ASSESSMENT OF FACTORS INFLUENCING NURSES AND THE CASUALTY DEPARTMENT'S PREPAREDNESS FOR INCIDENTS OF MASS CASUALTY AT NYANGABWE REFERAL HOSPITAL IN FRANCISTOWN BOTSWANA

BY

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DECLARATION

I, Gaoduelwe Lekesi, hereby declare that this dissertation herein presented is entirely the result of my effort and has not been previously submitted either wholly or in part for any diploma, degree, or any other qualification at this or any other university. It was written according to the guidelines for the Master of Science in Emergency and Trauma Nursing at the University of Zambia.

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ABSTRACT

The increasing incidence of mass casualties globally has resulted in higher fatalities, financial losses, and disruptions in health institutions' service delivery. Health facilities are often overwhelmed by a surge of critically injured or ill patients, compromising their ability to provide timely and effective medical care. Emergency preparedness strategies enhance institutional capacity to ensure high-quality care and improved patient outcomes. The study assessed emergency preparedness for mass casualty incidents among nurses and the casualty department at Nyangabwe Referral Hospital in Francistown. A quantitative descriptive cross-sectional study adapted the World Health Organization (WHO) hospital emergency response checklist and the tool used by Amaitari et al (2020) in a study in Nigeria. Through a survey of nurses, the study examined protocols, medical equipment, staff training, and trauma support services. These factors shaped the preparedness strategy for major crises, enabling the institution to respond effectively during mass casualty incidents. The results were presented in frequency tables and summarized in percentage form. Chi-square and binary logistic regression analyses were conducted to assess factors influencing emergency preparedness and those associated with good practices in emergency preparedness, respectively. The study results revealed that multiple factors influenced the emergency preparedness of nurses and the casualty department. Overall emergency preparedness awareness (n=184) distribution among respondents was categorized into low, moderate, and high awareness. The majority, 71 respondents, were categorized under moderate awareness while the low awareness category had 68 respondents. The high preparedness awareness category had 45 respondents who fell under high emergency preparedness awareness. Similarly, the overall attitude towards emergency preparedness showed that 55% exhibited a poor attitude, while 45% demonstrated a good attitude. Furthermore, nearly half of the participants (50.5%) exhibited poor knowledge, while 49.5% had good knowledge of the primary survey. The chi-square analysis revealed significant associations between emergency preparedness and job title ($p = 0.015$), gender ($p = 0.025$), work experience ($p = 0.029$), knowledge level ($p = 0.001$), and knowledge of the primary survey ($p = 0.043$). However, the binary logistic regression found no significant association between gender and emergency preparedness. Lastly, the results indicate that while NRH has the basic structure and processes required for handling mass casualty incidents, certain deficiencies hinder optimal response. These include a lack of a dedicated trauma team, structured activation protocols, and sufficient ICU and emergency surgical capacity, compromising its ability to manage patient influx during disasters. Additionally, limited access to advanced diagnostic tools and a shortage of specialists delay life-saving interventions.

Keywords*: Hospital emergency preparedness, mass casualty incidents, and Nurses.*

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LIST OF ABBREVIATIONS

ACS	American College of Surgeons
AH	Available in Hospital
AHA	American Heart Association
AOR	Adjusted Odds Ratio
ATLS	Advanced Trauma Life Support
AVPU	Alert, Voice Stimulation, responsive to Pain, Unresponsive to any form of stimuli
BLS	Basic Life Support
BP	Blood pressure
BVMs	Bag Valve Musk
CI	Confidence Interval
CPD	Continuous Professional Development
CT scan	Computed Tomography
CVP	Central Venous Pressure
ECG	Electrocardiogram
ECOMO	Extracorporeal membrane oxygenation
ECS	Emergency Care System
EOP	Emergency operational plan
EP	Emergence preparedness
EPRP	Emergency preparedness and response planning
FAST	Focused Assessment Sonography for Trauma
FEMA	Federal Emergency Management Agency
HDP	Hospital disaster plan
HEAT	Hospital Emergency Preparedness Checklist Tool
ICU	Intensive care Unit
IVF	Intravenous Fluids
LIMICs	Low- and Middle-income countries
MCI	Mass casualty Incidents
MoH	Ministry of Health

NHRA	National Health Research Committee
NMCB	Nursing and Midwifery Council of Botswana
NRH	Nyangabwe Referral Hospital
PDL	Problem Based Learning
PhD	Doctor of Philosophy
SPSS	Statistical Package for the Social Science
SSA	Sub-Saharan Africa
UNZA	University of Zambia
UNZABREC	University of Zambia Biomedical Research Ethics Committee
UOR	Unadjusted Odds Ratio
WHO	World Health Organization

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CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Mass casualty incidents (MCI) and other major incidents occur repeatedly globally, thus threatening the health of the general population. Therefore, this demands a special healthcare system and preparedness to mitigate the aftermath (Khirekar *et al.*, 2023). The incidents of mass casualty are increasing in frequency and complexity with time, and these have been associated with ecological changes, global warming, technological advancement, and the current unique way people interact with their environment, (Safarpour *et al.*, 2022). The sub-Saharan African region is one of the most affected and burdened by the increasing healthcare incidents of mass casualty such as road traffic accident injuries and industrial explosion burns, (World Health Organisation (WHO), 2022). In the past four decades, 35 million people in the sub-Saharan African region have been affected by public health emergency incidents, which require timely recognition, response, and treatment to mitigate the associated mortality and morbidity, (WHO, 2017).

Emergencies resulting from various hazards can lead to Mass Casualty Incidents (MCIs), impacting large populations and causing significant mortality. The incidents often disrupt the balance between demand and supply, as the need for clinical services surpasses the healthcare system's capacity (Ayenew *et al.*, 2022). A robust emergency care and trauma system is crucial for effective mass casualty management (MCM) and continuity of care. In the immediate aftermath of an emergency incident, the Emergency Care System (ECS) is likely to be the major functioning platform for maintaining general healthcare services for the acute care of the victims. Therefore, careful planning and preparation minimize the risk of emergency response disruption and save lives (Seeger, Islam and Seeger, 2021). Hospital-based emergency staff often represent the frontline of the health system during MCIs, providing timely services such as resuscitation and transferring patients to relevant units or service points for their emergency care needs.

The role of the hospital in providing healthcare services during mass casualty incidents cannot be over-emphasized. Therefore, emergency preparedness and response planning programs are crucial in building institutional capacity and resilience to improve emergency responsiveness and patient outcomes. These programs have evolved in response to research-generated information, best practices globally and experience gained through exposure and continuous management of emergencies. The new developments emphasize a comprehensive emergency preparedness and management approach guided by the disaster life cycle (mitigation, preparedness, response, and recovery). This involves a continuous process of planning, implementation, evaluation, and corrective action to enhance overall preparedness (Pigoga et al, 2020; Puryear and Gnugnoli, 2023).

1.2 Background

Globally, an estimated 190 million people are affected by major incidents of mass casualty with fatalities reaching 77,000 people, annually (Ayenew et al., 2025). These consistently increasing health threats from a wide range of emerging and re-emerging health incidents in the Sub-Saharan Africa region in particular, have shown that healthcare emergencies are inevitable as people continue to interact with their surroundings (Azizpour *et al*., 2022). These incidents often prompt a wave of

fatalities with serious injuries and financial and social losses. A significant disruption in the normal functioning of the affected health institutions, businesses, and or communities is often noted as the aftermath (Ayenew et al, 2022). As a result, health facilities are often overwhelmed by the unexpected surge of critically injured or ill patients, therefore their ability to offer timely and effective medical care is compromised. Therefore, this demands an extensive emergency preparedness strategy and proactive actions to mitigate the impacts and minimize associated mortality, morbidity, and improve patient outcome (Joshi *et al.*, 2022).

The common diseases outbreaks include cholera, measles, Ebola, COVID-19, and traumatic conditions such as road traffic accidents and industrial explosions, have been associated with mass casualty crises (Seeger et al, 2021). About 1.25-1,35 million fatalities occur and up to 50 million people are injured due to road accidents annually. Additionally, 90%-93% of these road fatalities occur in low-income and middle-income counties (Ayenew et al., 2021; Safarpour et al., 2019). The road traffic accident injury trends in Botswana reveal that a total of 5,219 casualties were recorded in 2021, and these were attributed to about 17,277 road accidents, which indicated an increase of 3.3 % from the previous year. Furthermore, it was reported that the death toll of the recorded casualties was 413 during the period, an increase of 27.1 percent from 325 deaths recorded in 2020. Casualties resulting from serious injuries increased by 11.5%. This trend shows how the healthcare system in Botswana is burdened by emergency incidents, especially since there are only two major government tertiary hospitals (Majelantle, 2017; WHO, 2020).

The healthcare systems in sub-Saharan Africa are affected and burdened by the increasing health incidents of mass casualty resulting in several significant complications or poor patient outcomes. These complications are often attributed to poor emergency preparedness (WHO, 2022). Therefore, hospital emergency preparedness and response planning are essential for enhancing hospital capability, ensuring the continuity of vital services, and delivering effective care to victims during MCIs.

Emergency preparedness (EP) is defined as the knowledge and capabilities developed by governments, professionals, response and recovery organizations, communities, and individuals to effectively anticipate, respond to, and recover from, the impact of likely, imminent, or current hazard, event or a condition" (WHO, 2017). It involves an updated response plan, staff training, acquiring adequate supplies and medical equipment, and power sources. Development of clear protocols and guidelines, hospital incident command centre, triage, surge capacity, and chain of command with defined roles and responsibilities also enhance emergency preparedness, (Ayenew et al, 2022).

Emergency preparedness and response planning (EPRP) articulate how an agency or organization can effectively respond to and manage emergency incidents. Through the implementation of developed protocols, utilization of resources, and systems, an institution can avert the impact of the current or impending emergency threat (Joshi *et al.*, 2022). It requires sustained actions, funding, partnerships, and political commitment at all levels, as well as effective collaboration among stakeholders to plan and implement priority actions (Pigoga et al., 2020; WHO, 2017).

A study by Farah et al. (2023) highlighted that many hospital emergency departments and emergency medical services are inadequately prepared for crises or major cognitive impairments. This inadequate emergency preparedness results in an increased complication and mortality rate of patients in several

emergency departments. The vulnerable healthcare systems in Sub-Saharan countries were also exposed during the recent outbreak of communicable diseases such as COVID-19, cholera, and many other conditions (Ayenew et al, 2022). Primarily due to the failure to meet the healthcare emergency needs of their respective population, resulting in increased associated mortality and morbidity, (Mwandri and Hardcastle, 2018).

