' confidentiality and privacy were protected during the study. Personal information of the participants was kept confidential, and data was stored securely to prevent unauthorized access. These measures helped to protect the participants' privacy and ensure that their personal information was treated with respect and sensitivity throughout the entire study process. Justice in the context of research also extends to the fair selection of subjects (Kahn, Mastroianni & Sugarman 2018:2). In this research, the researcher applied the same types of assessment tools and methods for participants of all age groups and sex and the study population was treated equally in the study.

The potential participants' choice (about participation) was fully informed, free and private and recorded in writing. According to Harriss, MacSween and Atkinson (2019:814), justification should be given for any exceptions to this. In this study, the participants gave their consent after receiving adequate explanation about the purpose, type of questions, and

how they could give their responses. They were also informed about the significance of the study, and their anonymity, their right to withdraw from the study, and not to answer questions whenever they felt uncomfortable.

This study conducted in-depth interviews with participants to understand the challenges and effects of disaster preparedness and management plan in their hospital. The study further used audio tapes to record the interviews and later transcribed them manually. Transcription allowed exploring common themes and patterns in the data, such as the challenges and the effects of disasters hospital participants faced in disaster preparedness and management. All the study participants were informed about the purpose of the study, their right to refuse, and were given assurance of confidentiality. Informed verbal consent was obtained from every participant. Strict confidentiality was assured through anonymous recording and coding of the questionnaires.

### 3.4.3. Data analysis

Data analysis means a systematic approach, applying statistical methods and/or description and illustration from databases (Creswell & Creswell 2018:293). The data analysis in this study was aligned to the sequence of the data collection. The first phase was the analysis of quantitative data collected from the questionnaires. Phase two was the analysis of qualitative data from the individual in-depth interviews (Creswell & Creswell 2018:293). Both phases are unpacked below.

**Phase one**

**Part 1 for quantitative data analysis**

Data analysis was done using SPSS version 26:0 (Statistical Package for Social Sciences). The researcher inputted, purified, and analysed the data. Using descriptive statistics like mean, median, and standard deviation, a descriptive summary of the results was created. The association between the independent variable and the dependent variables was also evaluated using inferential statistics. The chi-square test was applied in this process. The results of the investigation were presented using texts, tables, and graphs.

**Part 2 for Qualitative data analysis**

The analysis of data process in this phase of the study occurred within the same timelines as the data collection process. Analysis was developed through several stages of coding the

data, from open coding to thematic coding (Friese 2019:6-7). The data was analysed by the use of ATLAS.ti version 8.1 software. The report of the analysis was presented backed by a combination of thick descriptions, verbatim quotes, and themes (Friese 2019:6-7).

SWOT Weave is a structured method of analyzing and synthesizing data that involves the integration of SWOT (Strengths, Weaknesses, Opportunities, Threats) analyses (Sangiamvibool 2022:2334). In this study data analysis, SWOT Weave provides a comprehensive and systematic framework for identifying the strengths and weaknesses of a hospital's disaster management plan as well as opportunities and threats posed by potential disasters. This approach can help healthcare providers to develop effective strategies for enhancing the resilience of health systems in the face of future disasters. It is often used in conjunction with other analytical methods to triangulate data from multiple sources and to identify key themes and patterns that emerge.

## 3.5. RIGOUR OF THE STUDY /TRUSTWORTHINESS

Rigour is the striving for excellence in research, and it requires discipline, adherence to detail, and strict accuracy (Burns & Burns-Lundgren 2015:39). According to Wamsler and Brink (2018:157), rigour of the research should be assessed through the criteria of credibility, transferability, dependability, and conformability. A more rigorous research process results in more trustworthy findings. Trustworthiness or rigour of a study refers to the degree of confidence in the data, interpretation, and methods used to ensure the quality of a study (Connelly 2016:435).

### 3.5.1. Trustworthiness for the quantitative phase

As mentioned, trustworthiness or rigour of a study refers to the degree of confidence in data, interpretation, and methods used to ensure the quality of the study (Connelly 2016:435). In this quantitative phase of research, reliability and validity of the instrument are very important for minimising errors that might arise from measurement problems in the study.

#### *3.5.1.1. Reliability*

**Reliability,** broadly speaking, is the extent to which scores are free from measurement error. The stability or test-retest reliability of the survey instrument was obtained through the pilot testing of the instrument with participants before the actual data collection period. Test-retest

reliability or consistency was shown if the same results were obtained with the repeated administering of the same survey to similar study participants (Polit & Beck 2018:259).

#### *3.5.1.2. Validity*

**Validity** means that the researcher checks for the accuracy of the findings by employing certain procedures and is the degree to which an instrument is measuring the construct it purports to measure (Creswell & Creswell 2018:261). This study shows the extent to which the survey items and the scores from these questions are representative of all the possible questions about disaster preparedness and the adapted and adjusted survey questionnaire for this study were compared on the consistency of the results with existing instruments, measuring the same construct, namely the disaster preparedness of the hospitals.

### 3.5.2. Trustworthiness for the qualitative phase

**Credibility, dependability, conformity and authenticity**

Athanasou, Di Fabio, Elias, Ferreira, Gitchel, Jansen and Mpofu (2012:140) cite Perakyla as defining trustworthiness as the way in which data are collected, sorted and classified. On the other hand, Lincoln and Guba (1985 cited by Haven & Van Grootel 2019:258) note that trustworthiness embraces credibility, dependability and conformity.

#### *3.5.2.1. Credibility*

Credibility is used to assess the extent to which the research findings convincingly describe the phenomenon being researched (Peters, Holloway & Peters 2019:290). Haven and Van Grootel (2019:258) describe credibility as the exact interpretation of the data collected by the researcher. In this study, credibility of the findings was ensured by using Purposive sampling was used to make sure that the primary informants were only those with first-hand knowledge of the phenomenon being studied.

#### *3.5.2.2. Transferability*

***Transferability*** refers the specific context in which the study occurs. Sufficient background and context details must be provided for readers to determine whether the conclusions can be transferred to other environments or situations (Krukowski, Leonard & White 2018:11). It is also referred to as the degree to which conclusions from a mixed methods study can be applied to similar settings, contexts, and people (Plano Clark & Ivankova 2016:163). The transferability of this study depends on future studies done in similar contexts.

In the study, transferability was assured by providing rich contextual descriptions, using purposive sampling to select representative participants, and triangulating findings through multiple data sources or methods. These strategies were employed to increase the relevance and applicability of the findings for a wider audience. By using thick descriptions to provide detailed context, purposive sampling to ensure diverse representation, and triangulation to verify findings, the researcher enhanced the transferability of the study.

#### *3.5.2.3. Dependability*

***Dependability*** is comparable to repeatability and dependability in quantitative research. In order for others to conduct the same research in comparable or dissimilar situations, the researcher must be able to clearly and concisely describe the complete research process. Athanasou et al (2012:140) cite Goetz and Lecompte (1984) as stating that dependability or consistency is the stability of the research process and methodology through time.

In this study, dependability was assured by addressing research questions that were consistent with the specified research aim or purpose. The use of audio recorded interview transcripts and functional audio recording devices addressed distortions or inadequacy in portraying phenomena as expressed by the participants.

#### *3.5.2.4. Conformability*

According to Wamsler and Brink (2012:127), ***conformability*** ensures that the findings, conclusions, and recommendations are congruent with the data collected. The authors further state that the researcher's interpretation and the actual evidence should be in harmony. After comprehensively describing the data gathering and data analysis steps, the researcher reported the conclusions in detail and linked these conclusions to the data analysis.

#### *3.5.2.5. Authenticity*

***Authenticity*** refers to the extent to which researchers fairly and completely show a range of different realities and realistically convey participants' lives (Polit & Beck 2018:416). The study ensured the authenticity of qualitative data using independent coders and two coders independently coded transcripts. Coders were met to review procedures and address any discrepancies. A senior coder acted as an arbiter if there was a disagreement between

coders. For this study, findings of the in-depth interviews were supported with quotations from the study participants to ensure authenticity.

## 3.6. CONCLUSION

This chapter has presented the design and methodology undertaken for the study. The researcher stated the area, design, methodology, sampling technique, data collection and ethical considerations of the study. A small pre-test was conducted before the main study commenced using the data collection schedule, which met the study objectives. The chapter concluded by considering the trustworthiness of the research process.

Chapter 4, the next chapter, presents the data analysis and interpretation and findings.

# CHAPTER 4
# ANALYSIS, PRESENTATION AND DESCRIPTION OF THE RESEARCH FINDINGS

## 4.1. INTRODUCTION

### 4.1.1. Outline of the presentation

The findings of the study are discussed, and the results are presented in this chapter. Two major sections are used to present the results. The first section reflects the demographic aspects of the respondents and participants in quantitative and qualitative phases respectively. The research results from both quantitative and qualitative methods are further presented and discussed in the second section. The research results and findings are presented in a way that relates them to the accomplishment of the study's goals. The chapter commences by reiterating the aim and objectives of the study and the procedures followed for analysis of the data.

### 4.1.2. Aim of the study

The aim of this study was to develop a disaster preparedness and management plan to support hospitals in Addis Ababa Administration Health Bureau, Ethiopia.

### 4.1.3. Research objectives

The objectives of this study were to:

- Explore and describe the nature and types of disasters encountered in the hospitals in Addis Ababa Administration Health Bureau.
- Explore and describe the existing interventions to respond to disasters that have been encountered in the hospitals in Addis Ababa Administration Health Bureau.
- Establish measures to be implemented to ensure that disasters are prepared for and managed in the hospitals in Addis Ababa Administration Health Bureau.
- Explore and describe the challenges facing hospitals in Addis Ababa Administration Health Bureau, Ethiopia, in disaster preparedness and management.
- Establish the effects of disasters in hospitals in Addis Ababa Administration Health Bureau.

- Propose plans to ensure disaster preparedness and management in the hospitals in Addis Ababa Administration Health Bureau in a case of a disaster.

The first to fifth objectives are addressed in this chapter, while the sixth objective will be covered in the remaining chapter.

It has already been mentioned in Chapter 3 that an explanatory sequential mixed-methods research design was employed in this study to achieve the study objectives. The analysis of the results is presented using tables, graphs, and text in different sections.

## 4.2. DATA MANAGEMENT AND ANALYSIS

### 4.2.1. Data management

Quantitative and qualitative data were collected to study and assess disaster preparedness and management planning in the hospitals in Addis Ababa Administration Health Bureau. The data collection centred on EDs, intensive care units, wards, outpatient departments, operating theatre, laboratory, pharmacy, and human resources. Moreover, data were obtained on supervision conducted in the data collection period. The researcher checked the collected data for completeness, accuracy, and clarity. The study's data as well as the files created from the collected data are kept on the researcher's personal computer and are protected by a password, thus ensuring the data's confidentiality.

Following UNISA's data management policy, the researcher will keep the collected data for the next five years, after the publication of findings. After five years, the retained data will be deleted, subject to the approval of the Unisa and as long as there is no demand for prolonged retention of the data.

### 4.2.2. Data analysis

Data were analysed using appropriate analysis methods, depending on the type of data, as described in detail below. Quantitative data analysis is described first, followed by qualitative data analysis.

#### *4.2.2.1. Quantitative phase*

The quantitative data were analysed using the SPSS software version 26 in consultation with a biostatistician to assess the disaster preparedness and management plan in the hospitals

in Addis Ababa Administration Health Bureau. Descriptive statistics such as frequencies and percentages were used to summarise the basic features of the data.

#### *4.2.2.2. Qualitative phase*

The qualitative data were analysed thematically with the help of ATLAS.ti 8 and Colaizzi's seven-step analysis framework. The qualitative data presentation and discussion mainly focused on the effects and challenges of a disaster preparedness and management plan. This entailed reading and re-reading the transcripts to ensure familiarisation with the data, identifying significant statements and phrases, formulating meanings from these statements, identifying themes and sub-themes, and describing the phenomenon under study in detail. The participants were labelled with codes to hide their identity and preserve their anonymity. 'IDIP' stands for in-depth interview participant.

#### *4.2.2.3. Mixing of quantitative and qualitative data*

Both the quantitative and qualitative data and the results were captured and mixed and revealed the reality about the hospitals regarding the status of disaster preparedness and management plans. Quantitative analysis of the findings revealed that lack of coordination, lack of information, lack of resources, sloppiness, and lack of training were among the challenges of responding to disasters at hospitals. The qualitative component clearly explored disaster preparedness and management, the effects of disaster, and the challenges facing hospitals. It was during the qualitative data collection phase that the participants were given the chance to air their feelings about the challenge to disaster preparedness and the management plan. The qualitative and quantitative data were combined where suitable in the presentation of the results. The explanation of the qualitative outcome was strengthened by the use of the quantitative data, and vice versa. The results from both the quantitative and qualitative data were used to inform the development of the strategies.

## 4.3. RESEARCH FINDINGS

This section on the research findings presents the demographic characteristics including the work experience of the research participants in each of the quantitative and the qualitative phases. The quantitative phase is therefore presented first followed by the qualitative phase.

### 4.3.1. The quantitative phase demographic characteristics of the study sample and the research findings for the quantitative sections

*4.3.1.1. Demographic characteristics of the respondents: The quantitative phase*

In this sub-section, the percentage distribution of the research respondents is presented.

**TABLE 4.1: PERCENTAGE DISTRIBUTION OF THE RESPONDENTS BY GENDER (N=369)**

| Characteristics | Frequency distribution number (n) | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 199 | 53.9% |
| Female | 170 | 46.1% |
| **Total (N=369)** | | **100.0** |

Table 4.1 indicates that of the 369 participants in the study, males accounted for 53.9% and females 46.1% of the total sample (n=369). Therefore, the males were in the majority compared to females, suggesting that availability of more males may contribute the physically fit manpower to support disaster preparedness and management.

**TABLE 4.2: PERCENTAGE DISTRIBUTION OF THE RESPONDENTS BY AGE (N=369)**

| Characteristics | Percentage (%) |
|---|---|
| **Age in years** | |
| 21-30 | 53.9% |
| 31-40 | 34.7% |
| 41-50 | 9.2% |
| Above 51 | 2.2% |
| **Total (N=369)** | **100.0** |

Table 4.2 illustrates that, of the 369 respondents, the majority, that is 53.9%, were in the age group 21 to 30 years, followed by 34.7% who were in the 31 to 40-year age group, followed by 9.2% who were between 41 and 50. Only 2.2% of the respondents were above 51 years of age, representing the least in the group. The results of this study show that given the age

of the participants, which is a major factor in productivity, most health professionals and support staff may be able to contribute to relatively appropriate support for disaster preparedness and management.

**TABLE 4.3: PERCENTAGE DISTRIBUTION OF THE RESPONDENTS BY DUTY STATION (N=369)**

| Characteristics | Percentage (%) |
|---|---|
| **Duty station** | |
| Emergency | 30.4% |
| Wards | 19.2% |
| ICU | 11.7% |
| OR Theatre | 3.8% |
| Pharmacy | 3.3% |
| Laboratory | 3.5% |
| Administration | 5.1% |
| Human resources | 3.8% |
| Outpatient | 4.9% |
| Other | 14.4% |
| **Total (N=369)** | **100.0** |

Table 4.3 above indicates that the majority, 30.4%. of respondents, worked in the ED, followed by 19.2% in the wards, 14.4% in other departments, 11.7% in ICU, 5.1% in administration, 4.9% in outpatients, 3.8% in the operating theatre, 3.8% in human resources, and 3.5% worked in the laboratory. However, only a small number of respondents, 3.3%, worked in the pharmacy department.

The results of this study suggest that the majority, 30.4%, of the hospital staff worked in the emergency room and only 19.2% worked in inpatient wards, which may indicate that a large number of emergency room staff were assigned to manage disasters and control life-threatening conditions. On the other hand, the hospital staff was assigned to disaster management and post-disaster care service provided in the wards.

**TABLE 4.4: PERCENTAGE DISTRIBUTION OF THE RESPONDENTS BY CURRENT POSITION (N=369)**

| Characteristics | Percentage (%) |
|---|---|
| **Current position** | |
| Nurse | 36.0% |
| Midwifery | 6.0% |
| Emergency professionals | 11.6% |
| Health officers | 2.2% |
| General practitioner | 11.4% |
| Specialist | 8.1% |
| Administration/ Human resources | 6.0% |
| Other | 18.7% |
| **Total (n=369)** | **100.0** |

In Table 4.4, it can be seen that the majority of the respondents, 36.0%, were nurses, followed by 11.6% who were emergency professionals. The table further reveals that the 11.4% were general practitioners, 8.1% specialists, 6.0% midwives, and 6.0% administration/human resources. However, only a small number, that is 2.2% of respondents, were health officers.

The results of this study suggest that most health care professionals were nurses and might contribute to disaster preparedness, the provision of good nursing care, and the nursing management of injured patients.

**TABLE 4.5: PERCENTAGE DISTRIBUTION OF THE RESPONDENTS BY WORK EXPERIENCE EXPRESSED IN THE NUMBER OF YEARS IN THE CURRENT ORGANISATION (N=369)**

| Characteristics | Percentage (%) |
|---|---|
| **Working years in the current organisation** | |
| Less than 1 year | 8.9% |
| 1-5 years | 43.9% |
| 5-10 years | 35.0% |
| 10- 15 years | 9.2% |
| 15-20 years | 0.3% |
| More than 20 years | 2.7% |
| **Total (N=369)** | **100.0** |

Table 4.5 illustrates that 43.9% of the respondents had worked for 1 to 5 years, 35.0% for 5 to 10 years, 9.2% for 10 to 15 years, 8.9% for less than 1 year, 2.7% for more than 20 years, and 0.3% had worked for 15 to 20 years in the current organisation. The study found that 78.9%% of the respondents' work experience in the organisation currently was 1 to 10 years.

The results of this study suggest that a lack of experience in any disaster preparedness and management plan may contribute to the challenges.

**TABLE 4.6: PERCENTAGE DISTRIBUTION OF THE RESPONDENTS BY THE HIGHEST LEVEL OF EDUCATION (N=369)**

| Characteristics | Percentage (%) |
|---|---|
| **Highest level of education completed** | |
| Diploma | 2.7% |
| Undergraduate | 60.4% |
| Postgraduate | 36.6% |
| Other | 0.3% |
| **Total (N-369)** | **100.0** |

Table 4.6 reflects that the majority, 60.4%, of respondents in the study had achieved undergraduate education, 36.6% of respondents had achieved postgraduate studies, 2.7% had reached diploma level, and only 0.3% had achieved higher levels of education.

This suggests that the majority of hospital employees had a bachelor's degree, potentially pointing to the need to improve their knowledge, skill and educational status in disaster preparedness and management, both in prevention and treatment.

*4.3.1.2. The research findings: The quantitative phase*

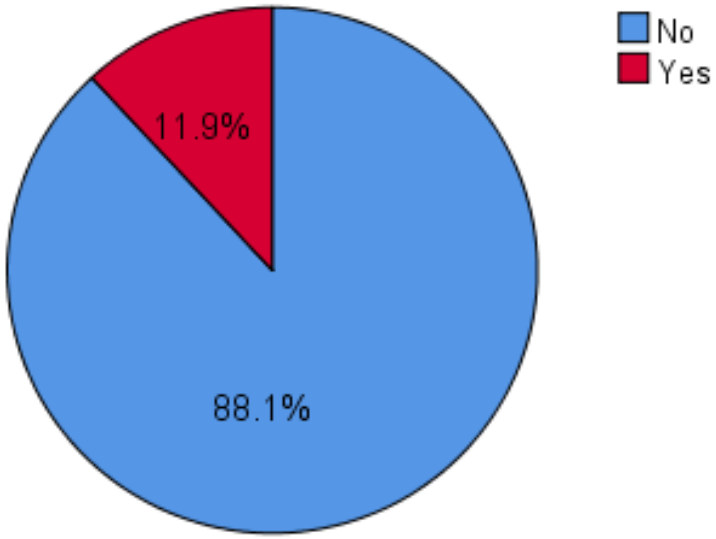


**Figure 4.1: Percentage of membership of the respondents (N=369) in the disaster management committee**

Figure 4.1 reveals that most of the respondents, 88.1% in this study, were not members of the disaster management committee, while only 11.9% were members. This indicates that most health professionals and support staff were not members of the disaster management committee. In a similar study conducted in Kenya, most of the respondents, 95%, were not members of the committee (Kiongo 2015:34). In a similar study conducted in Egypt, 89.5% did not participate in any type of concern with the disaster management committee (Elsayed et al 2020:471).