Hospital emergency preparedness is an upcoming concept in the Sub-Saharan African region, as countries continue to adopt the best international practices and research-guided interventions (Tassew *et al.*, 2022). Furthermore, some aspects of emergency preparedness noted amongst African countries include training of health workers, development of protocols and guidelines on emergency response, acquiring minimal resources, and development of general disaster response plans among others, (Ayenew et al, 2021; Mwandri and Hardcastle, 2018). A study in Ghana for instance found that there was significant skilled human resource capacity to handle health emergencies, with strategic plans and guidelines at all levels. Similarly, the necessary consumables, good infrastructure, adequate numbers of personnel, and rehabilitation services were found to be available in most health facilities in Botswana, including protocol, guidelines, and standard operating procedures, (Mwandri and Hardcastle, 2018). The Nursing and Midwifery Council of Botswana (NMCB) has also introduced modules that all nurses in the country have to undertake and achieve certain points to qualify for their annual licensure. This was meant to keep nurses updated on new developments or information in terms of modern medicine. However, staff knowledge, preparedness implementation and coordination within institutions like Nyangabwe Referral Hospital (NRH) and relevant stakeholders remain inadequate. Therefore, the assessment of emergency preparedness and response planning amongst nurses and the casualty department at NRH was aimed at helping the institution identify gaps, opportunities, and strengths. Targeted intervention can then be put in place to improve gaps, minimize disruption of essential healthcare services, and improve patient outcomes during MCIs.

1.3 Statement of the Problem

Nyangabwe Referral Hospital (NRH), a major health facility serving a large catchment population, continues to face a high burden of disease and trauma-related incidents. This is particularly evident during mass casualty incidents (MCIs), such as road traffic accidents, which have significantly strained the hospital's emergency services. Hospital records from 2021 to 2023 indicate that a total of 57,349 clients were seen at the emergency department, with 4,954 trauma-related cases and 403 recorded deaths, resulting in an average annual mortality rate of 6.81 deaths per 1,000 patients. A notable increase in mortality was observed in 2023, rising to 11.30 deaths per 1,000, suggesting a potential link between increased patient load and compromised care during peak emergency periods. Despite the growing burden and the frequency of MCIs, the hospital lacks a comprehensive understanding of its level of emergency preparedness, particularly concerning staff knowledge, attitudes, availability of protocols, medical resources, and trauma care support services. Moreover, the hospital's current response culture, where victims are transferred in masse to NRH post-incident despite its limited capacity, has contributed to disorganized care and delayed critical interventions.

The mismatch between patient influx and available staff, typically only two nurses and one doctor per shift further compounds the problem. The reliance on redeployed nurses from other units, many of

whom are not trained in emergency protocols, often leads to confusion, emotional distress, and a breakdown in teamwork. These factors collectively result in compromised patient and staff safety, and ultimately, poor patient outcomes during MCIs.

Given the above challenges and the current staffing structure (only 21 nurses in the emergency department, working in three shifts), it is essential to assess the factors influencing nurses' and the casualty department's preparedness to effectively respond to mass casualty emergencies.

There were 21 nurses allocated to the NRH emergency (casualty) department, they operated on a three-shift basis and 2 nurses were deployed per shift. Their credentials were as follows: Degree 6 and diploma 15 with no specialties.

1.3.1 Table 1. shows statistics of patients seen and related deaths at NRH emergency department over three years (2021-2023), (hospital records).

	Years			
	2021	2022	2023	**Total**
No. of clients seen at NRH department annually	17693	20 455	19201	57 349
No. of Trauma patients seen	1088	2944	922	4954
Total hospital admission	10312	9511	10248	30 071
Percentage % Increase (**2021 REF)**		15% increase	8% increase	
Annual deaths at Accident and emergency department NRH (***only***)	73	102	217	403
Death per 1000, annually.	4.13	4.99	11.30	6.81(average)

(Nyangabwe Referral Hospital records, 2021, 2022 and 2023).

1.4 Justification

The need to conduct the study was motivated by the ever-increasing road traffic accidents (RTAs) that claim many lives along the A3 highway, especially public transport involvement. The mass casualty incidents often overwhelmed the healthcare institution's routine services, leading to chaotic events and potentially compromised patient care. Therefore, the assessment of factors influencing nurses' and

casualty department preparedness was critical to determine the level of preparedness for incidents of mass casualty. The study recommendations provided the hospital with gaps or areas of improvement. This has inspired the institution to put measures in place to improve overall preparedness, ensuring an effective response during an emergency crisis,(Safarpour *et al.*, 2022). This includes amendments to the emergency preparedness short-term and long-term plans based on recommendations.

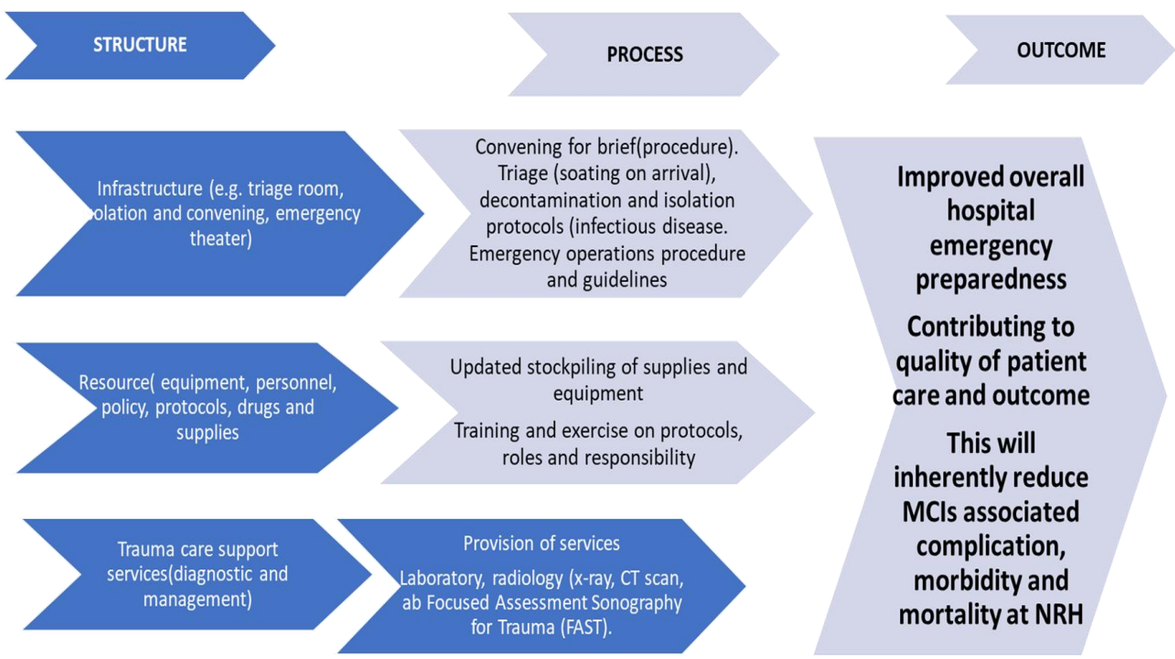
Additionally, the study provided useful information on identifying obstacles that hindered effective collaboration and coordination amongst NRH and other health institutions or agencies during MCIs. It also exposed the impediments that hindered the direct division of patients at the scene and direct transfer to different hospitals (both private and government) to aid effective crisis management in case of motor vehicle accidents.

The current study also provided insightful information that has strengthened compliance with regulations governing health institutions and accreditation bodies. This has improved the quality of care and minimized lawsuits in the hospital associated with poor service delivery and patient negligence. The institution is expected to fulfill its duty of care by providing the highest standard of care for all patients, including those involved in mass casualty incidents.

Furthermore, this study aligned with the Sustainable Development Goals (SDGs), particularly SDG 3 which promoted improved health outcomes through better planning. The study particularly targeted an item that sought to halve the number of global deaths and injuries from road traffic accidents (WHO, 2020).

There was also a general scarcity of published information on emergency preparedness amongst nurses in public health institutions in Botswana. However, few studies that have been conducted are more anchored to trauma care and grouped institution (Mwandri and Hardcastle, 2018). This scarcity of literature made it difficult to critically analyse and assess emergency preparedness at NRH. Therefore, these findings contributed immensely to a body of knowledge on hospital emergency preparedness for mass casualty locally, regionally and globally.

1.5 CONCEPTUAL FRAMEWORK



1.5.1 Figure.1: Adapted Donabedian Model.

The model was used to evaluate emergency preparedness and response planning at NRH. It demonstrated the relationship between structures, processes, and expected outcomes (Goenta et al 2022).

Donabedian model is a comprehensive framework utilized to assess the emergency preparedness and response planning at Nyangabwe Referral Hospital. The model was characterized by three main components: structure, process, and outcome. The structure component involved the physical and organizational features of the institution. Medical equipment and supplies, infrastructure, human resources, and staff knowledge were critical elements that influenced hospital emergency preparedness (Binder, Torres and Elwell, 2021; Moayed et al., 2022).

The processes, protocols, and procedures used include triage methods, airway management, oxygen therapy, spine immobilization, and external hemorrhage control in multi-trauma patients. The application of nurses' knowledge and utilization of the available medical equipment and supplies supported the execution processes during emergency incidents (Binder, Torres, and Elwell, 2021; Moayed et al., 2022).

The structural and procedural components of the framework serve as the foundation for emergency preparedness and response planning. The interconnections between these components ensure the delivery of high-quality care during emergency incidents (Binder, Torres, & Elwell, 2021; Moayed et al., 2022).

The outcome aspect evaluates the effectiveness of emergency preparedness efforts, including overall improvement in readiness. Through, the Donabedian model, patient satisfaction was measured, and Nyangabwe Referral Hospital was assessed for its emergency preparedness. The findings help identify strengths and weaknesses, guiding targeted interventions to enhance the hospital's capacity to respond to mass casualty incidents.

1.6 Study Objective:

1.6.1 General Objective

To assess factors influencing nurses' and the casualty department's preparedness for mass casualty incidents at Nyangabwe Referral Hospital in Francistown, Botswana.

1.6.2 Specific Objectives:

1. To evaluate nurses' preparedness for mass casualty incidents by the awareness of the related policy guidelines and attitudes towards participation at NRH.
2. To describe the casualty department's capacity to respond during mass casualty incidents by the availability of pre-determined medical equipment and protocols at Nyangabwe Referral Hospital.
3. To determine the casualty department's capacity to provide initial trauma care during mass casualty incidents by the availability of trauma care support services at NRH.

1.7 Research Hypothesis

- There are no significant factors that influence nurses and the casualty department's emergency preparedness for incidents of mass casualty at Nyangabwe Referral Hospital in Francistown, Botswana.

1.8 Dependent Variable

Emergency Preparedness

1.8.1 Independent Variables

1. Emergency preparedness awareness
2. Triage knowledge
3. Attitudes
4. Availability of equipment and supplies
5. Availability of Protocols and guidelines
6. Trauma care support services

1.8.2 Table 1.2 Variables, Indicators, Cut-Off Points and Questions.

Dependent variable	***Conceptual definition***	***Operational definition***	***Indicator***	**Cut-off points**	Question
Emergency Preparedness	The process of anticipating and reducing risk, identifying necessary resources and capacities, clarifying roles and responsibilities, encoding plans in written form, and testing plans through training and exercise, (Seeger *et al*, 2021).	This describes the total aggregated preparedness of all factors influencing emergency preparedness measured in percentage form at NRH.	Good Moderate Poor	60-100% 50-59% 0-49%	I-VX and 1-44
Independent variables				Cut-off points	Questions

Emergency preparedness Awareness	It refers to the understanding, knowledge, and recognition healthcare professionals possess regarding protocols, procedures, and responsibilities required to respond effectively to emergency events, including mass casualty incidents (MCIs) (Veenema, 2019).	It was measured using a structured questionnaire comprising multiple items across key domains such as knowledge of mass casualty protocol, emergency roles, and familiarity with hospital response plans. Each item was rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), and the total score determines the level of awareness: high, moderate and low	High Moderate Low	60-100% 50-59% 0-49%	15-21
Triage knowledge	the ability to assess, prioritize, and allocate resources efficiently in situations requiring urgent decision-making (Iserson & Moskop, 2007).	Respondents were given a case scenario and asked to explain how they would conduct the primary survey on the case and the responses were graded against a rubric and key.	Good knowledge Poor knowledge	50-100% 0-49%	Section E 1.0-5.0
Attitude	A psychological	The awareness, beliefs, and	Good	60-100% 59 and	22-30

	construct that refers to an individual's evaluation, feeling, or predisposition toward a person, object, or situation (Very Well Mind. 2024)	perception that shape a person's understanding of the potential impending risk, drives a person to engage in preparedness efforts. It can either be poor or good attitude.	Poor	below	
Essential Medical equipment and supplies	The necessary medical supplies, tools, and technologies are used by the emergency medical service to provide pre-hospital treatment and stabilization of serious illnesses and injuries (Gabble et al, 2020).	The medical supplies and equipment used to support service delivery such as diagnosis and treatment.	Adequately resourced moderate Poorly resourced	50-100% 49% and below	1-18 (list) And 1-14(list)
Protocols and guidelines	structured frameworks designed to standardize practices across various fields, ensuring consistency, safety, and efficiency (Gabble et al,	The availability and staff awareness of the protocols and guidelines are presented in a percentage form	**Percentage Availability** **Good** **Moderate** **poor**	**60-100%** **50-59 %** **0-49 %**	Part B 5.19.1 SECTION B

	2020).				
Trauma care support services	The assessment of hospital capability for performing advanced definitive trauma management such as surgical procedures (Mwandri and Hardcastle, 2018).	The availability of different specialists to perform different surgical interventions and critical care of patients during MCIs. It was described as either adequately staffed or poorly staffed.	adequately staffed or poorly staffed.	Percentage availability 50-100% 49% and below	1-14(services) 1-30(specialists)

1.9 Conclusion

There has been an increased focus on strengthening emergency preparedness and response in health institutions globally. The development and implementation of standardized measurable programs ensured effective hospital preparedness for mass casualty incidents. Effective emergency preparedness in a hospital requires a comprehensive all-hazard approach to planning. The elements of major importance to achieve a comprehensive EPRP include risk assessment and planning, triage, training, communication systems, surge capacity expansion, and leadership and coordination. Institutions should also create a work culture that promotes improvement and growth among employees. Continuous evaluation and improvement of emergency preparedness in a health institution is also emphasized, as it ensures that institutions are well prepared to manage MCIs at all times. The current study results provide recommendations on training personnel on emergency preparedness, and conducting simulation drills to identify gaps and strengths. The Donabedian model proposed for the study provided a comprehensive framework for evaluating healthcare quality. The model breaks down healthcare delivery into three interrelated components: structure, process, and outcome. Each component aligns well with the elements involved in preparedness for mass casualty events.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of the literature on studies conducted on the assessment of factors influencing nurses' and the casualty department's emergency preparedness (EP) for incidents of mass casualty globally, regionally, and locally. The review articulates the relationship between the dependent variable, emergency preparedness, and the independent variables. The variables include staff knowledge, EP awareness, attitudes, availability of essential medical equipment and supplies, protocols and guidelines, and provision of trauma care support services. The study adopted the Donabedian Model, which evaluates healthcare quality using the dimensions of structure, process, and outcomes (Donabedian, 1988). The literature review also explored how the model has been applied in previous studies and supports its relevance in assessing emergency preparedness among nurses.

The literature was sourced from published articles on computerized databases such as Research for Life, Google Scholar, PubMed Central, and Research Gate.

Keywords used for the literature search: Assessment of hospital emergency preparedness, mass casualty incidents preparedness, Factors influencing hospital emergency preparedness, and assessment tools for emergency preparedness.

2.2 Overview Emergency Preparedness

Emergency preparedness and response are critical components of healthcare delivery, significantly influencing patient outcomes and the efficiency of emergency services (Chia-Huei et al., 2023). It influences effective response during mass casualty incidents and minimizes associated complications and mortality. Hospitals should develop a comprehensive plan to manage sudden patient numbers that may exceed normal operational capacity, allowing for timely triage and treatment. A study conducted in India by (Khirekar *et al.*, 2023) shows that catastrophe preparation techniques include creating an emergency operations plan (EOP) with clearly defined roles and processes for the management of different incidents. The study articulates that the hospital should set up an incident command system with a clear, transparent chain of command to enhance coordination, communication, and decision-making. Another study conducted in Australia, Canada, England, and New Zealand by Gabbe *et al.*, (2020) found a widespread commitment to disaster and emergency preparedness in the said countries. About 80% of the institutions had an all-hazards disaster plan, and 91% had a committee dedicated to emergency preparedness with an overall emergency preparedness calculated between 60-95%. furthermore, Safarpour *et al.*, 2022) stated that hospital preparedness was categorized into three levels: good (66–100%), moderate (34–65%), and poor (0-33%).

Similarly, a study in Sweden by Söderin et al., (2020) found that all hospitals except one had a hospital-wide contingency plan, with 83% having department-specific plans and 50% having plans. However, the study found significant disparities in contingency planning, and organizational structure, and the hospitals had limitations on a comprehensive all-hazards approach. A study conducted in Nigeria by Amaitari *et al.*, (2020) found that the emergency preparedness and response plans were not comprehensive and did not exist in some hospitals. Similarly, a study by Jamileh et al., (2024) found

that the institutions had limitations or inappropriate interactive platforms during disasters, the presence of obstacles to teamwork or poor coordination, and moral tension in complex disaster situations. Healthcare professionals, particularly nurses, were found to play a pivotal role in emergency management due to their direct patient care responsibilities and substantial presence within the healthcare workforce. Therefore, comprehensive training in emergency protocols, incident command systems, triage methodologies, treatment procedures, and safety measures were found to be essential in enhancing their preparedness and response capabilities (Chia-Huei et al., 2023).

2.3 Staff knowledge concerning hospital emergency preparedness

Healthcare professionals, especially nurses, should know about emergency preparedness and response to enable better coordination and management of emergencies. This was found to have an impact on patient outcomes and the efficacy of emergency services provision (Jamileh et al., 2024). The study also found that institutions have limitations in terms of platforms for nurses to acquire adequate disaster risk management competence. Staff, especially nurses, should know protocols and guidelines, incident command systems, triage systems, treatment protocols, and safety precautions. Adequate training equips staff with essential knowledge and skills, clarifies individual roles, and helps identify gaps in preparedness. A study by Leigha and Mollie, (2023) found that mass casualty incidents triage systems are implemented to offer the greatest good to the greatest amount of people as healthcare resources are limited or strained due to the number of injured individuals. The study continued to show that with regular drills and simulations, the skills were gained as well as identifying gaps and allowing targeted intervention to reinforce the hospital emergency preparedness plan. However, studies have highlighted the lack of adequate training in low- and middle-income countries, particularly the Sub-Saharan region, (Tassew *et al.*, 2022). A study conducted in Iran, (Azizpour, Mehri, and Soola, 2022) study reveals that emergency nurses lacked knowledge on disaster preparedness, leading to potential harm to victims. Factors such as work experience, adequate training, and age were predictors of disaster preparedness knowledge. Those with higher knowledge had better triage decision-making skills. Similarly, a study in Ethiopia by Ayenew, Tassew and Workneh, (2022) found that 50.8% of healthcare workers had good knowledge about hospital emergency and disaster preparedness. A study conducted in Botswana by Mwandri and Hardcastle, (2018) also found that there was inadequate knowledge on initial trauma care amongst emergency department healthcare providers. This inadequate knowledge was linked to poor patient outcomes during case management.

On the contrary, a study conducted in Yenagoa Metropolis, Nigeria by Amaitari et al., (2020), found that 80% of health workers, especially nurses had good knowledge of emergency preparedness and response. However, the study found that those who participate in emergency drills often cannot use these skills for long periods, which results in knowledge and skill deterioration. Furthermore, a study in Saudi Arabi by Medina et al, (2021), found that the level of knowledge on triage varied with higher educational attainment. That is the higher educational attainment, the more decision-making capacity. For instance, those with a degree or master's major in emergency management had good decision-making during triage.

2.4 Staff attitudes in relation to emergency preparedness

The health professionals' attitudes toward emergency preparedness significantly influenced their willingness to participate in preparedness initiatives such as training and drills (Chia-Huei et al., 2024). Furthermore, the study found that factors influencing staff attitudes include knowledge and skills, availability of resources, training opportunities, and work culture. It was also found that trained staff with good knowledge, a supportive work environment, and adequate resources are more likely to have a positive attitude at work and participate accordingly, as they often possess confidence. A work culture that does not prioritize emergency preparedness can lead to apathy among staff (Janizadeh et al., 2023). Additionally, in a study conducted in Iran, Tassew et al. (2022) found that respondents with good knowledge were more likely to have a positive attitude than those with poor knowledge. The study also found that nurses with five years or more of work experience were more likely to have a positive attitude than those with less than five years. Another study conducted in Iran by Janizadeh et al. (2023) concurred with this finding. Similarly, a study in Saudi Arabia by Nofal et al. (2017) found that overall, physicians and nurses had a satisfactory level of knowledge and a positive attitude toward disaster and emergency preparedness. Another study conducted in the United Arab Emirates found that health professionals have moderate levels of knowledge, positive attitudes, and high readiness to engage in disaster management. The study also indicates that gender and work culture can influence staff attitudes.