*4.3.1.3. Information on the types and nature of disasters in the study hospitals*

**TABLE 4.7: OCCURRENCE OF DISASTERS IN HOSPITALS**

| Disaster category | Not at all | Less frequent | Frequent | Very frequent |
|---|---|---|---|---|
| | Percentage (%) | Percentage (%) | Percentage (%) | Percentage (%) |
| Epidemics | 12.7% | **55.8%** | 22.0% | 9.5% |
| Drought | **56.9%** | 23.0% | 13.8% | 6.2% |
| Transport accidents | 9.8% | 13.3% | **40.7%** | 36.3% |
| Fire | 26.0% | **39.6%** | 27.4% | 7.0% |
| Flood | **59.3%** | 27.4% | 9.8% | 3.5% |
| Explosion | **58.5%** | 32.2% | 5.4% | 3.8% |
| Environmental pollution | **46.1%** | 26.8% | 19.0% | 8.1% |
| Earthquake | **83.7%** | 8.9% | 3.8% | 3.5% |
| Landslide | **81.0%** | 12.5% | 3.3% | 3.3% |
| Infestation | **50.9%** | 29.5% | 12.7% | 6.8% |

Table 4.7 shows the top occurrences of disasters considered to happen frequently in hospitals in the study were transport accidents, at the frequency of 40.7%. Epidemics were considered less frequent at 55.8%, and 39.6% were fire disaster responses in the hospitals. The disastrous events that were considered less frequent or not at all (not to exist) in hospitals were earthquakes at 83.7%, landslides 81.0%, floods 59.3%, explosions 58.5%, drought 56.9%, infestation 50.9%, and environmental pollution 46.1%.

The study suggests that for most people, 40.7% of the incidents that occur in hospitals are related to transportation accidents. Similarly, 85.0% of respondents in a South African survey believed that there was a high probability of an accident occurring as a result of mining (Vaughan 2019:48). A similar study conducted in Roxas City, Philippines, found that 65.2% of respondents were highly vulnerable to natural disasters, such as floods (Dariagan, Atando & Asis 2021:1931). In a similar study conducted in Zaria, Nigeria, 90% of respondents viewed mass casualties caused by for instance road accidents, fire outbreaks, or terrorist bombings as likely (Musa-Maliki & Ibrahim 2021:33). Another study conducted in Dar es Salaam,

Tanzania, revealed that 87% of disasters were major road traffic accidents (Koka et al 2018:2). According to a study conducted in Uruguay, Latin America, 94 % of respondents identified inundations and river floods as the most common events (Nagy, Filho, Azeiteiro, Heimfarth, Verocai & Li 2018:15).

**TABLE 4.8: PERCENTAGE DISTRIBUTION OF THE RESPONSES TO POSSIBLE PUBLIC HEALTH CONSEQUENCES OF A DISASTER (N=369)**

| Variable /Description | Yes | No |
|---|---|---|
| | Percentage (%) | Percentage (%) |
| **What are the possible public health consequences of a disaster?** | | |
| Humans | 71.8% | 28.2% |
| Environment | 59.6% | 40.4% |
| Infrastructure | 60.4% | 39.6% |

Table 4.8 indicates that most of the respondents, 71.8%, 59.6%, and 60.4%, believed that there were possible public health consequences of a disaster for humans, the environment, and infrastructure respectively. However, the rest of the respondents believed disasters had no public health consequences for humans, representing 28.2%, the environment, representing 40.4%, and infrastructure, representing 39.6%.

The findings of this study suggest that human health, the environment, and infrastructure are the main problems and affected most by disasters today. Similarly, the economic and infrastructure impact of flooding events has received significant attention due to concerns regarding environmental change, including predicted increases in flooding event frequency and intensity (Andrade, O'Dwyer, O'Neill, & Hynds 2018:546). On the other hand, the human or physical effects of these events on our health, and specifically, the effects of flooding-induced enteric contamination of groundwater, remain poorly known and underreported (Andrade et al 2018:546). According to Vega Ocasio, Pérez Ramos and Dye (2020:6-7), the devastating cumulative consequences of the disasters have resulted in both an ecological and a multi-level social shift within the individual, household, and community levels that have collapsed infrastructure, exacerbated human chronic diseases, increased infectious

diseases, impacted mental health in community members, and created a significant migration to other places.

**TABLE 4.9: PERCENTAGE DISTRIBUTION OF THE RESPONSES BY THE RECENT DISASTER IN THE LOCALITY (N=369)**

| Variable /Description | Yes | No |
|---|---|---|
| | Percentage % | Percentage % |
| **If there has been any recent disaster in your locality, what caused it?** | | |
| Natural disasters (flooding, landslide, etc.) | 9.8% | 90.2% |
| Accidents/ Trauma | **66.9%** | 33.1% |
| Disease epidemics | **41.2%** | 58.8% |
| Terrorist attacks | 11.9% | 88.1% |
| Chemical spills | 4.3% | 95.7% |
| Fires | 23.8% | 76.2% |
| Food poisoning | 23.3% | 76.7% |
| There was no disaster | 9.5% | 90.5% |

Table 4.9 illustrates that when respondents were asked the question: 'what caused recent disaster in your hospital?', the majority, 66.9%, believed that accidents/ trauma was the main cause, 41.2% believed that disease epidemics were a cause, followed by 23.8% who believed that fire caused a recent disaster. In addition, 23.3% thought food poisoning, 11.9% terrorism attacks, 9.8% natural disasters (flooding, landslides, etc.) respectively caused disasters. Only 9.5% mentioned there was no disaster and 4.3% believed chemical spills were a cause of disasters.

According to this study, hospital staff experienced an increase in road traffic accidents. This study compares to a similar study conducted in Dar es Salaam, Tanzania, where 87% of the top causes were major road traffic crashes (Koka et al 2018:2). In another study conducted in Aden, Yemen, violence or terrorism were the leading causes which could lead to mass casualty incidents for 41.3% of the subjects followed by pandemics, floods, and earthquakes (36.6%, 10.7%, and 8.5%) respectively (Naser & Saleem 2018:4). The remaining 0.7% cited

no risk, while 2.2% of respondents cited other threats including transportation accidents, droughts, and famines (Naser & Saleem 2018:4).

**TABLE 4.10: PERCENTAGE DISTRIBUTION OF THE RESPONSES ABOUT DISASTER PREPAREDNESS (N=369)**

| Variable /Description | Yes | No |
|---|---|---|
| | Percentage % | Percentage % |
| **Disaster preparedness includes** | | |
| Material reserves | **71.5%** | 28.5% |
| Community rescue training and knowledge propagation | **75.1%** | 24.9% |
| Population vulnerability assessment | 48.5% | 51.5% |
| Other | - | - |
| Don't know | 2.2% | 97.8% |

Table 4.10 indicates that of the respondents who were asked what disaster preparedness included, the majority, 75.1%, responded community rescue training and knowledge propagation, followed by 71.5% who responded that it included material reserves and 48.5% responded that disaster preparedness included population vulnerability assessment. Only a small number of respondents, 2.2%, did not know what disaster preparedness included.

Most of the participants in the study agreed that the preparedness statement should include materials, community rescue training, and knowledge dissemination. In another similar study the findings suggested that there were several things that were needed to prepare before a disaster. These included an alert system to notify staff and community about a possible emergency as well as disaster kits including first aid kits, portable lights, necessary medications, personal protective equipment (PPE) supplies, and an emergency evacuation plan (Bhandari & Takahashi 2022:6). Similarly, preparedness included continuous training twice a year for basic life support, disaster management plans, and procedures to provide all staff with the necessary knowledge and skills for rapid rescue and response (Elsayed et al 2020:477).

*4.3.1.4. Responses to disaster in the study hospitals*

**TABLE 4.11: PERCENTAGE DISTRIBUTION OF THE RESPONSES TO DISASTERS THAT HAVE ALREADY BEEN ENCOUNTERED IN THE HOSPITALS**

| Variable /Description | Percentage (%) |
|---|---|
| **Emergency medical service staff can be integrated into hospital staff during disaster.** | |
| Yes | 76.2% |
| No | 7.9% |
| Don't know | 16.0% |
| **The hospital staff use identifying methods when the disaster plan is activated.** | |
| Yes | 31.4% |
| No | 45.5% |
| Don't know | 23.0% |
| **The hospital has pre-printed patient charts for use in disasters equal to 2 times the number of average daily ED visits.** | |
| Yes | 25.7% |
| No | 26.8% |
| Don't know | 47.4% |
| **Availability of emergency drugs and antidotes is maintained in the hospital.** | |
| Yes | 32.5% |
| No | 50.1% |
| Don't know | 17.3% |
| **Designated disaster supplies are ready for immediate distribution to and from the emergency department (ED).** | |
| Yes | 30.4% |
| No | 38.8% |
| Don't know | 30.9% |
| **The hospital uses a triage system that is consistent with local emergency medical services (EMS).** | |
| Yes | 37.7% |
| No | 41.2% |
| Don't know | 21.1% |
| **The hospital has designated an alternative triage area for disaster.** | |
| Yes | 38.8% |
| No | 41.5% |
| Don't know | 19.8% |

| Variable /Description | Percentage (%) |
|---|---|
| **The hospital has an alternative treatment area to accommodate casualty surge.** | |
| Yes | 30.1% |
| No | 45.8% |
| Don't know | 24.1% |
| **The hospital has a method for casualty tracking.** | |
| Yes | 34.4% |
| No | 40.1% |
| Don't know | 25.5% |
| **The hospital can increase isolation bed capacity.** | |
| Yes | 33.9% |
| No | 43.1% |
| Don't know | 23.0% |
| **The hospital has a plan, equipment, and appropriate level of PPE for protecting staff from the effects of chemical, biological, or radiological agents.** | |
| Yes | 37.9% |
| No | 41.7% |
| Don't know | 20.3% |
| **The hospital can manage emergency decontamination of 4 patients without outside resources or equipment that must be constructed to be deployed.** | |
| Yes | 33.5% |
| No | 42.0% |
| Don't know | 24.4% |
| **Coordination is in place to conduct epidemiological surveillance (microbiology, pathology, infectious disease, infection control), etc.** | |
| Yes | 30.4% |
| No | 43.9% |
| Don't know | 25.7% |
| **Surveillance is coordinated with local and/or state public health agencies** | |
| Yes | 33.3% |
| No | 41.7% |
| Don't know | 24.9% |

Table 4.11 shows that 76.2% of respondents confirmed that emergency medical service personnel could work in coordination with other hospital personnel when responding to an emergency, 16.0% did not know about it, and 7.9% of respondents did not work in

coordination. In addition, 46.6% of the respondents indicated that the hospital staff did not use identification methods when the disaster plan was made, 31.4% indicated that they used it, and 23.0% did not know about it.

When asked whether hospitals had pre-printed patient charts equal to twice the average number of ED visits per day, 47.4% of respondents indicated that they did not know about the issue, 26.8% indicated that there was no pre-printed chart, and 25.7% indicated that there was a printed chart.

According to the respondents, about 50.1% indicated that there was no availability of emergency drugs and antidotes in the hospitals, 32.5% of the respondents affirmed that there was, while about 17.3% of the respondents did not know anything about it.

Among the respondents, 38.8% indicated that emergency supplies were not readily available for immediate distribution to the ED, while 30.4% agreed that supplies were readily available, and 30.9% did not know anything about the issue. According to the respondents, 41.2% of the hospitals did not use a triage system to match the local emergency medical service, 37.7% of them did, and 21.1% did not know about it.

A total of 41.5% of respondents did not believe that the hospital had designated an alternative triage area for disasters, 38.8% agreed, and 19.8% were unaware. When asked whether the hospital had an alternative treatment area to accommodate casualty surges, most of the respondents, 45.8%, disagreed, 30.1% agreed, and 24.1% did not know about it.

Of the respondents, 41% disagreed that the hospital had a way to track casualties, 34.4% agreed, and 25.5% did not know. Most of the respondents (43.1%) agreed that the hospital had the capacity to increase isolation beds during a disaster while 33.9% disagreed; and 23% did not have an answer to the question.

Asked whether the hospital had a plan, equipment, and appropriate levels of PPE for protecting staff from the effects of chemical, biological or radiological agents, 37.9% of the respondents agreed, 41.7% did not agree, and 20.3% did not know about it. When asked whether the hospital could manage emergency decontamination of four patients without

outside resources or equipment, of the respondents, 33.5% agreed; 42.0% did not agree, and 24.4% did not know about it.

Asked whether the hospital had coordination in place to conduct epidemiologic surveillance, 30.4% of respondents agreed, 43.9% did not agree, and 25.7% did not know about it. When respondents were asked whether surveillance was coordinated with local and/or state public health agencies, 33.3% agreed, 41.7% did not agree, and 24.9% did not know about it.

This study shows that most respondents indicated that they would work in integrated emergency medical service staff with other hospital staff during disaster events. But most respondents indicated that hospital staff did not use identification methods when the disaster plan was activated. A similar study showed that the weakened understaffed healthcare system in the hospital and the added burden on existing healthcare workers would lead to a lack of integration, increased exhaustion, and fatal mistakes to the patients (Shoman, Karafillakis & Rawaf 2017:5). Another study conducted in Boston, Massachusetts, USA, strongly urged interdisciplinary collaboration to deconstruct the existing policy which currently separates these similar efforts to strengthen health systems. Working together as health professionals, disaster risk reduction (DRR) experts, and policymakers, we can develop integrated systems that limit suffering and death caused by disasters (Pyda, Patterson, Caddell, Wurdeman, Koch, Polatty, Card, Meara & Corlew 2019:10).

In this study, most respondents indicated that the hospital did not have pre-printed patient charts for use in disasters and there was a scarcity of emergency drugs and antidotes in the hospital. A similar study conducted in Kerman, Iran, explored the network of clinical experts and emergency drugs and supplies in the event of a natural or intentional disaster which might facilitate future disaster preparedness, response and improve patient outcomes. They used other forms of information technology to collect patient information, patient registered data, and transmit data to healthcare workers (Nejadshafiee, Nekoei-Moghadam, Bahaadinbeigy, Khankeh & Sheikhbardsiri 2022:6-7).

According to the study, most respondents indicated that the hospital did not have designated disaster supplies ready and did not use a triage system consistent with the local emergency medical service. In a similar study conducted in Shiraz, Iran, the management of the disaster supply chain's information systems in the hospital was important for collaborating and

sharing the information among internal and external professionals, suppliers, distributors, and other stakeholders to respond to disaster events (Bastani, Sadeghkhani, Ravangard, Rezaei, Bikine & Mehralian 2021:8). In another study conducted in Linkou, Taiwan, it was found that even highly developed nations could have their medical resources overwhelmed during disasters.

Triage strategies are essential to ensure resources are utilised effectively (Ng, You, Wu, Weng, Chaou, Chien & Seak 2018:5). Based on the findings of this study, most respondents indicated that the hospital had not designated an alternative triage area for disaster and did not have an alternative treatment area to accommodate casualty surges. In a similar consistent study, there was no specific triage method for such a disaster. Thus, a modified triage system based on the current method was developed. A disaster triage system developed in such a short period should be simple and easy to use without developing new measurement tools (Ng et al 2018:5-6).

According to Chuang, Woods, Reynolds, Ting, Balkin and Hsu (2021:6-7), the hospital did not stabilise to manage the disasters until the challenges regarding the emergency care staff and ED space were resolved, approximately 50 minutes after the emergency response program alarm sounded. In the case of the high-level difficulty hospital, they had no care capacity and accommodation.

This study showed that most participants indicated that the hospital did not have a method for casualty tracking, but the hospital was able to increase isolation bed capacity during a disaster. A study conducted in Milan, Italy, found that the emergency section was organised in large rooms, where plastic curtains could grant a bit of privacy to patients, even if it was not enough to protect patients, and the department rapidly moved to another building (Jachetti, Colombo, Brignolo-Ottolini, Franchi, Solbiati, Meli, Bosco & Costantino 2021:3). The ward was tailored to receive patients who had previously been in double rooms to an isolation room (Jachetti et al 2021:3).

This study revealed that most respondents indicated that the hospital had no plan, equipment, and appropriate level of PPE for protecting staff from the effects of chemical, biological, or radiological agents and the hospital was unable to manage emergency decontamination. A similar study conducted in Singapore reflected that advocating for zero

infections among health care workers should be one of our top priorities (Nadarajan, Omar, Abella, Hoe, Do Shin, Ma, & Ong 2020:3). As a first step, medical personnel must provide adequate PPE supplies and receive adequate training in their use and the routine uses of PPE when managing any infectious disease should be risk-adapted (Nadarajan et al 2020:3). A study conducted in Chicago, USA, revealed that in the ED, with a small-scale hazardous materials response team, decontamination simulation was conducted to train medical students and hospital staff in the handling of hazardous materials and how to control infection by using PPE during disasters (Verson, Dyga, Agbayani, Serafin & Hondros 2018:2).

This study found that most of the respondents highlighted that the hospital had no coordination in place to conduct epidemiological surveillance, and the surveillance was not coordinated with local and/or state public health agencies. In a similar study conducted in Kwara, Nigeria, integrating community-based surveillance and disaster response was found to be crucial in addressing the persistent scourge of poverty-related outbreaks and other emerging pandemic threats amongst vulnerable populations across the region (Tambo, Adetunde & Olalubi 2018:5-6). Furthermore, effective surveillance systems should be capable of providing timely, relevant healthcare information in addition to ongoing systematic collection of information (Mir, Bachani, Khawaja, Afridi, Ali, Khan, Jamali, Sumalani, Hyder & Razzak 2015:8).

*4.3.1.5. Challenges faced by hospitals in disaster management*

The description of challenges was measured through a Likert scale which ranked the responses in percentages (%) from very much disagree to very much agree. The description of challenges was listed on a vertical axis and the responses on the horizontal axis.

**TABLE 4.12: RESPONSES ABOUT THE EXTENT OF CHALLENGES THAT HOSPITALS FACE IN DISASTER MANAGEMENT (N=369)**

| Description of a challenges | Very much disagree | Disagree | Not sure | Agree | Very much agree |
|---|---|---|---|---|---|
| | Percentage (%) | Percentage (%) | Percentage (%) | Percentage (%) | Percentage (%) |
| Insufficient infrastructure | 10.8% | 11.1% | 16.0% | **38.5%** | 23.6% |
| Shortage of staff | 11.1% | 20.9% | 14.4% | **37.4%** | 16.3% |
| Lack of willingness by non-medical staff and off-duty staff to assist | 13.0% | 25.5% | **28.2%** | 26.8% | 6.5% |
| Unpredictable nature of disasters | 8.7% | 16.0% | 24.1% | **37.4%** | 13.8% |
| Shortage of blood in blood banks for transfusion | 9.2% | 22.8% | 21.7% | **34.4%** | 11.9% |
| Poor coordination when disasters strike | 9.2% | 17.1% | 20.1% | **40.4%** | 13.3% |
| Limited number of trained and dedicated members of staff | 7.0% | 12.7% | 18.4% | **46.1%** | 15.7% |
| Poor community empowerment and participation | 6.5% | 11.9% | 20.1% | **43.9%** | 17.6% |
| Lack of emergency training and drills | 7.0% | 11.7% | 17.6% | **42.5%** | 21.1% |

Table 4.12 highlights the following as the main challenges, as listed in order of priority:

- Limited number of trained and dedicated members of staff at 46.1%
- Poor community empowerment and participation at 43.9%
- Lack of emergency training and drills at 42.5%
- Poor coordination when disasters strike at 40.4%

Table 4.12 indicates that insufficient infrastructure, a shortage of staff, the unpredictable nature of disasters, and a shortage of blood in blood banks for transfusion were further regarded as challenges faced by hospitals at 38,5%, 37.4%, 37.4% and 34.4% respectively. Of the respondents, 28.2% were not sure whether lack of willingness by non-medical staff and staff who were off duty to assist were a challenge.

Table 4.12 reveals that the hospitals faced many challenges in disaster management. In another study conducted in similar situations in England, disaster managers might encounter logistical deficiencies, which could be due to a lack of funds, concerns about security management, or other concerns. It was difficult to administer donations, provide medical services in the appropriate places, and manage human resources (Salamati Nia & Kulatunga 2017:241). The first issue for the majority of hospitals when facing a disaster could be in managing the numbers and requirements of injured people, and a further challenge following the disaster was the lack of proper coordination of relief (Salamati Nia & Kulatunga 2017:240-241). In most of the described events, dealing with uncertainty, unpredictability and unexpected consequences was a significant challenge in many of the described events. Another challenge of specific interest was balancing following the plan or improvising, both individually and organisationally (Hugelius, Becker & Adolfsson 2020:5-6).

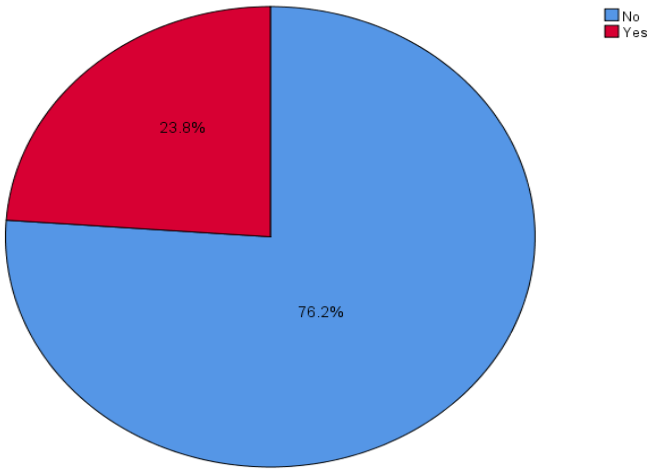


**Figure 4.2: Percentage of training of hospital staff in disaster management (N=369)**

Figure 4.2 shows that the majority of respondents, 76.2%, had not received any training in disaster management. Only 23.8% had received some training in disaster management.