It was found that about 90% of staff had a good attitude toward disaster preparedness, which was consistent with other cited studies. However, a few individuals were skeptical about participation when it involved victims with infectious diseases, as they might be affected, especially when there is limited protective clothing. Therefore, the organization needs to have a comprehensive strategy to prepare for incidents of mass casualty. On the contrary, a study done in Indonesia by Salmawati et al. (2022) found that there was no relationship between knowledge and attitude concerning emergency preparedness. However, a study by Labrague et al. (2018) noted that nurses' willingness to respond is often contingent upon their confidence in their skills and the support systems in place. The study highlighted that lack of training and experience correlated with feelings of unpreparedness and decreased confidence in disaster response capabilities. Therefore, staff training and engagement in emergency preparedness programs can improve staff attitude.

2.5 **Protocols and Guidelines Regarding Emergency Preparedness**

Protocols and guidelines provide a structured approach to different types of emergencies, thus minimizing confusion, delaying treatment, and improving patient outcomes during MCIs. They are developed based on potential hazards after risk assessment, thus proactive planning ensures mitigation of the possible impact. Key protocols include command and control system, triage, safety and security, continuity of essential services, post-emergency recovery, treatment, transportation, activation, evacuation, and supply protocols, (Seeger, Islam and Seeger, 2021). Several studies emphasize that an Incident Command System (ICS) is crucial for healthcare professionals as it establishes a standardized hierarchy during emergencies. This ensures clear communication, coordinated responses, and effective resource allocation (Hick et al., 2020). A study by FEMA, (2021) found that ICS enhances collaboration between hospitals, emergency medical services (EMS), law enforcement, and public

health agencies, thus improving overall disaster response (FEMA, 2021). The study emphasizes that key features of ICS include assigning leadership roles (e.g., Incident Commander, Operations Section Chief), defining responsibilities, and setting communication protocols to maintain operational efficiency.

Furthermore, hospitals often integrate the Hospital Incident Command System (HICS), a specialized adaptation of ICS designed to improve hospital disaster or emergency crisis management (Jensen & Waugh, 2022). Similarly, Kuza and (Joshi *et al.*, 2022) also recognized the need for institutions to have an Incident Command System (ICS) with a clear chain of command, roles, and well-defined communication channels. The study continues to show that HICS ensures that all personnel understand their roles in an emergency, facilitating rapid decision-making and effective patient care delivery during disasters. A study done in Nigeria by Amaitari et al (2020) found that the command & control lines were also not clearly defined as such role confusion was considered to be high during MCIs, thus delaying necessary treatment.

Triage is a critical component of emergency preparedness, allowing healthcare professionals to prioritize patient care based on severity (Cone & MacMillan, 2020). Various triage systems are used in healthcare. The classifications are as follows: START (Simple Triage and Rapid Treatment), mostly used during mass casualty incidents to quickly classify patients (Immediate, Delayed, Minor, and Deceased) based on respiration, perfusion, and mental status (Hogan et al., 2021). Jump-start Paediatric Triage is often adapted for children to account for their physiological differences. Lastly, the Emergency Severity Index (ESI) is a five-level hospital-based triage system used in emergency departments to categorize patients by acuity and resource needs (Gilboy et al., 2021). However, literature recommends implementing standardized triage protocols, to ensure that patients are given the appropriate and timely care, thereby reducing mortality and preventing emergency department overcrowding (Mazurek et al., 2022). On the contrary, a study done in Sweden by Soderia et al., (2022) found that hospital triage methods used during MCIs and disasters differ greatly between hospitals and regions. The study found that different triage methods pose a risk of miscommunication as patients are often referred between hospitals and regions. Additionally, a study conducted in Nigeria by Amaitari et al., (2020) found that there was no functional triage system in some hospitals and none of the hospitals assessed had the surge capacity to contain a sudden influx of patients in the event of a disaster. Therefore, Hospitals without a structured triage system may struggle to prioritize and allocate resources efficiently, leading to delayed treatment for critically ill patients. Similarly, a lack of surge capacity meant hospitals were ill-equipped to handle a sudden influx of patients during disasters. This led to overcrowding in emergency departments, depletion of critical supplies, and excessive strain on healthcare workers, further compromising patient care. Furthermore, healthcare facilities must follow evidence-based treatment protocols to guide clinical decision-making during disasters. These include Advanced Cardiac Life Support (ACLS) and Basic Life Support (BLS) protocols for managing cardiac arrests and respiratory emergencies (American Heart Association, 2021). Sepsis bundles such as early goal-directed therapy (EGDT) ensure prompt recognition and treatment of septic patients (Rhodes et al., 2021). Trauma Resuscitation Protocols, which follow guidelines from the American College of Surgeons (ACS) Advanced Trauma Life Support (ATLS) program focus on airway management, haemorrhage control, and shock resuscitation (ACS, 2020).

Additionally, healthcare staff safety should be paramount during emergencies, requiring strict adherence to infection control protocols and PPE guidelines (CDC, 2021; NIOSH, 2020). Healthcare professionals must be trained in proper donning and doffing of PPE to prevent cross-contamination and infectious disease spread (OSHA, 2021). Similarly, decontamination protocols for chemical, biological, radiological, and nuclear (CBRN) incidents, ensuring healthcare workers' safety before patient care begins (WHO, 2022).

A study conducted in the Netherlands, by Verheul et al 2020, found that institutions with well-understood operational protocols and guidelines by staff manage their institutional crisis better. The finding concurs with Soderia et al., (2022) finding in Sweden. Similarly, a study conducted in Saudi Arabia by Medina et al 2020 (Chu, Li, and Yuan, 2022), found gaps in staff knowledge of protocols and guidelines which negatively affected the overall emergency preparedness. A study by Gabbe et al (2020) in four countries also found the need for protocols and guidelines to enhance emergency preparedness in an institution and emphasized the need for protocols to meet international guidelines to achieve maximum outcomes.

2.5 Availability of essential medical equipment and supplies in relation to emergency preparedness

Hospital functional preparedness is significantly influenced by resource availability, including medical equipment, infrastructure, human resources, response operations, and emergency financing. Insufficient supplies can hinder the delivery of critical care and lead to increased mortality rates (Chu *et al.*, 2022). A study conducted in the Netherlands by Blanchette *et al.,* (2023) concluded that effective critical care relies on the availability of essential equipment, supplies, and pharmaceutical stockpiles. A reliable and stable supply and delivery chain is often underestimated in hospital emergency plans. Similarly, a study conducted in Nigeria by Amaitari et al (2020), found that almost 86% of the 45 items listed as essential equipment for emergency preparedness and response by Word Health Organisation (WHO) were not available. This has been associated with increased mortality in some hospitals as it limits staff to provide care to patients especially when there is a surge of patients. WHO, (2020) reports that most healthcare systems in Africa are least prepared for emergency incidents, especially during crises or MCIs. A study in Botswana by Mwandiri & Hardcastle, (2017) found that contrary to Amaitari et al (2020) consumables, good infrastructure, adequate numbers of personnel, and rehabilitation services were available in Botswana. Furthermore, a study conducted on selected developed countries by Gabbe et al., (2020), found that 39 out of 61 institutions had an inventory mechanism in place for equipment, supply, and pharmaceuticals. About 64% had an inventory system, 75% had a system for continuous provision of essential medications and supplies during an MCI, and 66% had contingency agreements with supplies for timely resource provision. About 81% had backup for essential resources lasting at least three or more days, and 11% had a method for accepting donations in case of prolonged impact of mass casualty incidents or disaster events. This demonstrates that developed countries level of emergency preparedness for MCIs was more advanced than developing nations.

2.6 Trauma support services to emergency preparedness

Trauma support services define the assessment of hospital capability for performing advanced definitive surgery to repair injuries related to the trauma of the head and neck, cardiothoracic, abdominal, pelvic and musculoskeletal (ACS, 2020). These guidelines emphasize that hospitals should be equipped with the necessary human and physical resources to manage complex trauma cases effectively. The number of procedures is often directly related to specialists within the institution. Literature has demonstrated that hospitals were limited in providing life-saving surgical procedures, especially during incidents of mass casualty (Mwandiri & Hardcastle, 2017). In sub-Saharan Africa, institutions are often limited by resources to perform lifesaving procedures. A study conducted in Botswana found that trauma-care organizations, such as the presence of trauma teams, trauma-team training, quality improvement initiatives, policies for receiving or referring trauma patients, and the presence of a trauma registry, did not exist in any of the hospitals evaluated, (Mwandiri and Hardcastle 2017). Similarly, a study in Nigeria, by Ojo, et al, (2022) associates increasing mortality for traumatic conditions with delayed care due to the limitation of the hospital to perform a life-saving emergency surgical procedure. A study conducted in Australia and New Zealand, by Kovoor *et al.*,(2022) shows that there are trauma centres with varying capacities. However, all institutions should have the capacity to stabilize patients before they can be transported to the upper Centre.

2.7 Application of the Donabedian Model in Emergency Preparedness

The Donabedian Model provides a framework for assessing healthcare quality by analysing the interplay between three core dimensions: Structure, Process and Outcomes. This model helps identify how resources and systems (structure) support effective response actions (process), leading to improved preparedness or reduced morbidity and mortality (outcome).

Structure

Several studies have identified structural components as foundational in determining nurses' preparedness for mass casualty incidents. The structure includes institutional policies, training availability, staffing levels, and material resources. A study by Baack and Alfred (2017) applied the Donabedian framework in assessing United States of America nurses' disaster preparedness and found that access to training programs, availability of written disaster plans, and institutional support were key structural factors that enhanced preparedness. Similarly, Fawaz et al. (2021) reported that institutional infrastructure such as access to personal protective equipment (PPE), availability of simulation training, and organizational protocols positively influenced nurses' self-efficacy and readiness. In the context of Botswana, health facilities like Nyangabwe Referral Hospital may encounter structural challenges such as inadequate resources, inconsistent disaster policies, or limited training access, all of which could impact preparedness (Mphoyakgosi & Hulela, 2019).

Process

The process dimension includes the actions and behaviours of healthcare workers during emergencies. It encompasses nurses' participation in emergency drills, protocol usage, communication, and decision-making in simulated or real events. A study by Labrague et al. (2018) and Al Thobaity et al. (2020) demonstrated that active participation in drills, interprofessional simulations, and timely decision-making are vital process components linked to higher preparedness. Furthermore, even when

structural resources exist, a lack of engagement in practical simulations often limits the translation of theoretical knowledge into effective responses. Nurses' involvement in planning and protocol implementation is a critical factor influencing preparedness. Fawaz et al. (2021) found that when nurses were engaged in emergency planning processes, they showed greater adherence to protocols and felt more confident during simulations and real incidents.

Outcome

Outcomes often relate to nurses' self-perceived preparedness, competence, and response effectiveness. Baack and Alfred (2017) linked prior disaster training (structure) and drill participation (process) to higher levels of perceived competence (outcome). Similarly, in the study by Juffermans and Bierens (2018), it was found that better hospital preparedness systems correlated with more effective mass casualty response outcomes, including quicker triage and reduced mortality. Preparedness outcomes may also be evaluated in terms of organizational readiness and the resilience of the hospital workforce. In a low-resource setting like Botswana, focusing on outcome measures such as staff confidence, communication efficiency, and patient stabilization rates becomes essential (Mphoyakgosi & Hulela, 2019).

Contrarily, during mass casualty incidents, emotional responses, psychological trauma, and ethical dilemmas often affect both patient care and nurse performance. The Donabedian model largely ignores subjective experiences such as fear, burnout, and team morale as factors which are increasingly recognized as central to disaster preparedness (Chan et al., 2020).

Although multiple studies have employed the Donabedian framework in high-resource settings, there is limited research in sub-Saharan Africa, particularly in Botswana, that examines nurses' preparedness using this model. Most existing studies focus on general disaster preparedness and overlook the specificity of mass casualty incidents. There is also a paucity of research integrating structural, procedural, and outcome variables in one coherent model tailored to nurses' roles. Therefore, this study seeks to address this gap by applying the Donabedian model within the specific context of a tertiary hospital in Botswana, contributing to both regional and theoretical knowledge on health systems preparedness.

2.8 Conclusion

Studies have highlighted several gaps that limit emergency preparedness and suggested several recommendations. These are as follows, institutions should develop a comprehensive emergency plan. The plan should include training programs for staff to improve their knowledge and skills in initial trauma care. This references a study in Ghana that addressed a similar issue by providing short-tailored trauma courses. The use of simulation and drills for emergency response preparedness has also been recommended, it is associated with positive outcomes in terms of emergency preparedness. The study also highlights the importance of training staff on command and control systems, triage, treatment, staff roles, communication, safety and security, debriefing, and resource supplies and logistics. Planning minimizes chaos and reduces delayed patient care during MCIs. Triage systems in some hospitals were found to differ within the country and it was recommended that institutions should adopt a common triage method. It was also suggested that institutions should monitor their storage and consumption of supplies and pharmaceuticals, as well as product quality before purchase to prevent

stock shortages during times of need. The Donabedian model will serve as a guiding framework for analysing the factors influencing nurse preparedness at Nyangabwe Referral Hospital, while recognizing that real-world emergencies may require more fluid interpretations of structure, process, and outcome interrelations.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the study design, setting, population, sample size, sampling technique, inclusion and exclusion criteria, data collection tool and technique, data analysis, and presentation of findings. Ethical considerations are also described.

3.2 Study Design

The study adopted a descriptive, quantitative, cross-sectional design. A descriptive quantitative approach was appropriate for this study because the researcher intended to describe the current emergency preparedness for mass casualty incidents at NRH, (Majid, 2018). The study was cross-sectional since data were collected at only one point in time.

3.3 Study Setting

The study was conducted at Nyangabwe Referral Hospital in Francistown, Botswana. Francistown is the second-largest city in Botswana, which houses the second largest government hospital in the country. The hospital provides health care services to a broader population of about 1 000 000 (Majelantle, 2017). The serviced population include the north east, central districts, Ngami and Chobe districts. This often means resources are continuously over stretched by routine service and emergency preparedness and response planning was likely to be compromised or overlooked by the institution.

Nyangabwe Referral Hospital was established in 1989. It is a Government of Botswana health institution with a capacity of 550 beds. The 24-hour emergency department is designed to cater for both adults and children. It is equipped to handle various emergencies and is supported by other hospital departments such as post-trauma counselling, occupational services, and a mortuary.

3.4 Study Population

In the current study, the study population comprised of all nurses currently employed at NRH. The target population were all nurses currently employed and available during the study period at NRH.

- All Nurses working at Nyangabwe Referral Hospital.

3.5 Sample Size

The sample size was 214 calculated using the Taro Yamane formula as the population is finite.

3.5.1 Nurses

n= sample size, $n=N/(1+Nd^2)$, N= population under study (459), d= the margin of error (0,05). n =459/ (1+459(0.05)2) = 214.

3.6 Sampling Technique

3.6.1 Nurses

A proportional stratified sampling technique was employed to select nurse participants from various hospital departments and units. These include Accident and Emergency (casualty), Surgical, Medical, Maternity, Gynaecology, Paediatrics, Outpatient, Theatre, Intensive Care Unit (ICU), Orthopaedics, and the Anti-Retroviral Treatment (ART) Centre. These units collectively constituted the target population for the study (Parsons, 2017; Campbell et al., 2020). The nursing population was stratified according to the hospital's 22 units or wards. Each unit's nurse population ranged between 20 and 35 staff members, with an average of approximately 28 nurses per unit. To ensure fair representation from each unit, a proportion of the total sample size (n = 214) was allocated to each unit based on the size of its nursing staff relative to the overall nursing population. Participants were randomly selected using the lottery method within each stratum (unit or ward). Each eligible nurse was assigned a unique number based on the hospital staff list. These numbers were written on identical slips of paper, folded equally, and placed in a container. A neutral, blindfolded individual was then asked to draw the required number of slips corresponding to the sample quota for that particular unit. Nurses whose numbers were drawn were approached individually for consent before being included in the study. During the 10% pretest and initial data collection from two wards, it was observed that many nurses consented but later failed to return completed questionnaires. This high indirect refusal rate posed challenges in achieving the intended number of participants per unit. As a result, adjustments were made during the sampling to ensure each unit contributed its proportionate share of participants. The final numbers were based on the unit's staff size, the availability and willingness of nurses to participate. This method allowed for the inclusion of a representative sample from each ward while maintaining the integrity of proportional stratified random sampling. In total, 214 nurses were successfully selected, ensuring balanced representation across all departments and units.

3.7 Inclusion And Exclusion Criteria

3.7.1 Inclusion Criteria

• All nurses working at NRH with a minimum of 6 months' work experience.

3.7.2 Exclusion Criteria

- Nurses who were sick during data collection.

3.8 Data Collection Tools and Techniques

3.8.1 Data Collection Tools

A checklist and a self-administered survey questionnaire were used for data collection. These tools were adapted from the World Health Organisation Hospital Emergency Unit Assessment Tool (HEAT) and a study conducted by Amaitari et al 2020 in Nigeria to minimize ambiguity, (WHO, 2023).

3.8.1.1 Validity

The data collection tools were evaluated by supervisors and statisticians. Questions met the respondents' level of understanding and the formulation of questions was guided by the World Health Organisation Hospital Emergency Unit Assessment Tool (HEAT) and the tool used by Amaitari et al (2020), in the study conducted in Nigeria, to minimize ambiguity, (Pigoga et al 2020:Amaitari *et al.*,

2020). The adapted tool had a Total Content Validity Ratio of 0.97, and the total Content Validity Index for the whole tool was 0.98, (Safarpour et al, 2022: Amaitari et al., 2020).

3.8.1.2 Reliability

The tool adapted was a pre-tested tool from previous studies with Cronbach alpha of > 0.7 and modification guided by experts. The researcher also employed continuous monitoring of data to ensure the accuracy, relevance, and completeness of collected data. Use of pre-test, A 10% (22) of the sample from the participants was used for the pilot study to test the data collection tool. Section E of the tool was then edited from short answers to multiple-choice answers. The section was previously made of short answer questions. This was influenced by 61% (14) of participants who did not attempt the questions, they left the part blank. Therefore, it was then converted to multiple questions type comprising of 5 questions with total points of 10. A pilot study was conducted at Nyangabwe Referral Hospital. Participants engaged during the pretest were not used for actual data collection exercise to minimize biases.

3.8.2 Data Collection Technique

The data collection process began by sending the participant information form to the units' managers to share with the nurses in the units' WhatsApp groups. The participant information form explained the study's purpose, procedures, and the importance of participation. This was followed by creating a list of targeted nurses willing to participate in different departments and units with the help of unit managers. Those who consented were given the questionnaires to attempt. The questionnaires were then collected immediately or placed at the unit manager's office by those who attempted them in their spare time. The checklist was also used to check the equipment available at the emergency department and other areas like the intensive care unit with the help of unit managers. Similarly, a list of selected specialists and procedures performed were requested through management approval for trauma management.

3.9 Data Analysis and Presentation of Results

3.9.1 Data Analysis

Questionnaire data are kept in a locked cabinet and soft copies are stored in a computer and hard drive with password protection known privately by the principal researcher.

A backup is well-kept to prevent data loss.

Microsoft Excel was utilized for data cleansing, while the Statistical Package for the Social Sciences (SPSS) version 26 was used for data analysis, as it provided a comprehensive technique for Inferential analysis and enabled presentation using the frequency of the Descriptive statistics. The chi-square test was applied to the Statistical significance of the association between categorical variables, analysis was conducted at 95% confidence interval, and the significant level was set at $p< 0.05$. Multiple logistic regression (binomial logistic regression) was employed to explore the relationship between dependent and independent variables, (Campbell et al,2020).

3.9.2 Presentation of Results

Frequency tables were used to summarize numerical data and presentation of the standard deviation. Health workers' knowledge, awareness of preparedness, and attitude towards emergency preparedness are presented in percentage form.

3.10 Ethical Considerations

The study strictly followed ethical research standards, including obtaining informed consent from all respondents, safeguarding confidentiality, and anonymity, and minimising any potential risks or discomfort associated with participation in the study.

The research proposal, tools for data collection, and consent forms were submitted for approval to the relevant organization before the commencement of data collection. The organizations are as follows: University of Zambia Research Ethics Committee (UNZABREC) (REF. NO, 5866-2024), Botswana Ministry of Health Human Research and Development Committee (HRDC)(HPRD:6/14/1), as well as the Nyangabwe Referral Hospital Research and Ethics Committee.

Registration with the Zambia National Health Research Authority (NHRA) was achieved (NHRAR-R-1505/18/04/2024).

Informed consent was achieved amongst all participants and the researcher for shared decision-making. Furthermore, questions related to the study were clarified in case of misunderstanding. The participants then consented to participate in the study willingly before attempting the survey questionnaire.

Confidentiality was maintained to protect participants' identities by excluding information such as names. The individual's identity remained anonymous in any report or publication. The information generated from the survey was kept confidential and only used for research purposes.

The study also prioritized the well-being and interests of the participants during data collection to ensure beneficence. Data collection was conducted in a way that minimizes any potential risks or discomfort. The research ensured that any issues or discomfort arising during the research process were addressed immediately.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Introduction

Chapter four presents the results based on data collected during fieldwork. The data was cleaned using Excel and analyzed with SPSS version 26. Frequency data was exported to Excel for visual representations and to enhance clarity. Of the 214 targeted respondents, 184 completed the questionnaire, yielding a high response rate of 86%.