This finding corroborates the findings of another study conducted at Amhara Regional State Referral Hospitals, Ethiopia, where 65.7% of respondents had not received information or training regarding emergency or disaster preparedness and management (Tilahun et al 2021:225). In a similar study conducted in Nairobi, Kenya, 58% of the respondents had never had any training in disaster management (Kiongo 2015:29). In another, similar, study conducted in Johannesburg, South Africa, 58.7% of respondents had not participated in disaster management training (Vaughan 2019:51). Furthermore, a study conducted in Alexandria, Egypt, revealed that nearly three quarters, that is 71.9% of participants had not received previous training about disaster management (Elsayed et al 2020:471). According to a study in Indonesia, 98.4% of respondents had experience in previous training in emergency or disaster management (Martono, Satino, Nursalam, Efendi & Bushy 2019:42).

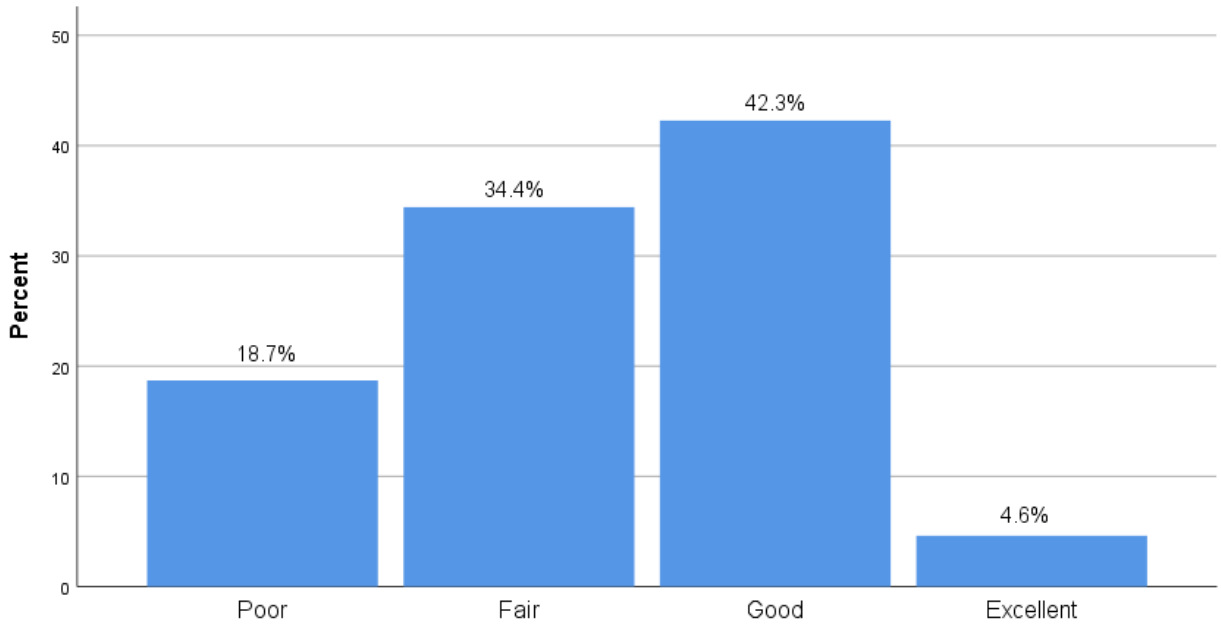


**Figure 4.3: Percentage distribution of level of knowledge about disaster management (N=369)**

Figure 4.3 shows that most, 42.3%, of respondents rated their knowledge as good, 34.4% as fair, 18.7% as poor, and 4.6% as excellent.

The majority of respondents to this study indicated that they had good knowledge of disaster management. In a similar study conducted at Amhara Regional State Referral Hospitals, Ethiopia, 39.2% of respondents had good knowledge regarding disaster management situations (Tilahun et al 2021:225). In a similar study conducted in Nairobi, Kenya, 45.2% had a fair knowledge of disaster management (Kiongo 2015:30).

*4.3.1.6. Measures to ensure disaster preparedness and management in the study*

**TABLE 4.13: POSSIBLE REMEDIES TO CHALLENGES HOSPITALS FACE IN DISASTER MANAGEMENT (N=369)**

| Description | Strongly disagree | Disagree | Not sure | Agree | Strongly agree |
|---|---|---|---|---|---|
| | Percentage (%) | Percentage (%) | Percentage (%) | Percentage (%) | Percentage (%) |
| Upgrade hospital infrastructure | 9.5% | 11.7% | 14.6% | **44.2%** | 20.1% |
| Increase number of medical staff | 6.5% | 12.7% | 15.4% | **46.3%** | 19.0% |
| Ask for support from other hospitals during times of disaster | 5.7% | 14.6% | 17.1% | **47.4%** | 15.2% |
| Train all members of staff in disaster management | 9.2% | 12.2% | 12.5% | **42.5%** | 23.6% |
| Perform regular emergency drills | 7.0% | 13.0% | 14.6% | **43.6%** | 21.7% |
| Improve on coordination at times of disaster | 7.6% | 10.0% | 12.2% | **45.8%** | 24.4% |

Table 4.13 shows that the possible remedies for challenges that hospitals faced in disaster management included asking for support from other hospitals in times of disaster at 47.4%, followed by increasing medical staff during disasters at 46.3%, and improvement of coordination during disasters at 45.8%. Other remedies that were suggested were to upgrade hospital infrastructure (44.2%), perform regular emergency drills and training for the entire staff in disaster management (43.6% of the responses), and lastly, training all members of staff in disaster management (42.5%).

Most of the participants agreed that the described possible solutions to challenges hospitals face during disasters were helpful. In a similar study conducted in England, it was suggested that providing disaster training for all staff, equipping health care facilities for disaster events, and allocating building codes could be productive solutions to mitigate the risk of disasters in hospitals (Salamati Nia & Kulatunga 2017:243). Another similar review of studies conducted in Europe, the United States of America (USA), Asia, and the Middle East found that strengthening the hospital's disaster preparedness capacity, medical procedures, disaster decision-making process, and disaster management were key solutions to overcoming the challenges that might arise during a disaster (Hugelius et al 2020:10).

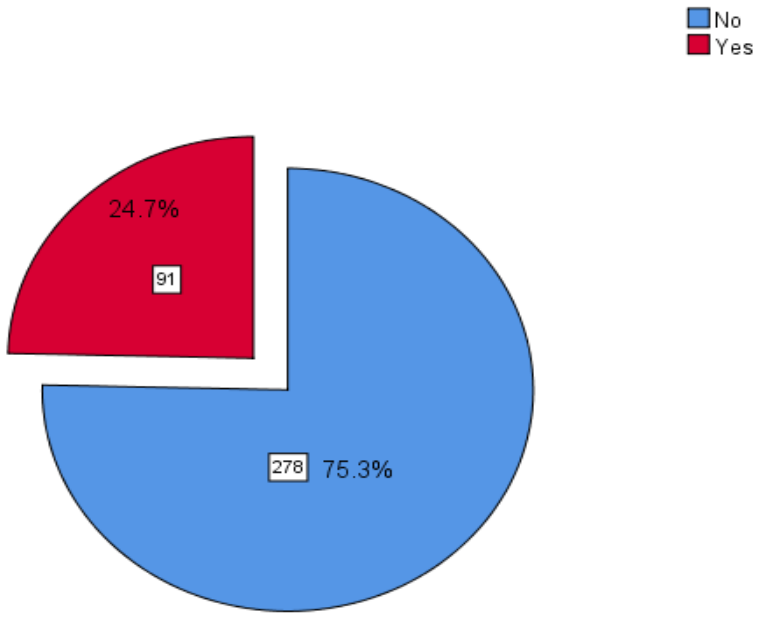


**Figure 4.4: Percentage of hospital staff involved in developing or revising the disaster management plan (N=369)**

Figure 4.4 shows that most of the respondents, 75.3%, had not been involved in developing or revising the hospital's DMP. Only 24.7% had been involved.

This study shows that most of the hospital staff were not involved in developing or revising the hospital's DMP. In a similar study conducted at Amhara Regional State Referral Hospitals, Ethiopia, 83.3% of respondents had not participated in developing/reviewing the hospital disaster plan (Tilahun et al 2021:225). In another, similar, study conducted in Nairobi, Kenya, 87% of respondents had never been involved in the development or revision of the hospital's DMP (Kiongo 2015:38). In a similar study conducted in Alexandria, Egypt, it was found that nearly two-thirds, 60.3%, of the respondents had not previously participated in any type of disaster plan or crisis plan (Elsayed et al 2020:471).

*4.3.1.7. Attitude towards disaster preparedness in the study*

**TABLE 4.14: ATTITUDE TOWARDS DISASTER PREPAREDNESS (N=369)**

| Description | Agree | Disagree | Unsure |
|---|---|---|---|
| | Percentage (%) | Percentage (%) | Percentage (%) |
| I do not need to know about emergency (disaster) operational plans | 11.9% | **81.8%** | 6.2% |
| Management should be adequately prepared when a disaster occurs | **68.6%** | 19.2% | 12.2% |
| Disaster management and planning is for a few people in the hospital | 24.7% | **61.8%** | 13.6% |
| Potential hazards likely to cause disaster should be identified and dealt with | **64.8%** | 22.0% | 13.3% |
| Training is necessary for all workers | **76.4%** | 16.0% | 7.6% |
| Do you think it is necessary to have an emergency (disaster) operational plan? | **77.2%** | 13.3% | 9.5% |
| An emergency (disaster) operational plan needs to be regularly updated | **73.4%** | 18.7% | 7.9% |
| Disasters are unlikely to happen in our hospital | 27.4% | **58.0%** | 14.6% |

| Description | Agree | Disagree | Unsure |
|---|---|---|---|
| | Percentage (%) | Percentage (%) | Percentage (%) |
| Disaster management is for nurses and doctors only | 3.0% | **78.0%** | 8.9% |
| Disaster simulations should occur frequently in the hospital | **52.8%** | 32.2% | 14.9% |
| Drills should be conducted in the hospital. | **54.5%** | 27.4 | 18.2 |

As shown in Table 4.14, the respondents were asked about their attitudes toward disaster preparedness, to which 68.6% of respondents said that management must be adequately prepared when a disaster occurs, and 64.8% said potential hazards should be identified and dealt with. In addition, 76.4% of the respondents indicated that training was necessary for all workers, 77.2% said an emergency (disaster) operational plan must be regularly updated, 52.8% said disaster simulations should be conducted in hospitals, and 54.5% said drills should be conducted in hospitals.

However, the rest of the respondents were asked about their attitude toward disaster preparedness, to which 81.8% responded that operational plans for emergencies (disasters) were not necessary, and 61.8% indicated that disaster planning and, management was the responsibility of a few people. Additionally, 58.0% maintained that disasters were unlikely to occur, and 78.0% disagreed that the only people who should be involved in disaster management were nurses and doctors.

In this study, the majority of the respondents expressed a positive attitude toward descriptions of disaster preparedness. In a similar study conducted in the Federal Addis Ababa public hospital, the general attitude of respondents towards disaster preparedness was positive at 64.8% (Habte et al 2018:43). In a similar study conducted in Aden, Yemen, the respondents' attitude toward disaster preparedness was generally positive, so that 84.9% agreed to teach disaster management in the hospital, wanted to have a disaster plan, and to know their responsibilities and roles during disaster events (Naser & Saleem 2018:5). In

another study conducted in Tokyo, Japan, the majority (51.49%) of participants had a positive attitude toward disaster preparedness (Bhandari & Takahashi 2022:4-5).

*4.3.1.8. State of preparedness to manage the disaster in the study*

**TABLE 4.15: PERCENTAGE DISTRIBUTION OF THE RESPONDENTS REGARDING THE LEVEL OF PREPAREDNESS TO MANAGE DISASTER (N=369)**

| Description | Strongly disagree | Disagree | Not sure | Agree | Strongly agree |
|---|---|---|---|---|---|
| | Percentage (%) | Percentage (%) | Percentage (%) | Percentage (%) | Percentage (%) |
| Presence of hospital's DMP | 9.2% | 19.5% | **27.6%** | 24.4% | 19.2% |
| Existence of a disaster management committee | 8.7% | 9.2% | 17.9% | **45.3%** | 19.0% |
| Familiarity with the contents of the DMP by all staff members | 10.0% | **48.8%** | 19.2% | 5.4% | 16.5% |
| Emergency/ disaster management Training for all staff members | 13.6% | **49.9%** | 15.7% | 13.6% | 7.2% |
| Existence of equipment in disaster preparedness (firefighting, early warning system, smoke detectors, fire extinguishers) | 10.3% | **55.0%** | 15.2% | 13.6% | 5.9% |
| Adequate evacuation plan and exits | 9.8% | **36.6%** | 21.1% | 16.3% | 16.3% |
| Regular emergency drills | 8.9% | **39.0%** | 19.2% | 16.5% | 16.3% |
| Availability of PPE in case of an infectious disease outbreak | 9.2% | **38.2%** | 15.2% | 15.4% | 22.0% |

Table 4.15 highlights that, when asked about disaster preparedness, 48.8% of the hospital staff agreed about familiarity with the contents of the DMP by all staff members, 49.9% for emergency personnel training, 55.0% for emergency equipment, 36.6% for adequate evacuation plans, 39.0% for emergency drills, and when asked about the availability of PPE, 38.2% of respondents indicated that their hospitals were not prepared for emergencies. However, the presence of the disaster management committee was confirmed by 45.3% of the respondents, but 27.6% of them did not confirm the availability of a hospital DMP.

This study shows that most respondents indicated that their hospitals' state of preparedness to manage disaster was inadequate. A similar study conducted in Alexandria, Egypt, indicated that two-thirds of study subjects (69.8%) were currently unprepared for disasters, and among them, 19.5% were insufficiently prepared, while only 10.7% were sufficiently prepared for disasters (Elsayed et al 2020:473). According to a similar study conducted in Nairobi, Kenya, 68% of participants agreed that the facility had effective communication in case of a disaster. It follows that communication is the most important determinant of disaster preparedness since it allows health care providers to provide appropriate disaster-related information (Kahare et al 2020:57).

The findings of the quantitative phase may inform phase 2 or the qualitative phase by indicating the gaps in awareness and knowledge about the Disaster Management Plan among hospital staff and used to develop targeted interventions to improve familiarity with the plan. The qualitative phase can help to uncover further insights into staff perceptions and attitudes towards disaster management planning and response, which can guide future initiatives in this area.

### 4.3.2. The qualitative phase

This section presents the demographic characteristics of the study sample and the research findings in the qualitative phase. The demographic characteristics are presented first, followed by the research findings.

#### *4.3.2.1. Demographic characteristics of the participants: The qualitative phase*

This sub-section provides information about the age, gender, qualifications, position, and experience of participants in the research.

**TABLE 4.16: SOCIO-DEMOGRAPHIC PROFILE OF THE PARTICIPANTS IN ADDIS ABABA, ETHIOPIA (N=15)**

| Participants | Age/ Years | Gender | Educational Status | Current Position | Experience/ Years | Pseudonym |
|---|---|---|---|---|---|---|
| 1 | 41 | Female | Master's Degree in EMCC | Emergency & ICU Director | 18 | IDIP-1 |
| 2 | 40 | Male | Master's Degree in EMCC | Emergency Coordinator | 23 | IDIP-2 |
| 3 | 39 | Female | BSc in Sociology | Social Service Department Head | 16 | IDIP-3 |
| 4 | 34 | Male | Master's Degree | Nursing Director | 5 | IDIP-4 |
| 5 | 38 | Male | Master's Degree in Public Administration | Vice Chief Executive Officer | 8 | IDIP-5 |
| 6 | 30 | Female | Master's Degree in EMCC | Emergency Coordinator | 4 | IDIP-6 |
| 7 | 39 | Male | Master's Degree in EMCC | ICU Coordinator | 16 | IDIP-7 |
| 8 | 35 | Female | Master's Degree in EMCC | Emergency Director | 7 | IDIP-8 |
| 9 | 50 | Male | Master's Degree | Procurement Director | 7 | IDIP-9 |
| 10 | 59 | Male | Master's Degree in Health service management | Planning & Budget Director | 23 | IDIP-10 |
| 11 | 54 | Male | BSc in Sociology | Social work Coordinator | 32 | IDIP-11 |
| 12 | 49 | Male | BSc in Public Health | Community Health Insurance Director | 15 | IDIP-12 |

| Participants | Age/ Years | Gender | Educational Status | Current Position | Experience/ Years | Pseudonym |
|---|---|---|---|---|---|---|
| 13 | 42 | Male | Master's Degree | Clinical Governance & Quality Director | 16 | IDIP-13 |
| 14 | 37 | Male | Master's Degree | Liaison department Head | 9 | IDIP-14 |
| 15 | 45 | Male | Master's Degree in EMCC | Emergency Director | 12 | IDIP-15 |

The table shows that 15 participants were interviewed for the study. They were aged between 30 and 59 years old, with a mean age of 42.1 years. The participants possessed either a BSc or master's degree in their field and had between four and 32 years of working experience in hospitals in different positions (see Table 4.16).

*4.3.2.2. Effects of disaster, and the challenges in preparedness and management*

This section discusses the effects of disasters in hospitals as well as challenges in disaster preparedness and management. These were explored through qualitative data collection and analysis methods, in accordance with the methodology of the study as discussed in Chapter 3.

The discussion follows five main themes and 16 sub-themes that emerged from the research question, and the coding and reduction of the data gathered through the qualitative research techniques. The discussion also presents quotations from the transcribed interviews. The five themes and 16 sub-themes are presented in Table 4.17 below.

**TABLE 4.17: THEMES AND SUB-THEMES**

| Theme | Sub-theme/Category | Problems and /or issues |
|---|---|---|
| Preparedness of disaster | Organisational factors | Lack of hospital preparedness |
| | | Unavailability of a warning system |
| | | Lack of disaster communication |
| | | Lack of resource inventories |
| | | Absence of mutual aid agreement |
| | Community factors | Lack of information |
| | | Lack of community education |
| | Individual factors | Lack of commitment |
| | | Lack of teamwork |
| Disaster management plan | Mitigation factors | Absence of mitigation |
| | | Lack of disaster prevention |
| | | Lack of public education |
| | Disaster preparedness factors | Lack of training |
| | | Disaster team preparedness formation & activities |
| | Response related factors | Team approach |
| | | Refer for better management |
| | | Hospital integration |
| | Recovery factors | Returning vital life support |
| | | Lessons learned |
| Effects of disaster | Human effects | Physical trauma |
| | | Disability |
| | | Economic crisis |
| | | Death |
| | Environment effects | Pollution |
| | | Congestion |
| | | Damage |
| | Infrastructure effects | Collapse |
| | | Destruction |
| | Organisational factors | Lack of surge capacity |

| Theme | Sub-theme/Category | Problems and /or issues |
|---|---|---|
| Challenges of disaster management | | Poor preparation |
| | | Poor security services |
| | | Stakeholder involvement |
| | | Counselling programme |
| | Medical supplies and equipment factors | Lack of resources |
| | | Improper utilisation of medical equipment |
| | Individual effects | Lack of trained professionals |
| | | Registration & record management |
| Recommendations | Strengthening training/ drills | Regular training /drills |
| | | Warning system |
| | | Risk assessment |
| | | Vulnerability analysis |
| | Strengthening collaborative partnership | Hospital preparedness |
| | | Government attention |
| | Strengthening public /community involvement | Community involvement |
| | | Stakeholder involvement |

4.3.2.2.1 Theme 1: Preparedness for disaster

This theme presents the response from middle and high-level hospital managers who were participants in the study regarding the preparedness of hospitals in the case of disaster. The participants mentioned problems and /or issues that gave rise to the preparedness of hospitals in the case of disaster in Addis Ababa city administration Health Bureau hospitals.

**TABLE 4.18: THEME 1: PREPAREDNESS FOR DISASTER**

| Theme | Sub-theme/Category | Problems and or issues |
|---|---|---|
| Preparedness for disaster | Organisational factors | Lack of hospital preparedness |
| | | Unavailability of a warning system |
| | | Lack of disaster communication |
| | | Lack of resource inventories |
| | | Absence of mutual aid agreement |
| | Community factors | Lack of information |
| | | Lack of community education |
| | Individual factors | Lack of commitment |
| | | Lack of teamwork |

Table 4.18 reveals the disaster preparedness of hospitals in Addis Ababa Administration Health Bureau, Ethiopia – the first theme. Theme 1 had three sub-themes drawn and categorised into organisational, community, and individual factors.

- **Organisational factors**

In this sub-theme, the hospital's middle and higher-level managers described their experience with organisational factors, including everything that had influenced how the organisation behaves and how everyone works together as a team in disaster preparedness.

Under the above sub-theme/category, participants mentioned the following problems and /or issues: lack of hospital preparedness, unavailability of a warning system, lack of disaster communication, the absence of resource inventories, and the absence of mutual aid agreements. These aspects are discussed below.

The participants, hospital staff, described their experiences related to disaster preparedness, the warning system in the hospitals, disaster communication issues, a resource inventory system, and the absence of mutual aid agreements. Despite the different perspectives offered by participants, all participants mentioned the importance of the above problems or issues and the need for organisational support during the disaster in many ways and for various reasons.

Lack of these aspects in the hospitals could mean that disaster-affected people would not receive appropriate health services and a failure of the health system to manage the health problems of the community timeously. These participants highlighted that absence of the indicated issues could exacerbate the suffering of the victims.