The chapter systematically analyzes the data, starting with the socio-demographic characteristics of the respondents. It then explores essential medical equipment and supplies, trauma and staff support, and the availability of protocols and guidelines for emergency preparedness. Key aspects such as staff knowledge and attitudes toward emergency preparedness were assessed. Relationships between variables were examined using chi-square and multiple nominal logistic regression.

Aggregated responses for knowledge, attitude, and other emergency preparedness variables were categorized to create composite variables. The analysis was organized to follow a logical flow: socio-demographic characteristics, availability of essential equipment and services, emergency preparedness, staff knowledge and attitudes, and associations between variables.

4.2 Presentation of Results

The study results were presented using frequency tables, charts, and contingency tables, organized in alignment with the structure of the study questionnaire. This approach provided a clear and concise summary of the results, enhancing their comprehensibility. Frequency tables systematically summarized responses and contingency tables highlighted relationships between variables. The structured arrangement of these visual aids followed the logical flow of the questionnaire, enabling readers to easily interpret the results.

4.2.1 Socio-Demographic Characteristics of Respondents

The socio-demographic characteristics of the study respondents are shown in Table 4.1. The socio-demographic characteristics analyzed included gender, age, marital status, academic qualifications, work experience, and employment category.

4.2.2 Table 4.1 Socio-demographic characteristic of Respondents (n=184)

Variable	Frequency	Percentage
Gender		
Male	58	32%

Female	126	68%
Age Group		
20-25	8	4%
26-30	26	14%
31-35	53	29%
36-40	47	26%
41 and above	50	27%
Marital Status		1%
Married	78	42%
Single	99	54%
Divorced	1	1%
Separated	0	0%
Widow	6	3%
Academic Qualification		
PHD	0	0%
MSc	1	1%
BA/B.SC	32	17%
Diploma	151	82%
Other	2	1%
Work experience		
6 Months- 2 years	8	4%
2- 5 years	24	13%
5- 10 years	68	37%
10- 15 years	36	20%
15 years and above	48	26%
Category of employee		
Management Staff	11	6%
General duty/other	173	94%
Total	**184**	**100%**

Table 4.1 shows that the majority were female (68%), while males accounted for 32%. Most respondents were aged 31-35 years (29%), followed by those aged 36-40 years (26%) and 41 years and above (27%), with smaller proportions in the 26-30 years (14%) and 20-25 years (4%) age groups. In terms of marital status, the majority were single (54%), followed by married individuals (42%), widowed (3%), and divorced (1%), with no separated respondents. Regarding academic qualifications, most respondents held a Diploma (82%), followed by BA/B.S.C holders (17%), with only 1% holding an MBA. Other qualifications accounted for 1%, while no respondents had a PhD. Work experience revealed that the majority had 5-10 years of experience (37%), followed by those with 15 years and above (26%), 10-15 years (20%), 2-5 years (13%), and 6 months-2 years (4%). Most respondents were general duty or other staff (94%), while management staff accounted for 6%.

4.2.3 Emergency Preparedness for Mass Casualty Incidents

The hospital's emergency preparedness and response policy were assessed using specific questions addressing the availability of guiding policies, their implementation, the frequency of policy review (annually, as planned, or as needed), and the visibility of the emergency plan to all employees. The responses and their frequencies are presented in Table 4.2. These responses were scored and aggregated into composite performance categories: Good (60-100%), Moderate (50-59%), and Poor (0-49%).

4.2.4 Table 4.2: Nurses' Responses on the Emergency Preparedness Awareness at Nyangabwe Referral Hospital (NRH)(n=184)

Variables	**Number**	**Percentage**
Emergency Preparedness		
There are guiding policies		
No	63	34%
Yes	121	66%
Undecided	0	0
Are they Implemented		
No	68	36%
Yes	116	63%
Undecided	0	0
The hospital emergency management policy is reviewed annually/ as planned, and or anytime the need arises		
No	85	45%
Yes	99	54%
Undecided	0	0
The hospital emergency policy is visible to all categories of employees in the hospital		
No	128	70%
Yes	56	30%
Undecided	0	0

TOTAL SCORE	184	100%
Low Awareness	68	36%
Moderate awareness	71	39%
High Awareness	45	24%

Table 4.2 presents the respondents' perceptions regarding emergency preparedness. The outcomes are as follows: 66% of respondents report the existence of guiding policies, while 34% disagree. Regarding the implementation of these policies, 63% agree, while 36% disagree. On the review of the hospital's emergency management policy, 54% confirm it is reviewed annually or as needed, while 45% disagree. Additionally, only 30% of respondents indicate the policy is visible to all categories of employees, while 70% disagree.

The overall emergency preparedness awareness (n=184) distribution was categorized among respondents into low, moderate, and high. The majority, 71 respondents, were categorized as moderate. This was followed by 68 respondents categorized under low awareness, while 45 respondents fell under the good emergency preparedness awareness category.

4.2.5 Respondents Level of Awareness on Emergency Preparedness

The emergency preparedness awareness was assessed using a set of questions that required respondents to rate their level of agreement on key aspects of emergency preparedness. The responses and their frequencies are presented in Table 4.3. Responses were aggregated and categorized into three levels: High awareness (60-100%), Moderate awareness (50-59%), and Low awareness (0-49%), providing a composite measure of the respondents' overall awareness of emergency preparedness and response planning. The collapsing of the variables of choice from 5 to 3 allowed categorization that helps to identify areas of good awareness and where improvement is needed.

Questions	Frequency	Percentage
Emergency preparedness and response refers to the ability of healthcare systems, communities, and individuals, to prevent against, quickly respond to, and recover from healthcare emergencies.		
Undecided	11	6%
Strongly Disagree	0	0%
Disagree	1	1%
Agree	66	36%
Strongly Agree	106	58%
A hospital emergency preparedness plan consists of structural and non-structural, functional, and human resource components.		
Undecided	17	9%
Strongly Disagree	1	1%
Disagree	2	1%
Agree	86	47%
Strongly Agree	78	42%
There is an emergency preparedness and response plan in the hospital and I know where to access it.		
Undecided	19	10%
Strongly Disagree	12	7%
Disagree	32	17%
Agree	101	55%
Strongly Agree	20	11%
Over the past 1 or 2 years I have participated in educational activities (training) or drill exercises dealing with emergency preparedness and response.		
Undecided	8	4%
Strongly Disagree	29	16%
Disagree	108	59%
Agree	36	20%
Strongly Agree	3	2%
The steps to follow in the hospital when there is an emergency with a sudden influx of patients are well documented in the emergency plan and well understood by staff, including me (Mass causality).		
Undecided	21	11%
Strongly Disagree	13	7%
Disagree	56	30%
Agree	77	42%
Strongly Agree	17	9%
I have the competence to perform the acceptable triage principles used in disaster and emergency incidents		
Undecided	14	8%
Strongly Disagree	6	3%

Disagree	21	11%
Agree	112	61%
Strongly Agree	31	17%
There is a need for staff to be trained and exercise or drill to prepare for incidents of mass causality or emergency?		
Undecided	4	2%
Strongly Disagree	1	1%
Disagree	2	1%
Agree	28	15%
Strongly Agree	149	81%
Total Score		
High Awareness	**81**	**41%**
Moderate Awareness	**41**	**22%**
Low Awareness	**62**	**33%**

4.2.6 Table 4.3 Respondents responses on Awareness on emergency preparedness and participation (n=184)

The table 4.3 shows respondents' perceptions regarding emergency preparedness and response. Regarding the definition of emergency preparedness and response, the majority strongly agreed, followed by 36% who agreed, 6% who were undecided, and 1% who disagreed, with no respondents strongly disagreeing. On the components of a hospital emergency preparedness plan, 47% agreed, 42% strongly agreed, 9% were undecided, 1% disagreed, and 1% strongly disagreed.

When asked about the presence of an emergency preparedness and response plan and knowledge of access, most respondents (55%) agreed, while 17% disagreed, 11% strongly agreed, 10% were undecided, and 7% strongly disagreed. Regarding participation in educational activities or drills on emergency preparedness in the past 1-2 years, the majority (59%) disagreed, 20% agreed, 16% strongly disagreed, 4% were undecided, and 2% strongly agreed.

On whether steps for emergencies with a sudden influx of patients are well documented and understood, 42% agreed, 30% disagreed, 11% were undecided, 9% strongly agreed, and 7% strongly disagreed. The competence in performing triage principles during disasters, most respondents (61%) agreed, followed by 17% who strongly agreed, 11% who disagreed, 8% were undecided, and 3% who strongly disagreed.

Furthermore, on the need for staff training and drills for emergencies, the vast majority (81%) strongly agreed, 15% agreed, 2% were undecided, and 1% disagreed, with only 1% strongly disagreeing.

Lastly, the overall Awareness on Emergency Preparedness (n=184) shown in the distribution indicates that the majority, 81 respondents, were categorized under high awareness. This was followed by 62 respondents classified under low awareness, while 41 respondents fell under the moderate awareness

category. The categories were collapsed to form a summary of three categories that provide a clear depiction of the overall awareness of nurses on emergency preparedness and response, highlighting areas of good awareness and areas needing improvement.

4.2.7 Attitudes Towards Emergency Preparedness Participation

The attitude of health workers toward emergency preparedness and response was assessed using a series of statements aimed at gauging their willingness, perception, and commitment to emergency preparedness activities. Responses were categorized into two levels: Good (60-100%) and Poor (59% and below), as summarized in Table 4.4. The categories were collapsed to form a summary of two categories that provide a clear depiction of the overall attitude of health workers toward emergency preparedness and response, highlighting areas of positivity and areas needing improvement.

Questions	**Frequency**	**Percentage**
I need to know about disaster and emergency preparedness planning		
Undecided	3	2%
Strongly Disagree	0	0%
Disagree	0	0%
Agree	77	42%
Strongly Agree	104	57%
If you were not on duty and were asked to come to work because the hospital had a large number of casualties to take care of as a result of a disaster, would you be willing to do so?		
Undecided	38	21%
Strongly Disagree	3	2%
Disagree	17	9%
Agree	95	52%
Strongly Agree	31	17%
Potential hazards likely to cause disaster should be identified through risk assessment and intervention should be put in place for mitigation.		
Undecided	4	2%
Strongly Disagree	0	0%
Disagree	2	1%
Agree	82	45%
Strongly Agree	96	52%
I am willing to participate in emergency response activities including infectious disease outbreaks without incentives in the hospital when given an opportunity or the need arise		
Strongly Disagree	12	7%

Disagree	22	12%
Agree	98	53%
Strongly Agree	18	10%
The attitude of other health personnel on emergency preparedness and response in the hospital in very good. Your view on previous experiences if any.		
Undecided	20	11%
Strongly Disagree	17	9%
Disagree	59	32%
Agree	84	46%
Strongly Agree	4	2%
Lives and properties are lost during emergencies and disasters due to untrained personnel in the hospital and community		
Undecided	13	7%
Strongly Disagree	1	1%
Disagree	7	4%
Agree	100	54%
Strongly Agree	63	34%
The hospital is adequately prepared to manage any type of disaster or emergency in which there is a large influx of patients		
Undecided	26	14%
Strongly Disagree	23	13%
Disagree	57	31%
Agree	70	38%
Strongly Agree **Total score** **Poor attitude** **Good Attitude**	8 **102** **82**	4% **55%** **45%**

4.2.8 Table 4.4 Respondents' responses to questions on attitude towards emergency preparation and participation (n=184).

Table 4.4 highlights respondents' attitudes towards disaster and emergency preparedness planning. The majority (57%) strongly agreed that they need to know about disaster and emergency preparedness planning, while 42% agreed, 2% were undecided, and none disagreed or strongly disagreed. When asked about willingness to report to work during a disaster despite being off duty, 52% agreed, 17% strongly agreed, 21% were undecided, 9% disagreed, and 2% strongly disagreed.

Regarding the identification of potential hazards through risk assessment and mitigation, 52% strongly agreed, 45% agreed, 2% were undecided, and 1% disagreed, with none strongly disagreeing. On willingness to participate in emergency response activities without incentives, 53% agreed, 10% strongly agreed, 12% disagreed, and 7% strongly disagreed.

When asked about the attitude of other health personnel towards emergency preparedness, 46% agreed, 32% disagreed, 11% were undecided, 9% strongly disagreed, and 2% strongly agreed. Regarding the loss of lives and property due to untrained personnel, 54% agreed, 34% strongly agreed, 7% were undecided, 4% disagreed, and 1% strongly disagreed. Additionally, when evaluating the hospital's preparedness to manage large-scale emergencies, 38% agreed, 31% disagreed, 14% were undecided, 13% strongly disagreed, and 4% strongly agreed.

Finally, the overall Attitude Towards Emergency Preparation (n=184) as depicted in the table above, a significant proportion of respondents, 55% exhibited a poor attitude, while 45% demonstrated a good attitude.

4.2.9 Triage knowledge on Management of Patient using Primary Survey

The respondents were given a case scenario and asked to explain how they would conduct the primary survey on the case. Their responses were graded against a rubric and key. The scores of respondents on the conducted primary survey and the composite knowledge variable are shown in the table below.

4.2.10 Table 4.5 Knowledge and skill on the management of patients utilizing a primary survey, based on a given scenario (n=184)

Assessment of basic knowledge and skill on management of patient utilization of primary survey	n (%)
A and B. Airway and Breathing	
Check temperature, pulse, blood pressure, and bleeding	46 (25.0)
Check for airway patency, check trachea position, look for breathing patterns/signs of respiratory distress, bilateral air entry	177 (96.2)
Refer to a higher practitioner, give fluids and a painkiller	9 (4.9)
Possible management for Airway and Breathing	
Apply a compressive bandage, order an X-ray or CT scan and give painkillers	19 (10.3)
Give normal saline 0,9%, nebulize, and give antibiotics as needed.	177 (96.2)
Protect C spine, secure airway (inserting oral/nasal airway device, perform jaw thrust), and give oxygen	0 (0.0)
Assessment and management of Circulation abnormalities and presence of shock.	
Assess for pallor, capillary refill, check heart rate and blood pressure	136 (73.9)
Control external hemorrhage, insert a large bore cannula, run 1 L warm crystalloid fast, and place 12 lead ECG	57 (31.0)
draw blood for cross-matching, CBC, and chemistry, insert Foley, and record	9 (4.9)

urine output	
All above	45 (24.5)
Disability Assessment for Consciousness	
Assess for consciousness using AVPU and Glasgow scale (pupil dilation/motor/verbal response	151 (82.1)
Prevent secondary brain injury by administering high-flow oxygen	70 (38.0)
Feed the patient solid foods to increase their glucose	0 (0.0)
All above	3 (1.6)
Exposure. Purpose of exposure	
Head-to-toe examination (check for injuries/bleeding/ deformities/rashes/swelling)	144 (78.3)
Prevent hypothermia in the process of exposure	78 (42.4)
To assist a patient to calm down if in distress	0(0.0)
None of the above	0(0.0)
Knowledge and skill in the management and utilization of the primary survey	
Poor knowledge	93 (50.5)
Good knowledge	91 (49.5)

Table 4.5 reveals that nearly half of the participants (50.5%) demonstrated poor knowledge, while 49.5% had good knowledge of the primary survey. The categories were also collapsed to form a summary of two categories for a clear description of the overall knowledge of the primary survey amongst nurses.

4.2.11 Chi-Square Test Results for Factors Influencing Emergency Preparedness for Mass Casualty Incidents.

Table 4.6 reveals the association between variables and emergency preparedness participation, using the Pearson Chi-square test to measure significance. It presents the relationship between various factors, including grouped job titles, gender, age group, marital status, academic qualifications, work experience, category of employee, knowledge level on emergency preparedness, and primary survey with emergency preparedness participation as the dependent variable. The Pearson Chi-square test was used to measure the significance of the relationships between the variables.

4.2.12 Table 4.6: Chi-square test results of factors associated with Emergency Preparedness (n=184)

Variables	**Emergency preprepared**	**P-value**

	Poor		**Good**		
	N	**%**	**n**	**%**	
Grouped Job Titles					
Chief/Senior Nurse	10	29%	25	71%	
Registered Nurse/Nurses	13	32%	28	68%	0.015*
Principal Nurse	44	42%	61	58%	
Total	67		114		
Gender					
Male	17	29%	41	71%	0.025*
Female	51	40%	75	60%	
Total	68		116		
Age group					
20-25	5	63%	3	38%	
26-30	10	38%	16	62%	
31-35	18	34%	35	66%	0.563
36-40	18	38%	29	62%	
41 and above	17	34%	33	66%	
Total	68		116		
Marital status					
Married	0	0%	1	100%	
Single	31	40%	46	60%	
Divorced	34	34%	65	66%	0.269
Separated	0	0%	1	100%	
Widow	3	50%	3	50%	
Total	68		116		
Academic Qualification					
PHD	0	0%	1	100%	0.492
MSc	9	28%	23	72%	
BSc	59	40%	90	60%	

M.Sc./Med	0	0%	2	100%	
BA/B.SC/	0	0%	0	0%	
Diploma	0	0%	0	0%	
Other	0	0%	0	0%	
Total	68		116		
Work Experience					
6 Months- 2 years	5	63%	3	38%	
2- 5 years	8	33%	16	67%	
5- 10 years	26	38%	42	62%	0.029
10- 15 years	12	33%	24	67%	
15years and above	17	35%	31	65%	
Total	68		116		
Category of Employee					
Management Staff	3	43%	4	57%	
general duty/other	65	56%	112	82%	
Total	68		116	0%	0.403
Emergency preparedness Awareness				0%	
Low	39	63%	23	37%	
Moderate	17	41%	24	59%	
High	12	15%	69	85%	
Total	68		116	0%	0.001*
Attitude					
Poor	42	35%	78	65%	
Good	43	44%	55	56%	
Total	68		116		0.72
Knowledge on primary survey					
Poor Knowledge	41	44%	52	56%	
Good Knowledge	27	30%	64	70%	0.043*

Total	68		116		

* = Significant finding

The analysis reveals significant associations between emergency preparedness participation and job title (p = 0.015), gender (p = 0.025), work experience (p = 0.029), knowledge level (p = 0.001), and knowledge of the primary survey (p = 0.043). These findings suggest that individuals with higher awareness level and more experience are more likely to participate in emergency preparedness programs. Conversely, factors such as age, marital status, academic qualification, category of employment, and the presence of an emergency preparedness response plan were not significantly associated with emergency preparedness participation. Their p-values exceeded the 0.05 threshold, which implies that these variables do not have a meaningful impact on emergency preparedness in the given context.

4.2.13 Multivariate binary logistic regression model-determining factors associated with good emergency preparedness.

A binary logistic regression analysis was conducted to assess factors influencing nurses' emergency preparedness and patient management using the primary survey, adjusting for significant socio-demographic variables and key factors like knowledge and attitude. The odds ratios (AOR) with 95% confidence intervals (CI) and p-values provide insights into the significance and strength of associations between various predictors and good emergency preparedness.

4.2.14 Table 4.7 Multivariate binary logistic regression model-determining factors associated with good emergency preparedness (n=184)

Variables	**Emergency prepared**				**AOR (95% CI)**	**P- Value**
	Poor		**Good**			
	N	**%**	**N**	**%**		
Grouped Job Titles						
Chief/Senior Nurse	10	29%	25	71%	**Ref**	
Registered Nurse/Nurses	13	32%	28	68%	0.545 (0.44 - 1.85)	0.017*
Principal Nurse	44	42%	61	58%	0.27 (0.59 - 0.76)	0.021*
Gender						
Male	17	29%	41	71%	**Ref**	
Female	51	40%	75	60%	0.67 (0.46-1.49)	0.114
Work Experience						

6 Months- 2 years	5	63%	3	38%	**Ref**	
2- 5 years	8	33%	16	67%	0.552 (0.02 - 2.68)	1.170
5- 10 years	26	38%	42	62%	0.503 (1.67 - 2.61)	0.021*
10- 15 years	12	33%	24	67%	0.386 (2.78 - 3.03)	0.043*
15years and above	17	35%	31	65%	2.230 (0.23 - 2.56)	3.430
Awareness on emergency preparedness						
Low	39	63%	23	37%	**Ref**	
Moderate	17	41%	24	59%	1.083 (1.84 - 4.34)	0.011*
High	12	15%	69	85%	4.001 (2.23 - 3.05)	0.034*
Attitude						
Poor	42	35%	78	65%	**Ref**	
Good	43	44%	55	56%	2.588 (0.23 - 1.05)	0.014*
Knowledge on primary survey						
Poor Knowledge	41	44%	52	56%	**Ref**	
Good Knowledge	27	30%	64	70%	2.384 (0.57 - 2.94)	0.021*

AOR= Adjusted Odd ratio, CI= Confidence interval, * statistically significant

EP= Emergency preparedness, UOR= Unadjusted odd ratio, AOR= Adjusted Odd Ratio.

The results from the regression analysis in Table 4.7 indicate several significant determinants of emergency preparedness (EP). The Chief/Senior Nurses served as a reference group, while registered Nurses/Nurses had an AOR of 0.545 (95% CI: 0.44 - 1.85), with a p-value (0.017), indicating that they had lower odds of being likely to be well-prepared for emergencies than Chief/Senior Nurses. Principal Nurses also had lower odds of good emergency preparedness (AOR = 0.27, 95% CI: 0.59 -

0.76, p = 0.021). Similarly, nursing officers/assistant nursing officers had significantly higher odds of poor EP compared to registered nurses (AOR = 0.545, 95% CI: 0.44–1.85, p = 0.017).