IDIP-3 explained:

> *"Existing during disaster preparedness in our organisation, there is a shortage of supplies, resources, space for further examination or treatment; this time there is a shortage of ambulances; we have these challenges in terms of disaster preparedness".*

IDIP-9 stated:

> "*We do not have a warning system, but what else do we have at our facility now or next year with CCTV cameras everywhere so; I think it is one way to reduce the risk".*

IDIP-9 mentioned:

> *"In the event of a disaster, there is no way to communicate or access information; I only receive information through rumours".*

IDIP-5 added:

> *"In the case of resource inputs, space constraints, the lack of prepared emergency response team, the shortage of medical supplies, but this does not mean that we do not have all the resources to respond to disasters".*

IDIP-1:

> *"Although we did not sign the agreement, we negotiated with another institution, such as a tent, emergency bed or push-up bed, a glove, a syringe borrowed from another institution". (3)*

Based on research in Tehran, Iran, having disaster preparedness is not only necessary but essential for the improvement of preparedness in hospitals, which are the first in line to receive injuries, as well as increased activities in emergencies and disasters (Beyramijam,

Rasouli-Ghahfarokhi, Fathollahzadeh, Rahimzadeh, Shahabirabori & Aminizadeh 2019:1). It has been shown in a systematic review that warning systems are effective in predicting severe obstetric morbidity and mortality and could lead to significant improvements in the quality of care and health outcomes (Umar 2020:1). Communication during disaster and crisis is required to explain emergency issues simply and understandably to everyone (Wahyunengseh & Hastjarjo 2021:4).

A study in Melaka, Malaysia, showed that using the periodic inventory system proved to be very effective and would be extremely helpful for disaster management; Additionally, it can be used to reduce costs and increase profits (Usop, Ishak & Hamdan 2017:1). A mutual aid agreement is a written or verbal agreement among agencies/organisations and/or jurisdictions that provides a fast and efficient mechanism to get personnel, equipment, materials, and related services as needed. It enables quick deployment of emergency support before, during, and/or after an incident (Federal Emergency Management Agency (FEMA) 2017:18).

- **Community factors**

This sub-theme refers to the participants exploring their experiences on community factors related to the immediate physical and social surroundings of individuals and households/families that either increase or decrease an individual's likelihood of experiencing disaster preparedness before, during, or after a disaster.

In this sub-theme/category, participants mentioned the following problems and /or issues: lack of information and the lack of community education. The community factors are elaborated below by discussing the related problems and the narration from the participants.

According to participants, disaster information flow through education despite its importance has been virtually ignored by hospital staff and society. A lack of disaster information can lead to humans making mistakes that affect the well-being of the community. Participants believed that the lack of community education in disaster preparedness and management faces a growing number of problems: these include disaster policies that must constantly adapt to community needs, the development of disaster science, the lack of coordination during the disaster, the lack of involvement, the challenges of educational equity, and quality problems.

IDIP-4 mentioned:

> *"In terms of giving information to the community; I don't think there is enough preparation in the current situation related to disaster information the community".*

IDIP-7 stated:

> *"In terms of educating the community; disaster then is a broader term: the middle ground between disaster and pre-preparation; I believe the body needs to do this work; I don't think there is enough preparation in the current situation in terms of educating the community".*

IDIP-11 added:

> *"To be honest, there is no work being done to raise awareness and educate the public about disasters".*

Hospital communities need to gather information about disaster management; train their community in first aid and emergency situations by developing educational plans; and ensure their active participation during a disaster by increasing their awareness of and skills in different fields of work (Hosseini, Bahadori, Raadabadi, & Ravangard 2019:23). Disaster information, whether through television, radio, or the printed word, or the mass media, cannot replace direct instruction; but may provide an important supplemental tool for the overall disaster information process (Hosseini et al 2019:22-23).

Recent events indicate that effective community education and mobilisation continue to be important in disaster preparedness. Community education and hospital disaster programs should be involved in community-based disaster response (Shannon 2019:304). Community education is considered a very effective factor in the empowerment and competence of the community that facilitates the achievement of predetermined goals in times of disaster (Abbasi, Fadavi & Bazmi 2017:6).

- **Individual factors**

This sub-theme explored the individual factors that determine disaster preparedness. These are factors identified within an individual, including attitudes, knowledge, skill, and personal characteristics in a disaster situation.

In this sub-theme/category, participants mentioned the following problems and /or issues: lack of commitment and lack of teamwork. The individual factors are elaborated below by discussing the related problems and the narration from the participants.

Among the participants, it was believed that untrained staff and frequent turnovers between departments were the main causes of a lack of commitment in the workplace. Staff who do not feel confident performing their disaster preparedness and who make frequent mistakes become discouraged and may feel that hospitals do not care about them. Additionally, based on the participants' experience, during disaster management, there are problems with teamwork within departments, such as unclear roles of responsibility, insufficient coordination, and miscommunication. They also believed that resolving disagreements in a team was vital to a successful team effort.

IDIP-12 said:

> *"Regarding disaster; there are no incentives provided to the hospital community, and duty payments are [lower] to the staff. As a result, hospitals are less committed, less prepared and less able to respond to disasters".*

IDIP-4 mentioned:

> *"However, there are challenges such as lack of medical supplies, unwillingness to purchase, non-immediate purchase, lack of coordination during emergencies, and sometimes more unnecessary professionals than the patient. It is a problem of not working with coordination and teaming."*

Hospitals rely on the disaster preparedness skill and commitment of their workforce. Yet, our current understanding of how hospital staff workplace commitment is affected by and evolves throughout the phases of a disaster remains limited (Gifford, Van de Baan, Westra, Ruwaard, Zijlstra, Poesen, & Fleuren 2021:1). In the absence of proper teamwork, guiding hospital

staff interventions becomes an inefficient affair. This, in turn, leads to loss of the high staff capacity for helping to treat, retrieve and rescue the wounded and victims and loss of their cooperation through creating feelings of ineffectiveness (Abbasi et al 2017:6). Inappropriate teamwork has been shown to have an impact on patient care and safety, and good teamwork can help patients achieve better outcomes (Gordon, Jorm, Shulruf, Weller, Currie, Lim & Osomanski 2016:1).

#### 4.3.2.2.2 Theme 2: Disaster management plan

This theme presents the response from middle and high-level hospital managers who were participants in the study. Although the participants alluded to the existence of a DMP in the hospitals, they emphasised that it was only on paper, that it was difficult to convert it into action, incomplete, and that there was a gap. As described below, the participants pointed out the problems that arise in the management plan of hospitals in Addis Ababa City Administration Health Bureau during emergencies (see Table 4.19).

**TABLE 4.19: THEME 2: DISASTER MANAGEMENT PLAN**

| Theme | Sub-theme/Category | Problems and or issues |
|---|---|---|
| Disaster management | Mitigation related factors | Absence of mitigation |
| | | Lack of disaster prevention |
| | | Lack of public education |
| | Disaster preparedness related factors | Lack of training |
| | | Disaster team preparedness formation & activities |
| | Response related factors | Team approach |
| | | Refer for better management |
| | | Hospital integration |
| | Recovery related factors | Returning vital life support |
| | | Lessons learned |

Table 4.19 provides responses about the second theme – the disaster management of hospitals in Addis Ababa Administration Health Bureau, Ethiopia. Theme 2 had four sub-themes: mitigation-related factors, preparedness-related factors, response-related factors, and recovery-related factors.

- **Mitigation factors**

This sub-theme refers to disaster mitigation factors that affect those measures taken before an emergency or disaster occurs to reduce or eliminate the impact of hazards.

In this sub-theme/category, participants mentioned the following problems and /or issues: absence of mitigation, lack of disaster prevention, and lack of public education. The issues under this sub-theme are presented below and substantiated by quotations from the participants.

Participants believed that due to the lack of mitigation requirements, emotional injuries created systemic risk consequences and poor-quality disaster health services, resulting in victims receiving inefficiently low levels of post-injury care and poor recovery outcomes, and they believed that disaster prevention reduced potential damage and suffering.

Additionally, participants believed that a lack of public education and awareness of disaster management failed to translate human knowledge into specific local actions to reduce disaster risks and failed to mobilise people by providing clear messages not supported by detailed information.

IDIP-1 said:

> *"There is currently no work to be done in terms of disaster mitigation. For example, in the past, one patient died by throwing himself out the window. Based on this, we have begun to work to reduce risks".*

IDIP-8 expressed the following:

> *"In terms of disaster prevention; it is not being done by our institution. Our focus is on assisting traumatised patients, but because of the frequent accidents associated with construction work, to inform the relevant authorities of the sub-city that this is happening, and we work to make them work".*

IDIP-4 mentioned:

> *"We are not doing as much as we should in terms of public education about disaster and its effects [and] dangers, we are not doing more than providing occasional health education".*

According to Kelman (2013:1), the most cost-effective forms of disaster mitigation service tend to be non-structural approaches, such as space use planning, warning systems, and hospital-level changes, but these are often backed by structural measures, making complete separation difficult. Poor administration of disaster mitigation can be further complicated by its effects on governmental quality and other socioeconomic outcomes (Miao, Shi & Davlasheridze 2021:45).

Disasters necessitate a coordinated collaborative response from therapeutic and preventive health care services (Sharma & Rastogi 2021:2540). To reduce the death rates response and relief must be organised as per levels of prevention initiatives (Sharma & Rastogi 2021:2540). Public education is an essential part of disaster management; and civilians should be educated, empowered, and promoted in self-dependency, first aid, and other simple techniques to use quickly to respond to a disaster (Khorram-Manesh 2017:177).

- **Disaster preparedness factors**

This sub-theme refers to disaster preparedness factors that affect measures taken in advance by governments, organisations, communities, or individuals to better cope with the aftermath of disasters, whether they are man-made or natural.

In this sub-theme/category, participants mentioned the following problems and /or issues: the lack of training and disaster team preparedness formation and activities. The disaster preparedness factors are presented below by discussing the related problems and the narration from the participants.

Based on participant experience, there is a lack of disaster training that results in unplanned events and does not provide training for emergency response personnel regarding disaster operations. Generally speaking, according to participants' experiences, in their hospitals disaster preparedness was achieved by disaster preparedness committees, or disaster medical assistant teams; usually led by hospital directors, but these teams normally worked

when problems occurred and then started an activity, one response indicating that the movement would start when disaster arrived and then get ready.

IDIP-5 stated:

> *"In the current situation, not all professionals or supporting staff have received training on disaster preparedness and management; we are not doing regular test or drill for disaster*".

IDIP-8 commented:

> *"Disaster preparedness and response to professional training are required for any hospital staff. But we did not do training at our hospital, but we did raise awareness; It is also practised around the table in terms of experience".*

IDIP-6 added

> *"In terms of established disaster planning committee, having a disaster medical assistant team at its current situation or composed of a variety of medical staff and professionals as well as support staff but this team normally works when problems occur".*

According to Al Harthi, Al Thobaity, Al Ahmari and Almalki (2020:2633), hospital staff faces challenges in all phases of disaster management, including education, training, and practical matters. It requires further development, including improving education and training by developing the curriculum and educational and training activities at hospitals. Several teams are assembled during a disaster, including the police, firefighting, disaster medical assistance teams (DMAT), medical, and road management teams, and direction and communication between all of these teams are crucial to managing disaster-related situations. To accomplish this, manuals and simulations should be developed and repeated during training (Lee, Lee, Kim, Lee, Kim & Youk 2019:60).

- **Response factors**

This sub-theme refers to disaster response factors that affect or influence actions taken immediately after a disaster.

In this sub-theme/category, participants mentioned the following problems and /or issues: team approach, referral for better management, and hospital integration. These are discussed below.

Participants believed that the team approach was necessary during disaster response: a comprehensive, integrated, and coordinated effort by health team members from different specialties. Based on the participant experiences, they would send an injured patient from one better management or professional caregiver to another, who may have the bed, or who may be a specialist and therefore be more knowledgeable and skilful in the diagnosis and further management of the patient.

In addition to this participant's comment, their hospital's integration during disaster coordination of activities across treating units that were at the same level in delivering services involved grouping organisations that provided a similar level of care under the same management.

IDIP-8 said:

> *"There is no doubt that the hospital is ready to treat mass disasters; So, at our institutional level there is a structured team called the disaster preparedness team, but it is not as strong as expected. The work of this committee is usually a sudden happening event".*

IDIP-8 commented as follows:

> *"For patients who are injured; we respond with our medical resources and manpower, and beyond our capacity inform medical services coordinators in Addis Ababa and send them to another facility".*

IDIP-1 added:

> *"If the disaster is severe and beyond our control…, for better treatment, we distribute to other specialised hospitals. Before this, the medical team will continue to provide assistance depending on the severity of the injury".*

A strong health team approach is vital for ensuring a resilient health system, which in turn is a key element of effective public health disaster management (Olu, Usman, Kalambay, Anyangwe, Voyi, Orach, Azazh, Mapatano, Nsenga, Manga & Woldetsadik 2018:2). Referrals or connections between hospitals should be made first to reduce the burden on healthcare institutions. Disasters also need better management, especially for patients needing treatment for non-fatal and non-debilitating conditions (Sharma & Rastogi 2021:2538).

Organisational integration plays a significant role in promoting efficiency and quality in health care services, while relational coordination plays a crucial role in promoting the quality of the health care provision, but not in achieving operational efficiency (Albuquerque & Cunha 2020:1). The integration of hospitals can be important for healthcare policymakers and strategic hospital management, supporting the integration and differentiation of tasks in both the operating system and the strategic system within hospitals or even at the regional level (Van der Ham, Van Merode, Ruwaard & Van Raak 2020:16).

- **Recovery factors**

This sub-theme refers to disaster recovery factors that affect the enabling of the victims to routine life, and the hospitals need to regain use of critical systems as soon as possible after a disaster occurs.

In this sub-theme/category, participants mentioned the following problems and /or issues, returning vital life support and lessons learned. The recovery factors are presented below by discussing the related problems, supported by quotations from the participants.

According to the participants' experience, hospitals implement vital life support during disaster recovery. Unless the patient declines life support outright, doctors, nurses, and other health care professionals immediately begin vital life support. However, the participants believed that their hospitals lacked a documented lesson learning system, so they were unaware of the cause of the disaster, the reasoning behind it, and any corrective action taken to address it. Those who did not document a disaster's lessons learned effectively did not consider these types of question: information about a disaster in general, information about disaster preparedness, and information about the DMP.

IDIP-3 said:

> *"We respond, we provide support to the injured, we reach out to organisations that have lost limbs as a result of the disaster, and this organisation helps people who are unable to afford it. For example, wheelchairs, crutches, etc., we also support psychology".*

IDIP-8 added:

> *"Our institution has lack to learn from past disasters; our problems with each other after the disaster. Our gaps are the lack of a clear forum for documentation and discussion of what we will … improve in the future".*

For victims who have sustained disaster-related injuries, returning vital life support and meeting rehabilitation needs were found to be important predictors of returning to work after initial treatment (Bae, Lee, Park, Lee & Leigh 2021:9). Emergency medical disaster relief must return vital life support quickly, move and be fully operational near the epicentres of the disasters; the quicker the better, and giving preference to acute trauma and then to routine medical conditions (Johnson, Ronan, Johnston & Peace 2016:2).

But the inadequacy of data management and information leads to poor planning, ineffective institutional memory, poor learning from experience, and no improvements toward best practices. Additionally, this inadequacy has led to ineffective monitoring and evaluation of disaster risk trends (Kamau 2018:18-20).

#### 4.3.2.2.3 Theme 3: Effects of disaster

This theme presents the response from middle and high-level hospital managers who were participants in the study and explained the effects of disaster on public health. In addition, the participants mentioned problems and issues associated with disasters in the human, environmental, and infrastructure aspects of the Addis Ababa City Administration Health Bureau hospitals, as discussed below (see Table 4.20).

**TABLE 4.20: THEME 3: EFFECTS OF DISASTER**

| Theme | Sub-theme/Category | Problems and or issues |
|---|---|---|
| Effects of disaster | Human effects | Physical trauma |
| | | Disability |
| | | Economic crisis |
| | | Death |
| | Environment effects | Pollution |
| | | Congestion |
| | | Damage |
| | Infrastructure effects | Collapse |
| | | Destruction |

Table 4.20 reveals the effects of disaster in hospitals in Addis Ababa Administration Health Bureau, Ethiopia – the third theme. Theme 3 had three sub-themes, human, environmental, and infrastructure effects.

- **Human effects**

This sub-theme refers to the direct or indirect effects of disasters on human health through the morbidity and mortality associated with trauma and infectious diseases.

In this sub-theme/category, participants mentioned the following problems and /or issues: physical trauma, disability, economic crisis, and death. The issues and the quotations from participants' responses are presented below.

Participants believed that physical trauma was either blunt force or penetrating trauma when an object or force struck the victim's body; disability was any impairment condition of the body or mind that made it more difficult for the person with the situation to do certain activities, with limitations on interaction with the environment around them and with participation restrictions.

According to the participants' experience, results of an economic crisis after disaster could be temporary or permanent. The economic crisis affects humans, displaces people, destroys human capital, shatters business and job networks, and results in increased poverty.

Additionally, participants mentioned that human death occurred when bodily injuries were a direct or indirect result of a disaster arising from violence, external damage, internal organ damage, or any other visible cause of death.

IDIP-3 said:

> *"Disasters can have short-term effects, amputations, psychological trauma, unemployment, and physical and psychological trauma on people in general".*

IDIP-10 that:

> *"It can lead to long-term disability, inability to work independently, family dependency: Then I saw a lot of other mental disorders".*

IDIP-5 stated:

> *"The impact of disasters on human's economic crisis is associated with a greater risk of trauma, which is the impact on both professionals and the support staff".*

IDIP-4 added:

> *"Disasters can have short-term effects or even death on human-beings".*

Physical trauma is prevalent across many types of trauma experiences and can be associated with disaster. It can be defined as a "body wound" caused by a sudden physical injury which is mainly described as type 1 trauma (Tamir, Kassa & Gebeyehu 2022:4-6). According to a study conducted in Brazil, the most common disability consequences of disaster were skin excoriations, one of which resulted in an amputation of a lower limb due to crushing, one of which suffered soft tissue damage and a rib fracture, and one of which took place due to crushing and consequent amputation of a lower limb (Carvalho, Freitas & Miranda 2019:5-6).

An economic disruption or crisis is caused by the occurrence of a potentially damaging event, phenomenon, or human activity, and this may result in the loss of life or injury, property loss, or economic disaster (Bonadonna, Frischknecht, Menoni, Romerio, Gregg, Rosi, Biass, Asgary, Pistolesi, Guobadia & Gattuso 2021:2). The study conducted in Bangui, Central

African Republic, found higher mortality rates than have been previously estimated, including one that exceeded the disaster threshold at the time (Robinson, Lee, Roberts, Poelhekke, Charles, Ouabo, Vyncke, Ariti, Gbanzi, Ouakouma & Gray 2021:13-14).

- **Environment effects**

This sub-theme refers to the effects of disasters on the environment that lead to unsustainable use of natural resources, and environmental degradation, with implications for natural resources and the well-being of the displaced and host populations.

In this sub-theme/category, participants mentioned the following problems and /or issues: pollution, congestion, and damage. The emerging issues from the sub-theme and accounts from the participants are presented below.

Based on the participants' experience, environmental pollution occurs when air, land, or water becomes contaminated, unclean or polluted, or when harmful side effects affect human health, commercial or recreational activities, or adversely affect human life.

According to participants' experiences, disasters result in more congestion due to environmental factors. As a result, the city becomes overcrowded, vehicles and roads become more congested, and anxiety, stress, and road rage are more prevalent. Besides, participants believed that environmental damage, i.e., the excessive amount of gases harmful to the environment released by the different industries, was the biggest reason by far for all kinds of damage.

IDIP-11 said:

> *"A disaster effect is a sudden pollution in environments and this often beyond control of the capacity of our hospital to manage when high number of victims injured".*

IDIP-1 also mentioned:

> *"The impact of a disaster on the environment is the potential for congestion. This can hurt more people. Both the volunteers and the injured person may die there due to congestion".*

IDIP-9 added:

> *"Environmental damage can be caused by natural or man-made events and a hospital is unable to manage or respond".*

Environmental pollution produces enormous amounts of smoke; there are substances known to harm human health, such as nitrogen oxide, carbon monoxide, nitrous oxide, methane, volatile organic compounds, and particulate matter (Humphreys, Walker, Bratman & Errett 2022:2). Disasters create congestion as well as healthcare needs for institutions, which include employees and the hospital environment (Sharma & Rastogi 2021:2539).

The effects of disasters on the environment, damage or destroyed storage systems, equipment/materials, and supply networks can destroy the environment and cause the loss of indigenous knowledge, thus disrupting not only the current growing season but also future growth cycles of the environment (Chapagain & Raizada 2017:1). A cross-sectional study conducted in Kurdistan, Iran, found that disasters had a serious impact on societal environments, causing significant damage and influencing them negatively (Yari, Zarezadeh, Fatemi, Ardalan, Vahedi, Khoshsabeghe, Boubakran, Bidarpoor & Motlagh 2020:1).

- **Infrastructure effects**

This sub-theme refers to the consequences of disasters for the infrastructure because of these direct impacts during the disaster, which can be electricity outages, communication breaks, and damage to buildings, roads, bridges, etc.

In this sub-theme/category, participants mentioned problems or issues such as collapse and destruction. These are presented below, supported by quotations from the participants.

According to participants, infrastructure collapse is the sudden and dangerous distortion of any part of a building or pressure or crushing caused by gas or water pressure, whether attended by rupture or not. It does not mean any slowly developing destruction due to any cause. Additionally, based on the participants' experience, infrastructure refers to the organisation of a city, a country, community, or institution consisting of basic services such as health, transport, communications, power supplies, and buildings, which become unusable due to destruction by disaster.

IDIP-2 said:

> *"Disaster consequences to infrastructure, i.e., car accidents and other accidents can cause severe damage to infrastructure, resulting in collapse".*

IDIP-8 stated:

> *"Building collapses are common effects of disaster as new infrastructure is being developed".*

IDIP-10 mentioned that:

> *"If the cause of the disaster is either natural or man-made, it affects the destruction of electricity, water, telecoms, etc".*

IDIP-12 stated:

> *"The impact of disaster on infrastructure can be devastating in terms of infrastructure destruction".*

A study conducted in Buenos Aires, Argentina, reported how a disaster resulted in a widespread collapse of electricity supplies in the study area (Craig, Wilson, Stewart, Outes, Villarosa & Baxter 2016:9). Similar to what has been observed for other volcanic eruptions with similar urban ashfall thicknesses, ash contamination on electrical distribution lines and substation insulators leads to leakage currents, insulator flashovers, and ash blockage and collapse at thermal oil and coal-fired generation plants (Craig et al 2016:9-10).

Because of the destruction of infrastructure and the blocking of roads by debris that can occur during disasters, reconstruction activities typically involve cleaning up or rebuilding processes (Coca 2020:8). Disaster management should prioritise the restoration of critical infrastructure and the order in which it should be restored (Coca 2020:8). According to Weinthal and Sowers (2019:319), infrastructure destruction and restrictions on development are forms of slow violence carried out by both state authorities and settlers.

4.3.2.2.4 Theme 4: Challenges of disaster preparedness and management

This theme refers to the response from middle and high-level hospital managers who were participants in the study and explained the challenges of disaster preparedness and management. In addition, the participants mentioned problems and issues associated with challenges of disaster preparedness and management in the Addis Ababa City Administration Health Bureau hospitals, as discussed below (see Table 4.21).

**TABLE 4.21: THEME 4: CHALLENGES OF DISASTER PREPAREDNESS AND MANAGEMENT**

| Theme | Sub-theme/Category | Problems and or issues |
|---|---|---|
| Challenges of disaster management | Organisational factors | Lack of surge capacity |
| | | Poor preparation |
| | | Poor security services |
| | | Stakeholder involvement |
| | | Counselling programmes |
| | Medical supplies and equipment factors | Lack of resources |
| | | Improper utilisation of medical equipment |
| | Individual effects | Lack of trained professionals |
| | | Registration and record management |

Table 4.21 depicts the challenges of disaster management of hospitals in Addis Ababa Administration Health Bureau, Ethiopia, which was the fourth theme. Theme 4 had three sub-themes: organisational factors, medical supplies and equipment-related factors, and individuals-related effects.

- **Organisational factors**

This sub-theme refers to the challenges of organisational factors that affect saving lives, reducing the suffering of injured people, and maintaining a safe environment for patients, visitors, and staff during and after disasters.

In this sub-theme/category, participants mentioned the following problems and /or issues, lack of surge capacity, poor preparation, poor security services, stakeholder involvement and counselling programme. These are elaborated below.

Based on the experience of the participants, lack of surge capacity was one of the challenges to the ability of their hospital health care system to respond to sudden increases in demand for lack of services or emergencies. Participants believed that poor disaster preparation in the hospital would mean that some officials and workers would not be on the scene after a disaster except for emergency staff. They would be unable to cope with disaster without preparing in advance and working with their staff as a team. The hospital did not follow the steps listed in the information booklet to be prepared, were not informed, did not plan, or assemble a kit and maintain their plan and kit.

On the other hand, participants believed that the consequences of poor security services in their hospitals lead to an increase in theft, overcrowding, disturbance by the patients' families, and vandalism. Without any sort of security deterring criminal activity, their hospital was vulnerable to theft and vandalism. There was no procedure to handle disasters, tarnishing hospital communities; and there was poor legal liability.

According to participants, they believed there was a lack of extensive engagement with key stakeholders, including formal organisation involvement in line with informing, engaging, and consulting the community in developing disaster management and community care services in case of disaster management. Besides, these participants believed that during the management of a disaster counselling and psychological support services were not sufficiently available to the victims and staff, including that there were challenges with confidential evaluation and referral if needed.

IDIP-11 said:

> *"The challenges we have to deal with after a disaster are that our emergency room is too narrow, small, and we treat patients on the field when they come to us. What we did was there were tents set up for COVID 19 treatment; We are using it, and we are using it to identify patients".*

IDIP-3 explained:

> *"Existing challenges during disaster preparation, there is a shortage of supplies, resources, space for further examination or treatment; this time there is a shortage of ambulances; we have these challenges in terms of emergency preparedness".*

IDIP-8 commented:

> *"There is a problem with the security system in our institution; The expert is also involved in the accident, and there may be a conflict with the person outside the accident. This indicates a weakening of the institution's security".*

IDIP-12 said:

> *"We have poor stakeholder engagement and not communicated well during disaster. It result losing interest or becoming difficult and a loss of support from them".*

IDIP-5 added:

> *"In terms of recovery, we do not have a formal counselling program, just encourage them to return to work after they have recovered".*

During large-scale burn disasters, hospitals provide essential emergency care to traumatised patients; there is sufficient preparedness and surge capacity in most health care systems to respond effectively to conventional multiple casualty incidents, such as road traffic accidents and fires (Chuang et al 2021:1-2).

To effectively prepare the hospital staff for disasters, hospital administrators, government officials, and professional organisations must recognise the value of disaster preparedness and support innovative methods to educate staff (Schneider 2019:11). According to Parry, Kirk, Colquhoun, Durrheim, and Housen (2022:12), for plausible disaster management, preparation is crucial. Leadership, political, and communication skills need strengthening to ensure the public health workforce can effectively manage health security.

To improve disaster healthcare access, program planners should consider the security of health facilities as a key factor in program planning. Fear of crime and staff safety are

currently limiting factors for implementing and using disaster healthcare (Etiaba, Manzano, Agbawodikeizu, Ogu, Ebenso, Uzochukwu, Onwujekwe, Ezumah & Mirzoev 2020:8).

Mileski, Gharehgozli, Ghoram, and Swaney (2018:131) maintain that cooperation among involved stakeholders is the most effective mechanism for an appropriate disaster prevention and response plan; cooperation of stakeholders not only increases effectiveness; but also the speed of disaster response.

Based on research conducted in San Francisco, USA, study of the themes identifies essential directions for counselling psychologists working with survivors of natural disasters. They offer recommendations for training, theory, counselling, and research as a means of supporting and advocating for clients psychologically, socially, and emotionally in the event of a natural disaster (Domínguez & Yeh 2020:287).

- **Factors related to medical supplies and equipment**

This sub-theme refers to the challenges of medical supplies and equipment-related factors that affect difficulties of supply, poor information, and inappropriate uses of medical equipment in the case of disaster preparedness and management.

In this sub-theme/category, participants mentioned the following problems and /or issues: lack of resources and improper utilisation of medical equipment. These are discussed below, supported by quotations from the participants' responses.

Participants believed that hospitals were responsible for providing all facilities, materials, and resources (including personnel, equipment, and supply) necessary and appropriate for the performance of the services, but lack of resources presented a big challenge for managing the disaster. Moreover, based on the participants' experience, during the disaster physicians or other health professionals could not utilise such medical instruments and equipment appropriately. So, the improper usage of equipment, or if a health professional or hospital cannot maintain the standard of resources for protecting the health and welfare of victims, regardless of the medical issue, the disaster management is inadequate.

IDIP-11 explained:

> *"We do not have disaster medical supplies, such as a helmet, back support, and belt. To summarise, the first challenge is the challenge of room for preparedness, staff/professional, and medical resources".*

IDIP-12 added:

> *"Another problem to manage disaster is Laboratory investigation and Imaging services, such as the lack of an X-ray, a CT scan at our facility, and the unwillingness to work with patients GCS < 7 [Glasgow Coma Scale] when they are out of consciousness. Other patients who need cancer screening treatment".*

IDIP-4 stated that:

> *"It's known that medical resources are essential for disasters. There is no question that skill and knowledge [are essential] to use medical equipment, but because some healthcare workers cannot properly use medical equipment".*

Disaster issues must be prioritised, and best practices adopted to ensure accessibility, availability, and efficient use of resources in the hospitals (Bhattacharya, Hossain & Singh 2020:223). Based on research conducted in Michigan, United States of America, a shareable drug shortage resource could be developed to help facilitate the fair allocation of scarce drugs; a shared resource may allow hospitals to adopt accepted best practices, and share scarce resources more efficiently (Chen, Goold, Harrison, Ali, Makki, Kent & Shuman 2021:1).

In a study conducted in Kenya, human resource development, medical equipment management policy, medical equipment procurement policy, and adherence to the service charter were the major determinants of medical equipment utilisation at Mandera referral hospital (Aliow, Mwaura & Musa 2021:13).

- **Effects related to individuals**

This sub-theme refers to the challenges of individual-related factors that affect disaster preparedness. This relates to management that lacks the necessary skills, inadequate

hospital staffing during and after a disaster which leads to decreased health care demands and a lack of continuity of care, and poor patient safety.

In this sub-theme/category, participants mentioned the following problems and /or issues, lack of trained professionals, and registration and record management. These issues are discussed below.

Participants believed that they had inadequately trained professionals and were likely to experience poor disaster management performance and increased levels of work-related stress. If their hospital staff lack knowledge and are under-skilled, the chances of treating the victims and the prognosis will be compromised. Furthermore, they said during disaster management there was poor registration and records management which can lead to hospital system failure: Excessive amounts of time were wasted sorting through messy filing cabinets, forcing the hospitals to pay high prices.

IDIP-10 said:

> *"I have not seen any trained professionals in the disaster preparedness and management plan, but I do know that some have been trained before a year".*

IDIP-12 stated:

> *"Poor funding, insufficient computers and other technology, and poor computer skill all pose major challenges in handling health records in our hospitals".*

IDIP-15 added:

> *"In my view, having poor handwriting of some staff, failing to date, time, and sign a medical entry, not documenting prescribed medications or treatments, and incomplete or missing documentation are the most significant problems in managing disasters related to data management".*

It is a key issue that health professionals lack the required knowledge regarding disaster preparedness due to the absence of teaching programs; thus, this knowledge should be incorporated into the curriculum of primary medical schools and continuing education programs of health facilities (Naser & Saleem 2018:1). The roles and responsibilities of

healthcare professionals in disaster situations can vary greatly, even when they are properly trained. Disaster preparedness for health professionals explores the changes that happen from a basis of understanding disasters, preparedness planning, emergency management, and the roles of allied health professionals ensuring optimal outcomes (Richards 2018:1).

During patients' walk-through from one hospital to another, registering and recording disaster-relevant medical data, creating a continuous footprint of the patient as a scalable and secure data source, and addressing all concerning medical records sharing and accessing such as authentication, privacy, security, scalability and audibility, builds confidentiality (Hasavari & Song 2019:71). In the healthcare sector, patient health records provide a significant solution for managing patient details, and the patient health record scheme enables the exchange of data with healthcare providers and helps to predict health problems (Sammeta & Parthiban 2022:625).

#### 4.3.2.2.5 Theme 5: Recommendations/ suggestions to improve disaster preparedness and management plan

This theme refers to the recommendations/ suggestions of middle and high-level hospital managers who participated in the study to improve disaster preparedness and management planning in the Addis Ababa Administration Health Bureau hospitals (see Table 4.22).

**TABLE 4.22: THEME 5: RECOMMENDATIONS/ SUGGESTIONS TO IMPROVE DISASTER PREPAREDNESS AND MANAGEMENT PLANS**

| Theme | Sub-theme/Category | Problems and or issues |
|---|---|---|
| Recommendations/ suggestions | Strengthening training/ drills | Regular training /drills |
| | | Warning system |
| | | Risk assessment |
| | | Vulnerability analysis |
| | Strengthening collaborative partnership | Hospital preparedness |
| | | Government attention |
| | Strengthening public /community involvement | Community |
| | | Stakeholder involvement |

Table 4.22 reveals the recommendations/suggestions on how to improve disaster preparedness and management plans of hospitals in Addis Ababa Administration Health

Bureau, Ethiopia, which was the fifth theme. Theme 5 had three sub-themes: training/ drills, collaborative partnership, and public /community involvement.

- **Strengthening training/ drills**

This sub-theme refers to the recommendations and importance of disaster training/drills as a precondition for the development of technical skills, the improvement of operational management, and the optimisation of cooperation between disaster management staff.

In this sub-theme/category, participants mentioned the following problems and /or issues, regular training /drills, warning system, risk assessment, and vulnerability analysis. These issues are discussed below.

Participants believed that mandatory disaster preparation and management training must be undertaken or completed. Regular disaster management and preparedness training for hospital staff, whether clinical or non-clinical, is beneficial for those who have attended disaster preparation and management classes or have a decent level of disaster theory knowledge and need some orientation.

Additionally, based on the participants' experience, they needed a drill in which staff simulates the situation of a disaster so that they have an opportunity to practice their responses, simulations, and have the chance to work with the same disaster aid equipment which would be utilised in disaster preparedness and disaster management. Such drills are used to identify weak points in a disaster response plan and familiarise them with the steps they need to take so that their response in a disaster will be active.

Participants also believed that an early warning system was a technology designed to predict and mitigate the harm of natural and man-made disasters and other undesirable conditions. Early warning systems will necessarily be for natural disasters including floods, earthquakes, landslides, and drought. According to participants, disaster risk assessment involves analysing disasters and evaluating existing conditions of vulnerability to determine the nature and extent of the risks. Additionally, it could reduce the number of exposed staff, people, property, health services, livelihoods, and hospital facilities.

Based on the experience of participants, vulnerability analysis is a way of estimating the vulnerability to potential disaster, for more socio-economic advantages. It involves all

significant elements in the community, including physical, social, and economic considerations and the extent to which essential health services can continue functioning.

IDIP-13 said:

> *"As a solution, everyone involved in the training should be trained and should be aware of emergencies in the concept of preparation and planning".*

IDIP-7 added:

> *"Therefore, hospitals should have a plan of action for disaster. They have to practice or drill".*

IDIP-7 mentioned:

> *"They have to have a hospital warning system. There is no need to wait for a disaster to occur, and the host community must always be vigilant and prepared".*

IDIP-1 stated that:

> *"I suggest that doing risk assessment can decrease disasters happening by identifying potential disasters in hospitals and identifying who might be harmed by those disasters".*

IDIP-9) explained:

> *"A disaster vulnerability analysis is essential for the best way to resolve threats to coordination based on that overview of the disaster".*

Based on a systematic review conducted in Cambridge, United Kingdom, implementing disaster training programs for hospital staff improves disaster preparedness, knowledge, and skills that are important for hospital staff during times of pandemic disasters. If additional hospital staff is recruited to assist in the pandemic disaster, there needs to be a specific training program for them (Ashcroft, Byrne, Brennan & Davies 2021:368). Disaster drills, in addition to testing emergency systems, also offer organisations a chance to improve processes and communication structures before disasters strike, and they have been used

to develop and maintain collaborative networks in preparation for disasters (Andrew, Chatterjee, Namuduri, & Winkler 2021:575).

An early warning system is a collection of equipment, controls, capabilities, and technologies capable of disseminating information to, and reducing the impact of natural disasters on the affected communities, such as reducing financial losses, human losses, and property damage (Ramón-Valencia, Palacios-González, Santos-Granados & Ramón-Valencia 2019:83-84).

A risk assessment that integrates societal behaviour and the dynamics of adaptive behaviour can be more accurate in describing risks and can improve assessments of the outcomes and effectiveness of risk-management strategies and investments (Aerts, Botzen, Clarke, Cutter, Hall, Merz, Michel-Kerjan, Mysiak, Surminski & Kunreuther 2018:193). Based on research conducted in Canberra, Australia, an effective risk assessment framework should pay simultaneous attention to both social vulnerability and various characteristics of disasters (Zarghami, & Dumrak 2021:1).

A vulnerability analysis will assist in building a better understanding of the human-environment relationship to meet society's requirements and maintain a variety of life support systems, as the tourism sector, for instance, is not immune to the human-environment interaction within their system (Matusin, Siwar & Halim 2019:142).

- **Strengthening collaborative partnerships**

This sub-theme refers to the recommendations and the importance of disaster collaboration among governmental and nongovernmental organisations (NGOs) after disasters in helping them deliver services, share information, and avoid duplication of resources.

In this sub-theme/category, participants mentioned the following problems and /or issues: hospital preparedness and government attention. These are discussed below:

Participants believed that hospitals should ensure that their staff is adequately trained, equipped, and has access to medical supplies and equipment, so that disasters can be prevented and that they are capable of promptly identifying risks and analysing possible disasters within the hospitals. Furthermore, based on the participants' belief that hospitals and individuals are limited in their ability to process information, so government bodies such

as the (MOH) and the regional health bureau need simple ways to filter, prioritise, and create agendas for disaster preparedness and a management plan. This means that government policymakers also use past experiences to guide their attention to disaster preparedness and management.

IDIP-5 said:

> *"The main purpose of the hospital as a whole is to save lives and to save that, the work must be done with the utmost care, and the professional and the management staff must have a sense of self to serve the community".*

IDIP-9 stated that:

> *"Finally, as an institution and as a country, I believe that the government should pay special attention to emergency preparedness and response capacity, in both natural and man-made disasters and loss of life".*

Considering vital resources during a disaster surge event of the hospital preparedness: space, staff, physical equipment, and system or coordination and an adaptable approach, and the most common ways that should be addressed for disaster surge events during preparation is essential (Anesi, Lynch & Evans 2020:1). Hospital preparedness is a vital component of a disaster plan that can significantly reduce the impact of large-scale epidemic disasters; therefore, evaluating organisational preparedness is an essential step in this planning process (Gul & Yucesan 2021:16).

Based on a study conducted in Nanning, China, the focus of government attention and the dynamic evolution path in each pandemic disaster prevention and control stage is based on the policy documents issued by the Chinese central government, and they conclude that the government has paid attention to different disaster responses (Cheng, Kang & Lin 2021:16). It is strongly recommended that the government improve its cognitive ability and focus more on establishing a strong disaster health system (Chuang et al 2021:1).

- **Strengthening public /community involvement**

In this sub-theme/category, participants mentioned the following problems and /or issues, the community, and stakeholder involvement. The issues are discussed below, supported by quotations from the participants.

According to what participants believed, community involvement in disaster preparedness and management is the energy to bring positive, measurable change to the communities in which the hospitals can operate. Examples of community involvement comprise in-kind and financial donations for family losses by the disaster, participation in employee volunteer days, sustainable non-profit partnerships with the hospitals, etc. Furthermore, participants believed that stakeholder involvement in disaster preparedness and management plans like other facilities, representatives of locally affected communities, local or national government authorities, politicians, and civil society organisations was essential in a planning or decision-making process.

IDIP-6 stated:

> *"The solution is to set up various discussion forums with the community and learn from time to time about the dangers of disaster and pitfalls and how they should not be overwhelmed, but individuals around the hospital can help us when they need help".*

IDIP-7 said:

> *"The other is not only consistent with their institution but also with other hospitals in terms of admission and discharge or liaison office, but there is still a need to strengthen our relationship with the outside hospitals".*

IDIP-10 stated that:

> *"Disaster preparedness challenges, of course, will be prepared in communicating with the concerned parties. Based on this, the hospital management will focus on preparing, each year".*

A study conducted in West Sumatra, Indonesia, found that community involvement in disaster management was a collection of knowledge created by a group of people from generation to generation that lived, united, and in harmony with nature (Rozi, Ritonga, & Januar 2021:6). In a similar study conducted in West Bengal, India, the community's level of involvement had largely helped them cope with disaster, and community involvement was significant and increased the chances for participants to take up other disaster mitigation measures, thereby reducing the effects of the disaster (Ali & George 2021:406).

Based on a qualitative study conducted in Arizona, USA, infrastructure designers and engineers must work directly with community stakeholders to understand evolving needs and design systems that help achieve better disaster recovery outcomes (Chester, El Asmar, Hayes & Desha 2021:3458). The stakeholders' local knowledge and how this influences the overall position in disaster management and further development of knowledge co-production processes were based on giving equal weight, recognition, and importance to knowledge (Trogrlić, Duncan, Wright, Van den Homberg, Adeloye, Mwale & McQuistan 2021:1).

## 4.4. MIXING OR INTEGRATION AND SYNTHESISING KEY RESEARCH FINDINGS

Overall, in section 4.4. Mixing or Integration and Synthesising key research findings indicated how the results of Phase 1 were translated into specific actions in the development of a disaster management plan.

An explanatory sequential mixed-methods approach was used for this study. The findings from the quantitative and qualitative data were mixed after both sets of data were collected concurrently, separately analysed, and outlined.

The quantitative phase assessed and described the nature and types of existing interventions and measures to be put in place to ensure that disasters are prepared for and managed in the hospitals in the Addis Ababa Administration Health Bureau. The qualitative phase explored and described the challenges of facing the effects of disasters in hospitals. The findings from both the quantitative phase and qualitative phase exposed the challenges facing hospitals in the case of disaster. In summary, according to this study, while disaster preparedness and management plans are being offered in the assessed city administration

hospitals, significant challenges were noted, which the strategic plan should address. In brief, these are:

- Lack of preparedness: disaster management committee members comprised only 11.9% of the hospital staff; only 31.4% of the hospital staff used identification methods when a disaster plan was activated; only 32.5% of the staff indicated the availability of emergency drugs and antidotes in the hospitals; 41.2% of the hospitals did not use a triage system to match the local emergency medical service; 38.8% indicated that emergency supplies were not readily available for immediate distribution to the ED, and only 23.8% had received some training in disaster management.
- Lack of disaster communication: such issues were the result of complex and diverse factors, including technology and man-made factors that affect the health system to manage the health problems of the community in the hospital timeously.
- Lack of information: this issue has been virtually ignored by hospital staff and society.
- Lack of resources: lack of necessary resources such as materials and supplies (including personnel, equipment, and supply) was a big challenge in disaster management.
- Lack of training: hospitals do not provide disaster operations training for emergency response personnel, and the lack of disaster training will lead to unplanned events.
- Poor security services: the poor security services in their hospitals lead to an increase in theft, overcrowding, disturbance by patients' families, and vandalism. There is no procedure to handle disasters, tarnishing hospital communities; and there was poor legal liability.

A plan was developed based on the key findings which emerged from integrated findings from both qualitative and quantitative phases.

## 4.5. OVERVIEW OF RESEARCH FINDINGS

The study's findings have been presented in Chapter 4. The quantitative phase established that there was a need to identify the nature, types, existing interventions, and measures to be put in place to prepare for and manage disasters in the hospitals in the Addis Ababa Administration Health Bureau.

Five themes emerged from the qualitative phase, namely, disaster preparedness; DMP; effects of a disaster; challenges of disaster management and recommendations. The qualitative phase established that disaster preparedness and management plans are important for hospitals. However, hospitals' disaster preparedness and management plans within Addis Ababa city administration hospitals were below standard as far preparation and management for disasters was concerned. Thus, hospitals must develop appropriate intervention plans to address the challenges associated with disaster preparedness and management.

The next chapter presents the proposed disaster preparedness and management plan for the hospitals within Addis Ababa Administration Health Bureau, Ethiopia.

# CHAPTER 5

# PROPOSED DISASTER PREPAREDNESS AND MANAGEMENT PLAN FOR THE HOSPITALS WITHIN ADDIS ABABA ADMINISTRATION HEALTH BUREAU, ETHIOPIA

## 5.1. INTRODUCTION

This chapter outlines a disaster preparedness and management plan to support hospitals in Addis Ababa Administration Health Bureau. In this thesis a disaster preparedness and management plan refers to precautions taken before a disaster happens to mitigate damage or harm and effects on people and property.

The establishment of appropriate strategies is essential for managing and coordinating a course of action to minimise impact and facilitate recovery from the potential events that could endanger the people, infrastructure or functioning of hospitals.

The objectives of the study were to:

- Explore and describe the nature and types of disasters encountered in the hospitals in Addis Ababa Administration Health Bureau.
- Explore and describe the existing interventions to respond to disasters that have been encountered in the hospitals in Addis Ababa Administration Health Bureau.
- Establish measures to be put in place to ensure that disasters are prepared for and managed in the hospitals in Addis Ababa Administration Health Bureau.
- Explore and describe the challenges facing hospitals in Addis Ababa Administration Health Bureau, Ethiopia, in disaster preparedness and management.
- Establish the effects of disasters in hospitals in Addis Ababa Administration Health Bureau.
- Propose plans to ensure disaster preparedness and management in the hospitals in Addis Ababa Administration Health Bureau in a case of a disaster.

Based on these objectives, the nature and types of disasters encountered in the hospitals, in line with objective 1 of the study, were discussed in section 4.3.1.3. The hospitals' response to the disaster in line with objective 2 was discussed in section 4.3.1.4; to ensure

that disasters are prepared for and managed in the hospitals in line with objective 3 was discussed in section 4.3.1.6; the challenges facing hospitals in disaster management in line with objective 4 were discussed in section 4.3.1.5; and the effects of disasters in hospitals, responding to objective 5, were discussed in themes. The five objectives were addressed in Chapter 4 of the thesis. The sixth objective, namely the development of a plan to ensure disaster preparedness and management in the hospitals, is addressed in this chapter, Chapter 5.

A plan comprises the objectives and processes necessary to deliver the results under the expected output (the target or the goals) (Zohuri, Moghaddam & Mossavar-Rahmani 2022:4). By establishing output criteria, the completeness and accuracy of the specification are also a part of the desired improvement (Zohuri et al 2022:4). So, hospitals' disaster preparedness and management plan should be ready to establish a basic disaster preparedness and management program for providing a timely, integrated, and coordinated response to natural and man-made disasters that may disrupt normal operations and require a pre-planned response (World Health Organization (WHO) 2022:20-21).

## 5.2. MAJOR FINDINGS OF THE STUDY

The developed plan is based on the study findings. The study revealed barriers to disaster preparedness and management in some hospitals. The study findings were based on and informed by two theoretical models, namely, the health belief model and theory of planned behaviour.

Integrating the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB) provided a comprehensive framework for developing effective disaster preparedness and management plans in hospitals. By understanding the determinants of behaviour change, hospitals developed targeted interventions that addressed knowledge gaps, misconceptions, attitudes, norms, and behavioural control. This ultimately led to improved disaster response efforts and better health outcomes for individuals and communities affected by disasters.

As to the study, hospitals were aware of problems associated with disasters and were susceptible to being affected by these because of the absence of certain standards. The latter included mitigating the risks associated with an emergency or disaster, and properly preparing, responding, and recovering from a disaster. Challenges such as a lack of trained

and dedicated staff, insufficient community empowerment and participation, inadequate emergency training, poor coordination during disasters, inadequate infrastructure, a shortage of staff, the unpredictable nature of disasters, and a lack of resources contributed to an inability to prepare for and manage disasters.

The study findings also revealed that 5.4% of the hospital staff were receiving disaster information from their managers and health service providers in the hospitals which enabled them to use disaster preparedness and a management plan (cues to action) with all the challenges. Thus, the hospital staff could understand the benefits of disaster preparedness and a management plan (perceived benefits). Hospital staff who realised the benefits were confident enough to implement the plan (self-efficacy). Despite this fact, several challenges (perceived barriers) hindered hospital staff from preparing for disaster and management plans that were discussed in the results, such as insufficient infrastructure, shortage of staff, the unpredictable nature of disasters, lack of emergency training/ drills, and poor coordination when disasters strike. Moreover, there were factors that either enabled them to prepare or became an obstacle (modifying and enabling factors) to preparing for disaster and implementing the management plan.

The lack of disaster communication, lack of information, lack of resources, lack of training, and poor security services were also guided by the theory of planned behaviour. The results were discussed regarding attitude, individual-related factors, and perceived behavioural control, which all contributed to the behaviour intentions of individuals and preparedness and management plans in the study area on which the model is based.

While the plan provides a framework for effective disaster preparedness and management for the hospitals within the Addis Ababa Administration Health Bureau, it is important to note that it has not undergone a process of validation by experts in this field. Further research and validation with stakeholders and experts are necessary to ensure the effectiveness and practicality of this plan in practice. The study serves as a starting point for this validation process and provides a foundation for future research and development in disaster preparedness and management planning.

## 5.3. STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS (SWOT) ANALYSIS

The development of the envisaged plan was preceded by a SWOT analysis. According to Amirshenava and Osanloo (2022:2), a SWOT analysis assists in identifying key internal organisational strengths and weakness as well as external organisational opportunities and threats that should shape development of the strategic objectives (Amirshenava & Osanloo 2022:3). The SWOT analysis is outlined in Table 5.1 below.

**TABLE 5.1: STRENGTH AND WEAKNESS ANALYSIS**

| Strength | Weakness |
|---|---|
| **Nature and types of disaster:**<br>• Identifying the frequent accidents in their hospitals<br>• Knowing the impact of disaster on people, environment, and infrastructure<br>• Making efforts to help manage the disaster with available human resources, materials, and rooms | • Lack of preparedness in the event of a disaster other than frequent disasters<br>• Difficulty in fully controlling the disaster<br>• Lack of medical equipment in case of a disaster |
| **Disaster preparedness**<br>• Extensive hospitals infrastructure<br>• Increasing interest in disaster preparedness<br>• Personal motivation and desire to help patients in relation to disasters. | • Absence of a warning system<br>• Lack of disaster communication<br>• Lack of resource inventories<br>• Absence of mutual aid agreement<br>• Lack of disaster information<br>• Lack of community education<br>• Lack of commitment<br>• Lack of teamwork |
| **Disaster management**<br>• Increasing interest in disaster management<br>• Formation and activities of the disaster preparedness team<br>• Transfer of injured patients to another facility for better management<br>• Involved in restoring vital life support | • Absence of mitigation<br>• Lack of disaster prevention<br>• Lack of training<br>• Lack of lessons learned |
| **Challenges for disaster preparedness and management** | • Poor preparation<br>• Poor security services<br>• Stakeholder involvement |

| Strength | Weakness |
|---|---|
| • Desire to help the injured despite facing many challenges<br>• Demonstrate personal motivation and desire to help patients in relation to disasters. | • Lack of counselling program<br>• Lack of resources<br>• Improper utilisation of medical equipment<br>• Lack of trained professionals<br>• Poor registration & record management |

**TABLE 5.2: OPPORTUNITIES AND THREATS ANALYSIS**

| Opportunities | Threats |
|---|---|
| • Collaboration with private sectors or NGO in providing funds<br>• The plan can start from the resources available for disaster response<br>• Increased interaction with community leaders and responders<br>• Collaboration in developing the more effective disaster warning system<br>• Enhanced knowledge of available resources<br>• Learning from the experience of other countries<br>• Active engagement of different stakeholders | • Without training/drills, staff may feel helpless and panic<br>• Ineffective disaster forecasting and warning system<br>• Delayed evacuation response<br>• Poor media coverage<br>• Low in community capacity building<br>• Political instability between the opposition and the government of Ethiopia |

## 5.4. THE DISASTER PREPAREDNESS AND MANAGEMENT PLAN OF THE HOSPITALS WITHIN ADDIS ABABA CITY ADMINISTRATION HEALTH BUREAU, ETHIOPIA

The disaster preparedness and management plan for hospitals within Addis Ababa City Administration Health Bureau, Ethiopia, is discussed below. The plan embraces components such as the vision, mission, overall goal, and the underlying principles. The plan will be translated into operationalisation by proposing specific objectives with clear targets and indicators.

### 5.4.1. Vision

Hospitals to be resilient to negative impact resulting from injuries, harm, demolition of infrastructure or any other damages as a result of disasters.

### 5.4.2. Mission

To effectively prepare for and respond to disasters, manage recovery and mitigation efforts in Addis Ababa in collaboration with other stakeholders to save lives, minimise property damage, and protect the environment.

### 5.4.3. Overall goal and objectives

#### *5.4.3.1. Overall goal*

The overall goal of the developed plan is to improve health service coverage, quality, equity, and improved health outcomes by enhancing disaster preparedness and management of hospitals within the Addis Ababa City Administration Health Bureau, Ethiopia. The plan should ensure that hospitals continue operating after a disaster and recover all that could have been lost such as records or information during a disaster.

#### *5.4.3.2. Strategic objectives*

- To reduce impact of specific types of disaster encountered in the hospitals.
- To enhance standard health services to respond to a disaster that has been encountered in the hospital.
- To develop a disaster capacity building program for staff.
- To implement disaster preparedness and disaster management measures in hospitals such as committed, trained staff, participation in disaster planning, engaging the community and religious leaders, and examining the degree of physical environment, economic and social stability.
- To identify and address challenges facing hospitals for disaster preparedness and management.

### 5.4.4. Underlying principles

- An integrated approach to dealing with health-related disasters which should be developed by the health bureau's hospitals.

- A team approach to effectively manage and control health-related disasters – public education and awareness is crucial.
- An increase in the early warning systems in health care as a preventive measure.
- Emphasising quality before commissioning any infrastructure project or design to ensure that risk and hazard analyses are performed.
- Allocation of and availing resources including human resources, medical equipment, and other logistics for use during the emergency period is key.
- A functioning and effective communication system.
- An increase in communities that are economically and socially empowered by giving health education, health service, and awareness creation.
- Stakeholders should be considered when hospitals are planning for disasters.
- Disaster management should be viewed as the most important part of the process at the local level.
- State and district governments should take responsibility for disaster management, where they assist local governments in the event of a disaster.
- Building disaster-resistant and disaster-resilient communities is essential for future disaster mitigation.
- The principles of risk management (identifying hazards, assessing risks, and analysing impacts) should be observed.
- Hospitals and community members must work together to celebrate diversity at all levels.
- Innovative and creative solutions to disaster challenges can be communicated effectively.
- A disaster management program that emphasises education, training, and practical experience, as well as community stewardship, ethics, and continuous improvement.

### 5.4.5. Operational objectives, activities, and targets

#### *5.4.5.1. Operational objectives*

Operational objectives are short-term objectives that assist an organisation towards its longer-term strategic objectives (Lyon & Popov 2022:19). As a result of an ongoing process

or operation, they specify a clear and measurable outcome (Lyon & Popov 2022:20) as follows.

- Increase awareness creation among hospital staff daily
- Make a risk assessment and vulnerability analysis weekly
- Strengthen community-based disaster education
- Strengthen early warning and communication daily
- Ensure integrated disaster health service daily
- Strengthen coordination among health ministry officers and other stakeholders daily
- Provide on-the-job training to the hospital staff and improve disaster quality of care
- Identify staff eligible for training.
- Identify and source funds for training
- Develop curriculum for training
- Hold training workshops to capacitate staff on disaster preparedness and management
- Develop committed, trained staff for disaster preparedness and management planning
- Participate in disaster preparedness and management planning by hospital staff
- Engage community and religious leaders in solving problems
- Assess the degree of physical environment, economic and social stability
- Build a strong disaster preparedness and management committee
- Prepare resource mechanisms and essential supplies weekly
- Avail infrastructure for disaster preparedness and management
- Conduct monitoring and evaluation to solve the challenges faced in disaster preparation and management

*5.4.5.2. Activities*

Activities are a set of tasks that accomplish an objective and identification of the specific work that needs to be performed to complete the plan (Mick, Ceasar, Collins, Giegerich, Gilroy, Holub, Rittenhouse & Thayer 2022:50). Although preliminary activity definition begins in the concept development phase, this definition is further refined during the planning phase to ensure that all activities are defined in detail (Mick et al 2022:51).

- Involve the hospital staff in preparing an awareness program

- Notify the staff that risk assessment and vulnerability analysis is provided in the hospital
- Alert the hospital staff to the importance and practicality of community education
- Prepare a community-based disaster education program
- Inform the staff about the use and management of the early warning system and communication
- Participate in integrated disaster health services and informing the staff
- Educate hospital staff on the importance of cooperating with stakeholders
- Call meetings for identification of staff for training for disaster preparedness and management in the hospital capacity building program for the staff
- Tell staff about the purpose of the meeting to develop a budget for capacity building on disaster preparedness and management in the hospital
- Develop a workshop schedule to train staff
- Prepare and inform dedicated, trained personnel for disaster preparedness and management planning
- Convene meetings for hospital staff to participate in disaster preparedness and management planning
- Call and participate in the community and religious leaders' meetings to solve problems
- Discuss with the staff to evaluate the level of physical environment, economic and social stability
- Select and prepare a strong disaster preparedness and management committee
- Arrange access to or distribution of resources and necessary supplies in each unit
- Inform the staff on the proper use of disaster preparedness and management infrastructure at the hospital
- Conduct monitoring and evaluation on time

#### *5.4.5.3. Targets*

Targets are used to assess progress towards achieving the goals, guide planning efforts, inform programmatic adjustments, and communicate with stakeholders. Setting targets is an essential part of the implementation process (Teske 2022:1). The targets are set to guide implementation of the activities and monitor progress. Achievements of activities cumulatively lead to achievement of specific objectives which in turn lead to achievement of strategic objectives.

The targets:

- A staff meeting held to create awareness about the disaster in the hospital
- In the hospital, a meeting to identify the risk assessment and vulnerability analysis of the disaster
- Events and resources to help promote community-based disaster education
- Community-based disaster education at least one day a week
- All emergency rooms have a functional warning system
- Integrated disaster health services available within all the departments
- Regular participation of stakeholders in collaboration during a disaster
- Skill-based disaster management training provided every month
- First meeting held to create awareness on the need for training in disaster preparedness and management in the hospital.
- Second meeting held for identifying staff for training for disaster preparedness and management in the hospital
- Resources identified for capacity building of staff for disaster preparedness and management in the hospital within a month of calling a meeting.
- Workshops held as per schedule.
- Employ trained, committed, and equipped resources in all departments
- Invite hospital staff to participate in disaster planning
- Educate the community through representatives and religious leaders about disaster
- Examine physical, economic, and social developments post-disaster
- Disaster planning committee members meet regularly and there is a written plan that can be implemented.
- Provide disaster resources and prepare the team
- Disaster preparedness and management infrastructure at the hospital
- Conduct a discussion in all hospital departments
- Notify the hospital staff immediately if there is a disaster
- Program-based monitoring and evaluation

**TABLE 5.3: SUMMARY OF STRATEGIC OBJECTIVES, OPERATIONAL OBJECTIVES, ACTIVITIES, AND TARGETS**

| Strategic Objectives | Operational Objectives | Activities | Targets |
|---|---|---|---|
| • To reduce impact by specific types of disasters encountered in the hospitals | • Increase awareness among hospital staff daily<br>• Make a weekly risk assessment and vulnerability analysis<br>• Strengthen community-based disaster education | • Involve the hospital staff in preparing an awareness program<br>• Notify the staff that risk assessment and vulnerability analysis is provided in the hospital<br>• Make the hospital staff aware of the importance and practicality of community education<br>• Prepare a community-based disaster education program | • A staff meeting to be held to create awareness about the disaster in the hospital within a year of approval of the plan.<br>• Subsequent meetings to identify the risk assessment and vulnerability analysis of the disaster<br>• Events and resources organised to promote community-based disaster education<br>• Community-based disaster education at least one day a week |
| • To enhance standard health services to respond to a disaster that has been encountered in the hospital | • Strengthen early warning and communication daily<br>• Ensure integrated disaster health service daily<br>• Strengthen coordination among health ministry officers and other stakeholders daily<br>• Provide on-the-job training to the hospital staff and improve disaster quality of care | • Inform the staff about the use and management of the early warning system and communication<br>• Participate in integrated disaster health services and inform the staff<br>• Educate hospital staff on the importance of cooperating with stakeholders | • All emergency rooms to have a functional warning system<br>• Integrated disaster health services should be available within all the departments<br>• Regular participation of stakeholders in collaboration during a disaster<br>• Skill-based disaster management training provided every month |

| Strategic Objectives | Operational Objectives | Activities | Targets |
|---|---|---|---|
| • To develop a disaster capacity building program for staff | • Identify staff eligible for training.<br>• Identify and source funds for training<br>• Develop curriculum for training<br>• Hold training workshops to capacitate staff on disaster preparedness and management | • Call meetings for identification of staff for training for disaster preparedness and management in the hospital capacity building program for the staff<br>• Tell staff about the purpose of the meeting. Develop a budget for capacity building on disaster preparedness and management in the hospital.<br>• Develop a workshop schedule to train staff | • First meeting held to create awareness on the need for training in disaster preparedness and management in the hospital.<br>• Second meeting held for identifying staff for training for disaster preparedness and management in the hospital<br>• Resources identified for capacity building of staff for disaster preparedness and management in the hospital within a month of calling a meeting.<br>• Workshops held as per schedule. |
| • Implementation of disaster preparedness and disaster management measures in hospitals | • Develop committed, trained staff for disaster preparedness and management planning<br>• Participate in disaster preparedness and management planning by hospital staff<br>• Engage community and religious leaders in solving problems<br>• Assess the degree of physical environment, | • Prepare and inform dedicated, trained personnel for disaster preparedness and management planning<br>• Convene meetings for hospital staff to participate in disaster preparedness and management planning<br>• Call and participate in the community and religious leaders' meetings to solve problems<br>• Discuss with the staff to evaluate the level of physical | • Employ trained, committed, and equipped resources in all departments<br>• Invite hospital staff to participate in disaster planning<br>• Educate the community through representatives and religious leaders about disaster<br>• Examine physical, economic, and social developments post-disaster |

| Strategic Objectives | Operational Objectives | Activities | Targets |
|---|---|---|---|
| | economic and social stability | environment, economic and social stability | |
| • To identify and address challenges facing hospitals for disaster preparedness and management | • Build a strong disaster preparedness and management committee<br>• Prepare resource mechanisms and essential supplies weekly<br>• Hospital to avail infrastructure for disaster preparedness and management<br>• Conduct monitoring and evaluation to solve the challenges faced in disaster preparation and management | • Select and prepare strong disaster preparedness and management committee<br>• Access to or distribution of resources and necessary supplies in each unit<br>• Inform the staff on the proper use of disaster preparedness and management infrastructure at the hospital<br>• Conduct monitoring and evaluation on time | • Disaster planning committee members meet regularly and there is a written plan that can be implemented.<br>• Provide disaster resources and prepare the team<br>• Disaster preparedness and management infrastructure at the hospital<br>• Conduct a discussion in all hospital departments<br>• Notify the hospital staff immediately if there is a disaster<br>• Program-based monitoring and evaluation |

## 5.5. IMPLEMENTING THE PLAN

### 5.5.1. Promoting the implementation of the plan

The plan will be primarily driven for implementation by the health bureau of the city. Therefore, as a point of departure, the developed plan will be handed over to the Addis Ababa City Administration Health Bureau. A presentation will also be made to the higher officials of the health bureau. Experts on disaster in the bureau are expected to study the developed plan.

A workshop will then be organised to present and hold discussions with the staff at the hospitals of the health bureau on the plan. Once adopted, the hospital staff will be responsible for implementing the plan at their level of functioning. Moreover, the heads of the health bureau are expected to hold discussions with concerned government and non-government stakeholders on the expansion of disaster management services, and capacity development of hospital staff on disaster management.

### 5.5.2. Monitoring and evaluation

The monitoring and evaluation emphasise strengthening the availability of the disaster preparedness and management plan. Even with the developed plan, hospitals may not be able to achieve the desired changes in disaster preparedness and management. Monitoring and evaluation mechanisms are essential for assessing the proper implementations of the plan. Thus, the following leading indicators can be used to monitor and evaluate the progress of disaster preparedness and management of the hospitals.

- Number of staff meetings held to create awareness about the disaster in the hospital
- Number of meetings held in the hospital to identify the risk assessment and vulnerability analysis of the disaster
- Percentage of events and resources to help promote community-based disaster education
- Number of community-based disaster education at least one day a week
- Number of all emergency rooms with a functional warning system
- Percentage of integrated disaster health services available within all the departments
- Number of regular participation of stakeholders in collaboration during a disaster
- Percentage of skill-based disaster management training provided every month

- Number of first meetings held to create awareness of the need for HDP and management training.
- Number of second meetings held for identifying staff for training for disaster preparedness and management in the hospital
- Percentage of resources identified for staff capacity building for disaster preparedness and management in the hospital within a month of calling a meeting.
- Number of workshops held as per schedule.
- Percentage of employing trained, committed, and equipped resources in all departments
- Percentage of invited hospital staff to participate in disaster planning
- Number of education sessions given by the community and religious leaders about disaster preparedness
- Number of examining physical, economic, and social developments post-disaster
- Number of meetings regularly by the disaster planning committee and availability of the written plan that can be implemented.
- Percentage of providing disaster resources and preparing the team
- Number of the available disaster preparedness and management infrastructure at the hospital
- Number of discussions conducted in all hospital departments
- Percentage of notifying the hospital staff immediately if there is a disaster
- Number of program-based monitoring and evaluation

## 5.6. CONCLUSION

This chapter has provided an overview of the proposed disaster preparedness and management plan for hospitals in the Addis Ababa administration Health Bureau. The plan will be primarily driven for implementation by the health bureau of the city.

Conclusions, recommendations, contributions, and limitations of the study are presented in the next chapter.

# CHAPTER 6
# CONCLUSION AND RECOMMENDATIONS

## 6.1. INTRODUCTION

This section presents the study's overall based on the results. The focus of the study was to propose a plan to support hospitals in disaster preparedness and management. The chapter further offers recommendations to support the disaster preparedness and management plan. The study's advantages and contributions are highlighted, along with potential future research directions about disaster preparedness and the management plan and the study's limitations are also part of this chapter.

In South Africa, Johannesburg, nearly all hospital employees, 91%, are involved in disaster management and responding to disaster situations (Vaughan 2019:50). Contrary to that, 90% of hospital staff in the study admitted they were not fully prepared for disasters (Vaughan 2019:62). In Ethiopia, in a similar study, an average calculated preparedness score of 45.6% indicates that disaster preparedness is generally weak at these selected hospitals (Woyessa et al 2020:219).

This study aimed to propose a plan to ensure disaster preparedness and management in hospitals in the Addis Ababa Administration Health Bureau. Objectives include exploring and describing the nature and types of disasters encountered in the hospitals, hospitals' response to the disaster, ensuring that disasters are prepared for and managed in the hospitals, the challenges facing hospitals in disaster management, and the effects of disasters in hospitals. Moreover, plans are proposed for disaster preparedness and a management plan to support hospitals in Addis Ababa Administration Health Bureau.

## 6.2. RESEARCH DESIGN AND METHOD

Research design is the process of arranging conditions for the collection and analysis of data in such a way that aims to combine relevance to the research purpose with economy in method (Creswell & Creswell 2018:49). It is the conceptual framework for the conduct of research; it stipulates the method for gathering, measuring, and analysing data (Creswell & Creswell 2018:50).

A mixed-methods approach was used for this study. To create a complete and thorough picture of the study, both quantitative and qualitative data were merged. The quantitative approach was utilized to calculate the disaster preparedness and management plan and

investigate the nature and type of disaster, and hospital responses to disaster associated with it. However, the qualitative approach was applied to identify in-depth responses about the preparedness, management, effects, and challenges to manage disasters for hospitals.

The study's data were gathered from hospital staff working under the Addis Ababa City Administration Health Bureau. The hospital staff was selected by using stratified sampling, whereas purposive sampling was used to select middle and high-level hospital managers. A single proportion formula method was used to calculate the sample size for the quantitative data, meanwhile the data for the qualitative approach were gathered until saturation was reached.

A variety of techniques used to collect the data. A questionnaire was used to get the quantitative data, and in-depth individual interviews were used to gather the qualitative data. Descriptive statistics were used to analyse the quantitative data. Qualitative data were analysed thematically. In addition, the study's validity, reliability, and trustworthiness were ensured. Using data gathering methods that were approved by literature reviews and expert consultations was the main method used to assure validity. The researcher carried out pilot testing and gathered information from respondents who weren't in the main sample in order to guarantee the tool's dependability. In order to encourage participants and respondents to provide truthful responses, the researcher further ensured credibility by outlining the research objectives and by disclosing every step of the research process.

## 6.3. SUMMARY OF THE FINDINGS

The study showed that the hospital's disaster management committee consisted of only 11.9% of its employees. Only 31.4% of the hospitals' staff used identification methods when an emergency plan was activated. Only 32.5% of the staff indicated that emergency drugs and antidotes were available in the hospitals, while 41.2% of hospitals did not use a triage system to match their patients with their local emergency services; 38.8% of EDs did not have emergency supplies readily available to distribute immediately, and only 23.8% had received disaster management training.

The study also revealed that lack of disaster communication, lack of information, and lack of hospitals' materials and resources (including personnel, equipment, and supply) presented the major challenge in managing disasters.

Additionally, the study revealed that the hospitals did not provide disaster operations training, and the lack of disaster training will lead to unplanned events. Poor security services in their hospitals lead to an increase in theft, overcrowding, disturbance by patients' families, and vandalism.

## 6.4. RECOMMENDATIONS

### 6.4.1. For future research

Having assessed the disaster preparedness and management plans, and established factors that challenge the disaster preparedness and management in Addis Ababa City Administration Health Bureau hospitals, the researcher recommends the following for future research studies:

- To broaden the scope of the research and allow for generalizability of the findings, comparable studies should be carried out with larger sample sizes.
- Research that provides decision-making input for any initiatives. Since there are occasionally changes in knowledge, attitude, and disaster preparedness and management practices among hospitals in the city, ongoing disaster-related research is advised. Therefore, current and trustworthy studies are required to comprehend contemporary circumstances.
- Research involving both the health bureau and the MOH to give an evidence based comprehensive picture of disaster preparedness and management plan are required.

### 6.4.2. For health service providers at hospitals

Lack of disaster preparedness and weak management plans of hospitals lead to poor disaster health service and low quality of disaster health care. The hospital staff have to be committed, trained, and qualified disaster health care providers. So, the following are expected from disaster health care providers at the hospitals level:

- Prepare and manage disaster victims in a way that makes them feel comfortable and safe in disaster health services. This can be done if the health care provider's encounter to the injured in compassionate and respectful way.
- The hospital staff should be proficient in communicating. In line with this research, the victims go to hospitals for service without communication because of service providers' poor communication with emergency medical service coordinators and other hospital liaison officers in the country. Therefore, the hospital staff is required

to develop their communication abilities in order for emergency medical service coordinators or other hospital liaison officers to transfer the victims with communication to attend hospitals.

- Every hospital's staff must be professional and deliver high-quality disaster health services. The services provided to the victims must satisfy them. As a result, it is crucial that providers of disaster health services improve their skills in order to deliver high-quality and consistent treatments, and they should also adhere to a proper professional code of conduct.
- The provision of healthcare during a disaster depends on confidentiality. The medical history and trauma of the patients should remain private between hospital staff members.

### 6.4.3. For hospital managers and health bureau managers

- The study found that hospitals lack trained staff in disaster-related training. If sufficient hospital staff were trained and available in each hospital department, such problems could be mitigated. Therefore, the hospital managers and Addis Ababa Health Bureau managers should train and give attention to as much clinical staff/non-clinical staff as possible.
- Educating and obtaining a large number of health sciences graduates cannot be the only solution to promoting the use of disaster preparedness and management plans. It is also crucial to consider the quality of the professionals and non-clinical staff to be employed. Unqualified staff do not help; rather, they could be a factor for other competent staff not to show up in the hospital at all. Therefore, the hospital and health bureau managers should critically ensure the recruitment criteria of the staff to be employed to serve in the hospital. Moreover, on-the-job training should be offered to those who are working to upgrade their competencies.
- Hospital staff, especially specialists and experienced trained staff, were not easily found in hospitals, based on the findings of this study. This was mainly because of the location disadvantage and lack of incentives and remuneration. Thus, the hospital and the health bureau managers should design mechanisms for improving the working conditions of the hospital and incentivise health service providers.
- Any performance's efficacy and efficiency can be evaluated if there are monitoring and evaluation mechanisms. It was observed in the study area that there was no genuine mechanism of monitoring and evaluating the disaster preparedness and management of the hospital. As a result, the hospitals performed poorly, particularly

when it came to providing disaster services. Therefore, it is advised that hospital administrators implement monitoring and evaluation systems in each facility.

- Any health service should prioritize documentation and record-keeping. The documentation of documents, such as patient charts, was found to be lacking in hospitals. Therefore, it is anticipated that the hospital's many departments would improve their systems for recording information and maintaining records. Additionally, it's critical to have accurate records of the victims and other crucial information.
- Equipping is crucial. hospitals with required medical equipment and supplies so that hospital staff feel they can deliver the service the victims need. The hospital and health bureaus should make every effort in this area.
- It is crucial to set aside a suitable sum of money to evaluate and conduct research on the hospital's disaster preparedness and management position. Research is one technique to learn more about the hospital's actual situation regarding crisis management and preparation. In order to adequately fund research, hospitals and the Addis Ababa Health Bureau must set aside funds.

### 6.4.4. For community and religious leaders

- It is advised to schedule frequent catastrophe preparedness and management awareness sessions. Regular gatherings should educate the community's residents and dispel common myths about disasters. The hospital personnel should get together to talk about the importance of crisis management and preparedness measures. To promote community health and raise a disaster-free generation, hospital workers, community leaders, or religious figures can spread the word about the significance of disaster preparedness and management
- Community members frequently place more trust in religious and civic leaders than in representatives of other organizations. In light of their financial capacity and the victims' state of health, it is wise to employ these leaders to inspire the neighbourhood’s residents especially the victims, to refrain from experiencing stress as a result of the disaster. Addressing disaster-related myths and misconceptions is also essential.

### 6.4.5. For government officials and policymakers

- An incentive for hospital employees who labour in challenging conditions, such as congested and resource-constrained health bureau hospitals, is to raise their pay and provide them with a fair stipend. To this purpose, the government should make

a concerted effort to enhance the compensation and incentive programs for hospital employees employed in such locations.

- It is also advised to develop relevant policies and interventions to empower hospital employees considering the study's findings to fill the gap themselves and particularly managers living in administrative areas in the hospital. Creating conducive environments for staff that allow them to engage in successful activities increases their compassionate and respectful care for the injured. Therefore, they do not suffer because of a harsh environment and a lack of resources to handle disaster preparedness and management.

## 6.5. LIMITATIONS, STRENGTHS, AND CONTRIBUTION OF THE STUDY

### 6.5.1. Limitations of the study

The researcher is aware of the following study limitations:

- Because the study was limited to just six hospitals in Addis Ababa, its conclusions cannot be applied to hospitals in other parts of the nation. The survey excluded other federal and private hospitals. The health bureau, whose opinions would have strengthened the conclusions about obstacles to disaster preparedness and management, was not involved in the study.
- The data was only collected from hospital staff and not directly from victims themselves; there may be instances where certain details or information about a victim's experience or condition may have been missed or inaccurately reported. This limitation of relying solely on hospital staff for data collection emphasizes the importance of considering alternative methods for data collection to ensure a more comprehensive and accurate data set.
- The study's conclusions about emergency preparedness and management strategies were based on the opinions of hospital staff in the study area and might not be applicable to hospital workers in other parts of the nation. The study also failed to demonstrate the temporal relationship between disaster preparedness and management strategies and the factors influencing it because it used a cross-sectional research approach.

### 6.5.2. Strengths and contribution of the study

#### *6.5.2.1. Strengths of the study in regard to the development of the plan*

The study proposed plans to ensure disaster preparedness and management. As a plan has been proposed in consideration of existing reality of the study area, it could assist hospitals in the Addis Ababa Health Bureau to motivate hospital staff to change their attitudes toward disaster preparedness and management so that unnecessary public health consequences are minimized. In an area where victims cannot get health services in nearby hospitals, it is easy to understand what would happen if a victim faced complications. The hospital staff is also known for their instability and insecurity. Thus, limiting this environmental instability and insecurity could help staff to handle the victims carefully.

#### *6.5.2.2. Strengths of the study contributing to awareness creation and advocacy within the staff and community members*

The disaster preparedness and management plan should be known by any hospital staff. This research will inform the hospital staff about the basic reality in terms of disaster preparedness and management. Community members could also find it important so they could prevent unintended disasters. As to the study, most of the effects in the area were physical and environmental damage because of a lack of awareness about disasters in the community. Therefore, if the community is aware of the effect of unintended disasters, and disaster catastrophes, they can prevent them.

#### *6.5.2.3. Strengths in serving as a launching point for future disaster-related study*

The study contributes important insights to the body of knowledge already available concerning hospitals' disaster planning and management plans as well as the difficulties they face in doing so. Future research on disaster preparedness and management in general, as well as disasters in particular, can be based on the study's findings.

#### *6.5.2.4. Strengths of the study concerning a contribution to policy inputs*

Regarding hospital disaster preparedness and management plans, the report provides a clear message and picture. As a result, the current policies and strategy are insufficient to address hospitals' comprehensive disaster preparedness and management plans, and they will not help to guarantee an effective disaster response in the study area. The objective of this study will have been met if the findings are representative of the hospitals under study's preparedness and management for disasters and, as a result, alert

policymakers to the need for suitable and targeted measures that address preventable disasters.

### 6.5.3. The overall contribution of the study

The study purpose to develop a disaster preparedness and management plan for the hospitals within Addis Ababa Administration Health Bureau, Ethiopia. The researcher believes that disaster preparedness and management plans can help ensure that hospitals are prepared for and appropriately managed in the case of a disaster.

It contributes significantly to identifying, monitoring, and mapping disaster health risks at all levels of hospital planning, disaster preparedness, and mitigation of disaster impacts. Therefore, Addis Ababa hospitals should realise that it is a proper disaster preparation and management plan to save lives, reduce the effects of disaster and ensure the safety of society and the hospitals. The study suggests eliminating the challenges of disaster preparedness and management in hospitals.

## 6.6. CONCLUDING REMARKS

The purpose of this study was to develop a plan to ensure disaster preparedness and management of hospitals within the Addis Ababa City Administration, Ethiopia, for supporting hospitals to create a better quality of disaster preparedness and management.

As the study has shown, the disaster preparedness and management plan within Addis Ababa City Administration hospitals were below standard related to preparedness and management. Therefore, the regional health bureau and hospitals should devote themselves to disaster preparedness and management plans. Based on the results of this study, the Ethiopian government will hopefully receive directions on how to improve disaster preparedness and management plans in hospitals to improve the treatment of staff who do not always provide appropriate disaster health services to the community.

The mixed-methods approach involving quantitative and qualitative data collection and analysis established the effects of disasters on hospitals in the Addis Ababa Administration Health Bureau as follows:

Conducting a literature review and extracting the lessons; Administering data collection tools in both quantitative and qualitative tools to source related information and the analysis thereof: -

The findings informed the envisaged disaster management plans to strengthen health system resilience in the face of future disasters.

After the thesis has been approved, it will be handed over to the Ethiopian MOH, as well as the local hospitals and health bureaus in Addis Ababa. Additionally, articles derived from the thesis will be published in order to reach the entire scientific community as a whole.

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# ANNEXURES

## ANNEXURE A:
## ETHICAL CLEARANCE CERTIFICATE FROM THE DEPARTMENT OF HEALTH STUDIES, UNISA

UNISA university of south africa

**COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE**

11 November 2020

NHREC Registration # :
Rec-240816-052
CREC Reference # :
67124925_CREC_CHS_
2020

Dear MR. D.D. DERBEW

**Decision:**
**Ethics Approval from 11 November 2020 to 31 October 2024**

**Principal Researcher(s): MR. D.D. DERBEW (email: 67124925@mylife.unisa.ac.za)**

**Supervisor: Prof RM Mmusi-Phetoe (email: emphetrm@unisa.ac.za)**

**Title: Disaster preparedness and management Plan for the Hospitals within Addis Ababa Administration Health Bureau, Ethiopia**

**Degree Purpose: PhD in Public Health**

Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval is granted for three years.

The ***High-Risk application*** *was* ***reviewed*** by College of Human Sciences Research Ethics Committee, on **November 2020** in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.

University of South Africa
Prelier Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone +27 12 429 3111 Facsimile +27 12 429 4150
www.unisa.ac.za

3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date **(31 October 2024).** Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

*Note:*

*The reference number -**67124925** **_CREC_CHS_ 2020** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours Sincerely,

Signature :

Dr. K.J. Malesa
CHS Ethics Chairperson
Email: maleskj@unisa.ac.za
Tel: (012) 429 4780

Signature :

Prof K. Masemola
Executive Dean : CHS
E-mail: masemk@unisa.ac.za
Tel: (012) 429 2298

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# ANNEXURE B:

# SUPPORT LETTER FROM UNISA REGIONAL OFFICE TO ADDIS ABABA CITY ADMINSTRATION HEALTH BUREAU PUBLIC HEALTH RESEARCH AND EMERGENCY MANAGEMENT DIRECTORATE

UNISA university of south africa

02 November, 2021

UNISA-ET/KA/ST/29/02-11-2021

**Addis Ababa City Administration Health Bureau**

**Public Health Research and Emergency Management Directorate**

**Addis Ababa**

Dear Madam/Sir,

The University of South Africa (UNISA) extends warm greetings. By this letter, we want to confirm that Mr. Dereje Derbew Damte (student number 67124925) is a PhD student in the Department of Health Studies at UNISA. Currently, he is at the stage of data collection on his doctoral research entitled "***Disaster preparedness and management plan for hospitals within Addis Ababa City Administration Health Bureau, Ethiopia***."

This is therefore to kindly request your cooperation in assisting the student in any way that you can. We would like to thank you in advance for all the assistance that you would provide to the student. Attached, please find the ethical clearance that the student received from the Department.

UNISA-ETHIOPIA CENTER
P.O.BOX:13836
ADDIS ABABA
TEL+251912191483

Sincerely,

Dr. Tsige GebreMeskel Aberra

Director

University of South Africa
Regional Learning Center
P.O. Box: 13836, Addis Ababa, Ethiopia
Telephone: +251 11 435 2244 / +251 11 435 0078
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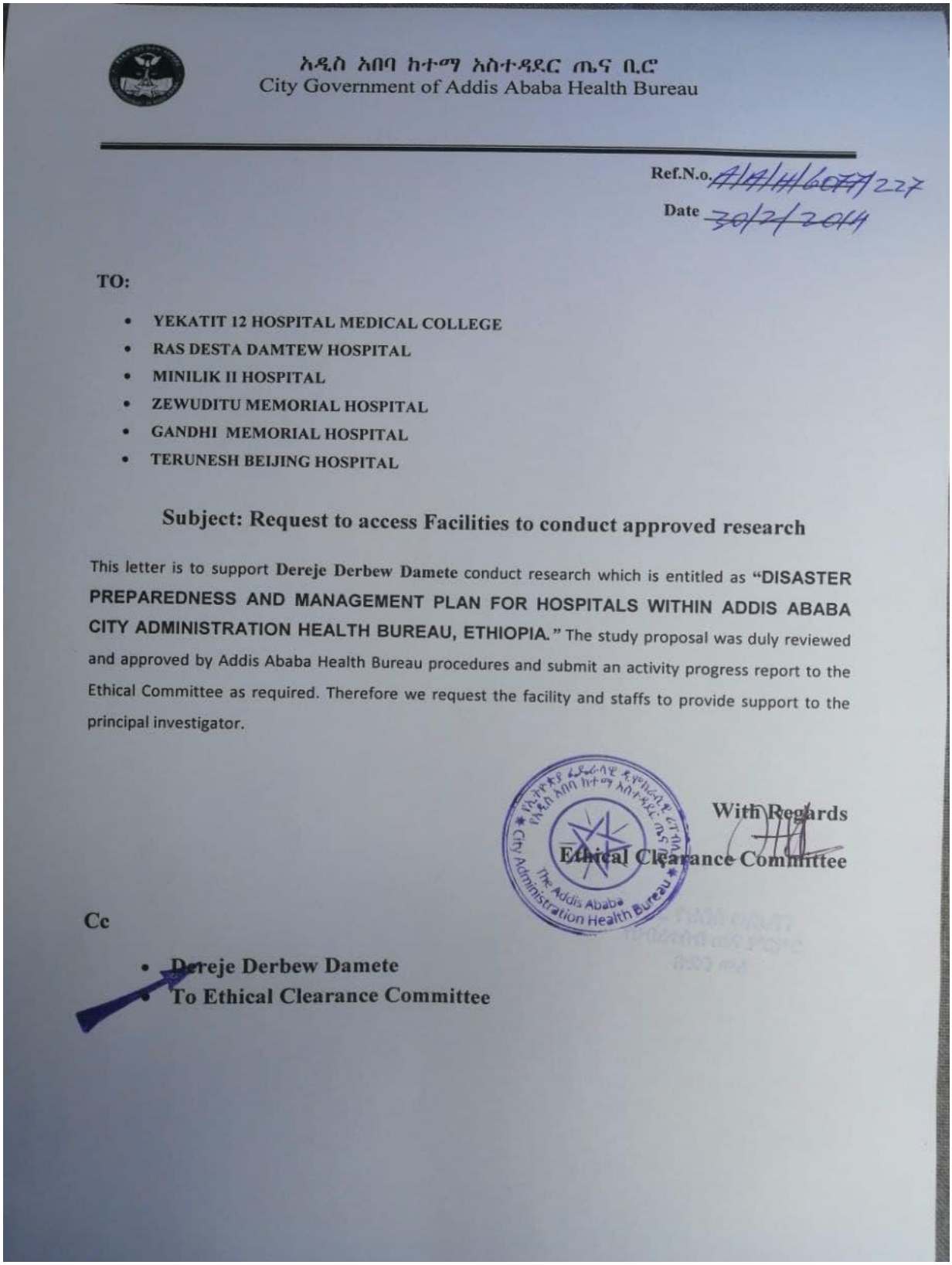
## ANNEXURE C:

## CITY GOVERNMENT OF ADDIS ABABA HEALTH BUREAU APPROVAL LETTRE WRITTEN TO CONCERNED HOSPITALS



አዲስ አበባ ከተማ አስተዳደር ጤና ቢሮ
City Government of Addis Ababa Health Bureau

Ref.N.o. A/A/H/6077/227
Date 30/2/2014

TO:

- YEKATIT 12 HOSPITAL MEDICAL COLLEGE
- RAS DESTA DAMTEW HOSPITAL
- MINILIK II HOSPITAL
- ZEWUDITU MEMORIAL HOSPITAL
- GANDHI MEMORIAL HOSPITAL
- TERUNESH BEIJING HOSPITAL

**Subject: Request to access Facilities to conduct approved research**

This letter is to support **Dereje Derbew Damete** conduct research which is entitled as **"DISASTER PREPAREDNESS AND MANAGEMENT PLAN FOR HOSPITALS WITHIN ADDIS ABABA CITY ADMINISTRATION HEALTH BUREAU, ETHIOPIA."** The study proposal was duly reviewed and approved by Addis Ababa Health Bureau procedures and submit an activity progress report to the Ethical Committee as required. Therefore we request the facility and staffs to provide support to the principal investigator.

With Regards

Ethical Clearance Committee

Cc

- Dereje Derbew Damete
- To Ethical Clearance Committee

# ANNEXURE D:

# THE INFORMATION SHEET AND INFORMED CONSENT

## THE INFORMATION SHEET AND INFORMED CONSENT

**Title of the study: - DISASTER PREPAREDNESS OF HOSPITALS WITHIN THE ADMINISTRATION OF HEALTH BUREAU ADDIS ABABA, ETHIOPIA**

**Primary researcher: -** Damete, Dereje Derbew

**Student Number: - 67124925**

**Supervisors: -** Prof. Rose Mmusi-Phetoe

### Introduction

The researcher should be responsible to provide adequate information for the study participants about the research protocol and procedures in comfortable and private setting with understandable language. In this study, the researcher will provide information about the research protocol and procedure for the study participants.

You are invited to be a volunteer research participant in a study conducted on hospital staffs. The information on this paper helps you to make informed decision, if you are volunteer to participate. Before you decide to participate, you should clearly understand what is involved in the study during you stay. Most important points are explained in the following paragraph. If there are any points which are not included or not fully explained or not clear for you in this paper, do not hesitate to ask the investigator. You may call me, **Dereje Derbew Damete at 0911686795 or 0944264977 (my mobile)** if you have further questions or need additional information. You should not agree to take part unless you are completely happy about all the procedures involved.

### Purpose of the study

This study will provide information for decision maker, policy makers, program and strategic action plan developers, health care providers and other responsible bodies who provide and works on disaster preparedness to develop DMP that will enhance the development of disaster preparedness of each hospital.

**Ethical approval**

The protocol of the study is to be presented to the Higher Degree Committees within the College of human science and Committees have approved Written Certified Standards for Ethical Morality.

**Your rights as a participant in this study**

Your participation in the study is by your full voluntariness. Therefore, you do not have to be part of the study if you do not want to. If you will be decided to participate and change your mind to be part of the study, you will be participated. If you want to withdraw from the study, you will be stopped to participate any time.

**Discomfort produced by the study procedures**

The study and procedures involve no foreseeable physical and psychological discomfort. However, the study involves in sharing your experience regarding disaster preparedness, as participants you may feel some emotional disturbance during sensitive issues. If you feel such discomfort you can report to the researchers immediately and we are ready to provide all the necessary support and counselling for you.

**Risks involved in this study**

The study procedures involve no visible and predictable risk (low risk category) on you and your family. It is negligible or less than minimal risks as equal to the probability in magnitude of physical or psychological harm that is normally encountered in the daily lives of people in a stable society or in the routine medical or psychological examination of healthy subjects.

**Confidentiality**

All information obtained during the course of this study is strictly confidential and keep in highly secured area. Your identity will not be revealed when the study is reported in scientific journals. All the data that has been collected will be stored in a secure place and will not be shared with any other person without your permission. The data will be destroyed after five years of publication of this study.

**INFORMED CONSENT FOR THE PARTICIPANT**

I hereby confirm that the investigator has informed me about the nature, conduct, benefits and risks of the study.

I have also received, read and understood the above written information (informed consent) regarding the study.

I am aware that the results of the study, including personal details regarding my age, sex, educational status, and monthly income, ethnicity, religion, and others will be anonymously registered into a research report.

I may, at any stage, without prejudice, withdraw my consent and participation in the study.

I had enough opportunity to ask questions and of my own free will declare myself prepared to participate in the study.

Participant' s signature: _____ Date _____

Investigator's name: Damete, Dereje Derbew

Investigator's signature _____ Date_____

I, Dereje Derbew Damete (investigator) herewith confirm that the above participant has been informed fully about the nature, conduct and risks of the above study.

# ANNEXURE E:

# DATA COLLECTION INSTRUMENT

## DISASTER PREPAREDNESS AND MANAGEMENT PLAN FOR THE HOSPITALS WITHIN ADDIS ABABA ADMINISTRATION HEALTH BUREAU, ETHIOPIA

### DATA COLLECTION INSTRUMENT

### SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS AND WORKEXPERIENCE

| Serial Number | Question | Response |
|---|---|---|
| **101** | Gender | 1) Male<br>2) Female |
| **102** | Age (Years) | 1) Below 20<br>2) 21-30<br>3) 31-40<br>4) 41-50<br>5) Above 51 |
| **103** | Duty station | 1) Emergency<br>2) Wards<br>3) ICU<br>4) OR Theatre<br>5) Pharmacy<br>6) Laboratory<br>7) Administration<br>8) Human resources<br>9) Outpatient<br>10) Other (specify) _____ |
| **104** | Current position | 1) Nurse<br>2) Midwifery<br>3) Emergency professionals<br>4) Health officers<br>5) General Practitioners<br>6) Specialist<br>7) Administration/ Human resources<br>8) Other (specify) _____ |

| Serial Number | Question | Response |
|---|---|---|
| **105** | Working years in the current organization | 1) Less than 1 year<br>2) 1-5 years<br>3) 5-10 years<br>4) 10- 15 years<br>5) 15-20 years<br>6) More than 20 |
| **106** | Highest level of education completed | 1) Diploma<br>2) Undergraduate<br>3) Postgraduate<br>4) Other (specify) _____ |
| **107** | Are you a member of the disaster management committee? | 1) Yes<br>2) No |

**SECTION B: INFORMATION ON DISASTER NATURES AND TYPES**

How would you rate the frequency of occurrences of the following disasters in your locality? **Please rate each of the items by ticking**:1=**Not at all,** 2=**Less frequent**, 3=**Frequent**, 4=**Very frequent**.

| Serial Number | Disaster category | Frequency | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| **201** | Epidemics | | | | |
| **202** | Drought | | | | |
| **203** | Transport accidents | | | | |
| **204** | Fire | | | | |
| **205** | Flood | | | | |
| **206** | Explosion | | | | |
| **207** | Environmental pollution | | | | |
| **208** | Earthquake | | | | |
| **209** | Landslide | | | | |
| **210** | Infestation | | | | |

| Serial number | Questions | Response |
|---|---|---|
| **301** | What are the possible public health consequences of a disaster for humans, for the environment, and for infrastructure? **Please describe?** | 1) Humans _____<br>2) Environment_____<br>3) Infrastructure_____ |
| **302** | If there has been any recent disaster in your locality, what caused it? **You can select more than one option.** | 1) Natural disasters (flooding, landslide etc.)<br>2) Accidents/ Trauma<br>3) Disease epidemics<br>4) Terrorism Attacks<br>5) Chemical spills<br>6) Fires<br>7) Food poisoning<br>8) There was no disaster |
| **303** | Disaster preparedness includes: -<br>**You can select more than one option.** | 1) Material reserve<br>2) Community rescue training and knowledge propagation<br>3) Population vulnerability assessment<br>4) Other (specify) _____<br>5) Don't know |

**SECTION C: POTENTIAL DISASTERS IN HOSPITALS**

On a scale of 1-4, where 1=**Not at all,** 2=**Less frequent**, 3=**Frequent**, 4=**Very frequent**. state the extent to which you rate the frequency of the following as potential disasters that are likely to occur in your hospital. **Please rate each of the items by ticking:**

| Serial number | Disaster category | Frequency | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| **401** | Epidemics | | | | |
| **402** | Drought | | | | |
| **403** | Transport accidents | | | | |
| **404** | Fire | | | | |
| **405** | Flood poisoning | | | | |
| **406** | Explosion | | | | |
| **407** | Environmental pollution | | | | |
| **408** | Earthquake | | | | |
| **409** | Landslide | | | | |
| **410** | Infestation | | | | |

**SECTION D: HOSPITAL RESPONSES TO DISASTER**

| On a scale of 1-3, where 1-**Don't know**, 2- **No**, 3- **Yes**, state responses to disasters that have already been encountered in the hospitals. **Please rate each of the items by ticking:** | | | | |
|---|---|---|---|---|
| **Ser. No** | **Description** | **Response** | | |
| | | **1** | **2** | **3** |
| **501** | Emergency Medical Service staff can be integrated into hospital staff during disaster. | | | |
| **502** | The Hospital staff use identifying methods when the disaster plan is activated | | | |
| **503** | The hospital has pre-printed patient charts for use in disasters equal to 2 times the number of average daily ED visits. | | | |
| **504** | Availability of emergency drugs and antidotes is maintained in the hospital | | | |
| **505** | Designated disaster supplies are ready for immediate distribution to and from the Emergency Department. | | | |
| **506** | The hospital uses a triage system that is consistent with local EMS | | | |
| **507** | The hospital has designated an alternate triage area for disaster. | | | |
| **508** | the hospital has an alternate treatment area to accommodate casualty surge | | | |
| **509** | the hospital has a method for casualty tracking | | | |
| **510** | the hospital can increase isolation bed capacity. | | | |
| **511** | The hospital has a plan, equipment and appropriate level of Personal Protective Equipment (PPE) for protecting staff from the effects of chemical, biological or radiological agents. | | | |
| **512** | The hospital can manage emergency decontamination of 4 patients without outside resources or equipment that must be constructed to be deployed. | | | |
| **513** | Coordination is in place to conduct epidemiologic surveillance (microbiology, pathology, infectious disease, infection control, etc. | | | |
| **514** | Surveillance is coordinated with local and/or state public health agencies | | | |

**SECTION E: CHALLENGES THAT HOSPITALS FACE IN DISASTER MANAGEMENT**

| On a scale of 1-5, where 1-**very much disagree**, 2-**disagree**, 3-**not sure**, 4-**agree**, 5-**very much agree**. State the extent to which you agree with the following as challenges that hospitals face in disaster management. **Please rate each of the items by ticking:** | | | | | | |
|---|---|---|---|---|---|---|
| **Serial No** | **Description** | **Response** | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| **601** | Insufficient infrastructure | | | | | |
| **602** | Shortage of staff | | | | | |
| **603** | Lack of willingness by non-medical staff and staff who are off-duty to assist | | | | | |
| **604** | Unpredictable nature of disasters | | | | | |
| **605** | Shortage of blood in blood banks for transfusion | | | | | |
| **606** | Poor coordination when disasters strike | | | | | |
| **607** | Limited number of trained and dedicated members of staff | | | | | |
| **608** | Poor community empowerment and participation | | | | | |
| **609** | Lack of emergency training and drills | | | | | |
| **610** | Have you received any training on disaster management? | 1) Yes<br>2) No | | | | |
| **611** | How would you rate your knowledge regarding disaster management? | 1) Excellent<br>2) Good<br>3) Fair<br>4) Poor | | | | |

**SECTION F: MEASURES TO ENSURE DISASTER PREPAREDNESS AND MANAGEMENT**

| On a scale of 1-5, where 1-**very much disagree**, 2-**disagree**, 3-**not sure**, 4-**agree**, 5-**very much agree.** State the extent to which you agree with the following as possible remedies to challenges those hospitals face in disaster management. **Please rate each of the items by ticking:** | | | | | | |
|---|---|---|---|---|---|---|
| **Serial No** | **Description** | **Response** | | | | |
| | | 1 | 2 | 3 | 4 | 5 |
| **701** | Upgradation of hospital infrastructure | | | | | |
| **702** | Increase number of medical staffs | | | | | |
| **703** | Asking for support from other hospitals during times of disasters | | | | | |
| **704** | Training all members of staff on disaster management | | | | | |
| **705** | Performing regular emergency drills | | | | | |
| **706** | Improve on coordination at times of disaster | | | | | |
| **707** | Have you ever been involved in developing or revising the hospitals disaster management plan? | 1) Yes<br>2) No | | | | |

**SECTION G: HOW DO YOU RATE YOUR ATTITUDE TOWARDS DISASTER PREPAREDNESS Please rate each of the items by ticking:**

| Ser. No | Description | Agree | Disagree | Unsure |
|---|---|---|---|---|
| **801** | I do not need to know about emergency (disaster) operational plans | | | |
| **802** | Management should be adequately prepared when a disaster occurs | | | |
| **803** | Disaster management and planning is for a few people in the Hospital | | | |
| **804** | Potential hazards likely to cause disaster should be identified and dealt with | | | |
| **805** | Training is necessary for all workers | | | |
| **806** | Do you think it is necessary to have an emergency (disaster)? operational plan? | | | |
| **807** | Emergency (disaster) operational plan need to be regularly updated. | | | |

| Ser. No | Description | Agree | Disagree | Unsure |
|---|---|---|---|---|
| **808** | Disasters are unlikely to happen in our hospital | | | |
| **809** | Disaster management is for nurses and doctors only | | | |
| **810** | Disaster simulations should occur frequently in the hospital | | | |
| **811** | Drills should be conducted in the hospital. | | | |

## SECTION H: AACAHB HOSPITALS STATE OF PREPAREDNESS TO MANAGE DISASTER

On a scale of 1-5, where 1-**very much disagree**, 2-**disagree**, 3-**not sure**, 4-**agree**, 5-**very much agree** state the extent to which you agree with the following as signs of a hospital's preparedness for disasters. **Please rate each of the items by ticking:**

| Ser. No | Description | Response | | | | |
|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** |
| **901** | Presence of hospital's disaster management plan | | | | | |
| **902** | Existence of a disaster management committee | | | | | |
| **903** | Familiarity of the contents of the disaster management plan by all staff members | | | | | |
| **904** | Emergency/disaster management training for all staff members | | | | | |
| **905** | Existence of equipment in disaster preparedness (firefighting, Early Warning System, smoke detectors, fire extinguishers) | | | | | |
| **906** | Adequate evacuation plan and exits | | | | | |
| **907** | Regular emergency drills | | | | | |
| **908** | Availability of personal protective equipment in case of an infectious disease outbreak | | | | | |

*Thank you for completing the questionnaire*

# ANNEXURE F:

# IN-DEPTH INTERVIEW GUIDE

## INTERVIEW GUIDE

### SECTION A. SOCIO-DEMOGRAPHIC AND WORK EXPERIENCE

| No | Questions | Response | Remark |
|---|---|---|---|
| 1 | Gender of the respondent | | |
| 2 | Age of the respondent | | |
| 3 | Duty station | | |
| 4 | Current Position | | |
| 5 | Working years in the current organization | | |
| 6 | Highest level of education completed | | |

### SECTION B: Disaster

1. What do you understand by “disaster”?
2. What type of disaster do you know?
3. What are the causes of disaster?
4. What are the potential disasters that can occur?
5. What are the challenges on disaster preparedness?
6. What are challenges facing your hospitals to manage disaster?

### SECTION C: Public health consequences/ Effects of disasters?

1. What are the possible public health consequences/ effects of a disaster for humans?
2. What are the possible public health consequences/ effects of a disaster for the environment?
3. What are the possible public health consequences/ effects of a disaster for infrastructure?

**SECTION D:** Plans to ensure disaster preparedness and management in the hospitals in Addis Ababa Administration Health Bureau in case of a disaster?

1. What is you experience Disaster preparedness?
2. What is you experience management plan in the Hospital?
3. What is your opinion established disaster planning committee?
4. What is you experience/opinion identify the disaster management strategies by the committee?
5. What is you experience in prevention of disasters?

**Probe**

**Disaster preparedness related (**Warning system, Emergency communications systems, Evacuation plan, Resource inventories (management), Emergency personnel/ contact list, Mutual aid agreement, Public information/education etc.)

**Disaster management related** (Experience in risk assessments, experience in vulnerability analysis, responsibilities of hospital departments and personnel, trained and regularly tested (drills), plan or document must be simple and straightforward, reviewed and updated on a regular basis, saving lives, meeting humanitarian needs, clean up, damage assessment, degree of physical, environment, economic and social stability etc.).

# ANNEXURE G:

# LETTER FROM STATISTICIAN

29 April 2022

RE: **Statistical Analysis of PhD Thesis in Public Health: DD Damete**

This Letter serves to confirm that I assisted Mr. Dereje Derbew Damete in the analysis of the data (With SPSS version 26) of a PhD thesis entitled '**Disaster Preparedness and Management Plan for the Hospitals Within Addis Ababa Administration Health Bureau, Ethiopia**'.

Regards!

Kedir Hussein Abegaz (PhD in Biostatistics)

Data Analyst and Research Assistant

Madda Walabu Univeristy

kedir.hussein@mwu.edu.et

## ANNEXURE H:

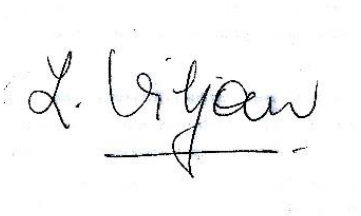
## LANGUAGE EDITING CERTIFICATE

This is to certify that I have edited the language of the dissertation of Dereje Derbew Damete, submitted in accordance with the requirements for the degree of Doctor of Philosophy in the subject Public Health at the University of South Africa.

Title: ***Disaster Preparedness and Management Plan for the Hospitals Within Addis Ababa Administration Health Bureau, Ethiopia***.

Promoter: Professor RM Mmusi-Phetoe

Feedback about the work has been provided to the author and, to my knowledge, after corrections the text is free of language errors.



**Leonie Viljoen, PhD (UCT)**

**05 December 2022**

Cell: 082 9244 733

## ANNEXURE I:

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Thesis - DISASTER PREPAREDNESS AND MANAGEMENT PLAN FOR THE HOSPITALS WITHIN ADDIS ABABA ADMINISTRATION HEALTH BUREAU, ETHIOPIA

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