These findings suggest that higher-ranked nursing professionals tend to be better prepared for emergencies. On gender, male nurses were set as the reference group. Consecutively, female nurses had an AOR of 0.67 (95% CI: 0.46 - 1.49) with a p-value of 0.114, which was not statistically significant. This indicates that gender was not a significant determinant of emergency preparedness in this study. Similarly, the reference category on nurses' experience was set as 6 months to 2 years of experience. The results indicated that Nurses with 2-5 years of experience (AOR = 0.552, p = 1.170) were not significantly different in preparedness from the reference group. Additionally, nurses with 5-10 years of experience (AOR = 0.503, p = 0.021) and 10-15 years of experience (AOR = 0.386, p = 0.043) were significantly more likely to be well-prepared than those with the least experience. On the contrary, the 15 years and above category had an AOR of 2.230 (p = 3.430), where the high p-value suggests this finding was not statistically significant. Therefore, the results indicate that nurses with moderate experience (5-15 years) tend to have better emergency preparedness.

Furthermore, a test on the level of awareness's influence on emergency preparedness results indicates that nurses under the moderate awareness category had an AOR of 1.083 (95% CI: 1.84 - 4.34, p = 0.011), showing a statistically significant increase in preparedness. Similarly, nurses under the high awareness category had an AOR of 4.001 (95% CI: 2.23 - 3.05, p = 0.034), indicating that they were four times more likely to be well-prepared than those who were categorized under low awareness (the reference group). Nurses with a good attitude had an AOR of 2.588 (95% CI: 0.23 - 1.05, p = 0.014), indicating that those with a positive attitude were significantly more likely to be well-prepared. Furthermore, knowledge of the Primary Survey amongst nurses, poor knowledge was kept as the reference point. The nurses with good knowledge had an AOR of 2.384 (95% CI: 0.57 - 2.94, p = 0.021). This indicated a significant association with emergency preparedness.

4.2.15 Description of Readiness Items Identified by the Key Informant

The table describes the number of items available concerning emergency preparedness for mass casualty incidents as described by the key informant

4.2.15.1 Table 4.8: Description of readiness items

Item	Yes/No
Hospital Disaster Preparedness (Yes = 5, No = 1)	
The hospital has a response plan (HEPRP)	Yes
The hospital has a disaster committee	Yes
The hospital has a response plan (HEPRP 001)	Yes
HDP covers external disasters	Yes

HDP is based on a structured plan	Yes
Trauma Preparedness (Yes = 2, No = 8)	
HDP is available in the hospital	No
Protocol exists for patient handover	Yes
Protocol exists for patient transfer	Yes
The trauma team is present	No
A trauma team activation protocol exists	No
Secondary trauma team activation exists	No
Ongoing in-house trauma preparedness exists	No
Clear identification of conveners is available	No
Trauma training has been conducted	No
Communication (Yes = 4, No = 3)	
Membership of the trauma team is clearly defined	No
The hospital has a dedicated trauma registry	No
Clear communication steps (e.g., telephone) are in place	Yes
Standardized disaster response steps exist	Yes
An emergency disaster plan is clearly defined	Yes
Staff are notified about disaster plans	Yes
Safety and Security (Yes = 4, No = 0)	
Provisions exist for disaster response	No
Arrangements for disaster emergencies exist	No
Communication systems for disasters exist	No
Triage (Yes = 4, No = 0)	
Hospital has controlled entry/exit points	Yes
HEPRP details are securely controlled	Yes
Crisis management procedures are in place	Yes
Logistics and Supply Management (Yes = 3, No = 1)	
Hospital has clear decontamination protocols	Yes
Supervisory roles exist in triage	Yes

Emergency care department is present	Yes
Human Resources (Yes = 2, No = 3)	
Key areas designated for emergency response exist	Yes
Hospital has a functional decontamination area	Yes
Adequate staff supply is ensured when necessary	Yes
Agreements exist for resource overstretch situations	Yes
Training and Education (Yes = 4, No = 4)	
Hospital has a mass casualty event response plan	Yes
Functional communication system exists for logistics	No
Institution has emergency management staff	Yes
Sufficient staff and patient care personnel exist	Yes
Hospital has a casualty management system	No
Communication structures for staff exist	No
Staff are allocated according to emergency needs	No
Staff receive regular disaster education	Yes
Surge Capacity (Yes = 0, No = 2)	
Training covers response to disasters	Yes
Emergency medicine training is included	Yes
Post-Delivery Recovery (Yes = 0, No = 2)	
Staff awareness programs are conducted	Yes
Disaster response sensitization is conducted	Yes
Hospital conducts disaster drills	No
Casualty management drills are performed	No
At least one unannounced drill is conducted every two years	No
Drills were conducted in the last 24 months	No
Institution has a plan for patient overflow	No
Hospital has plans to increase capacity	No
Institution can manage casualty incidents	No
Hospital conducts disaster post-action reporting	No

Incident debriefing documents exist	No	
Total cumulative percentage of related protocols and guidelines in place	Number	Percentage %
	32/60	**53**

The hospital demonstrates partial preparedness for emergencies, with strengths in structured disaster planning, triage, and some aspects of communication and training. It has key disaster preparedness components in place, including a response plan (HEPRP), a disaster committee, and coverage for external disasters. However, trauma preparedness is limited, as only two out of ten trauma-related preparedness measures are in place. Although patient handover and transfer protocols exist, the hospital lacks a trauma team, activation protocols, and ongoing trauma training.

In terms of communication, the hospital has four out of seven essential measures, such as standardized disaster response steps and staff notification systems. However, the absence of a trauma registry and clearly defined trauma team membership remains a concern. Safety and security measures are inadequate, with none of the four assessed provisions in place, indicating major gaps in disaster response arrangements and communication systems.

Triage was well-structured, with all four assessed components in place, including controlled entry and exit points and crisis management procedures. Logistics and supply management are fairly well-organized, with three out of four elements available, including decontamination protocols and supervisory roles, ensuring a structured approach to emergency care.

Human resources for emergency response remain inadequate, with only two out of five measures met. Although key areas for emergency response have been designated, there are no sufficient staffing agreements for resource overstretch situations. Training and education efforts show moderate preparedness, with five out of nine criteria met. The hospital provides disaster education and employs emergency management staff, but casualty management systems and structured communication for emergency staff are lacking.

Surge capacity is a major weakness, as none of the three assessed measures are in place, suggesting that the hospital lacks formalized plans for managing a sudden influx of patients. Post-disaster recovery is also insufficient, as the hospital does not conduct disaster drills, casualty management drills, or post-action reporting, highlighting critical weaknesses in post-disaster response and debriefing procedures. While the hospital has taken important steps in emergency preparedness, significant gaps in trauma readiness, safety and security, staffing, surge capacity, and post-disaster management could severely impact its ability to respond effectively to emergencies. Strengthening training, staffing, and surge capacity planning is essential for improving overall emergency readiness.

4.2.16 Descriptive assessment of physical resources for the management of airway and breathing at Nyangabwe Referral Hospital.

Effective airway and breathing management are a critical component of emergency and trauma care, particularly in high-acuity settings such as referral hospitals. Therefore, appropriate intervention in airway and respiratory emergencies can significantly reduce morbidity and mortality, especially during mass casualty incidents or critical trauma cases.

4.2.17 Table 4.9 shows available physical medical equipment at the casualty for the management of airway and breathing.

Item (unit)	**Available (Yes or no)**	**Number if applicable**
Oxygen supply/cylinder	Yes	+
Oropharyngeal airway	Yes	+
Suction unit-powered	Yes	
Suction tubes	Yes	+
Yanker or stiff suction	Yes	
Bag-value-mask	Yes	+
Nasogastric tubes (P^* A^*)	Yes	+
Laryngoscope (P^* A^*)	Yes	+
Magill forceps	No	-
Endotracheal tubes	Yes	+
Hard neck collar	Yes	+
Spine boards	Yes	+
Pulse oximeter	Yes	+
Ventilator machine	Yes	2
Underwater drain set (P^* A^*)	Yes	
Crash cart trolleys (P^* A^*)	Yes	2
Crash cart trolley maintenance protocol	Yes	
Portable X-ray machines	AH	
CT scanner	AH	
MRI	AH	
Chemistry analyzer	AH	
Chemistry analyzer	AH	
Hematology analyzer	AH	
ECG monitor	Yes	
Defibrillator	Yes	1

Key: AH= available in the Hospital, P^*=pediatric, A^*=adult, + = adequately available

This assessment indicates that NRH is well-equipped with oxygen supply, oropharyngeal airways, suction units, bag-valve masks (BVMs), endotracheal tubes, nasogastric tubes, laryngoscopes, hard neck collars, spine boards, pulse oximeters, ventilator machines (2 available), and crash cart trolleys (2 available).

However, notable deficiencies include no Magill force making it difficult to remove airway obstructions, which is critical in emergency airway management. The limited number of portable ventilators (only 2 available) may not be sufficient in a mass casualty scenario requiring mechanical ventilation for multiple patients, especially those that need transfer to other hospitals due to limited ICU beds.

4.2.18 Advanced Diagnostic and Monitoring Equipment

Several essential diagnostic tools such as X-ray machines, CT scanners, MRI, chemistry analysers, hematology analyzers, ECG monitors, and defibrillators (1 available) are present. These are critical in trauma assessment and resuscitation. However, the availability of these resources across different hospital departments (AH - Available in Hospital) rather than exclusively in the casualty/emergency unit may delay rapid diagnosis and intervention.

4.2.19 A descriptive assessment of physical resources for the management of circulation in an emergency room/casualty and other equipment.

This section presents a descriptive assessment of the physical resources available for circulation management in the emergency room/casualty unit at Nyangabwe Referral Hospital. It examines the availability, and operational status of equipment essential for circulatory support, as well as any additional tools required for broader emergency care. The assessment aims to identify existing strengths and gaps in the hospital's capacity to manage circulatory emergencies effectively, thereby supporting efforts to strengthen preparedness.

4.2.19.1 **Table 4.10 shows the physical medical equipment at the casualty for the management of circulation and other equipment**.

Item (unit)	**Available (yes/no)**
Cannular (14, 16, 18) (P* A*)	Yes
Central venous catheters	Yes
IVF crystalloids	Yes
Fluid warming equipment	Yes
Focused Assessment Sonography (FAST)	No
Central venous pressure monitoring	No
Arterial pressure monitoring	No
Blood transfusion capacity	Yes
Foley catheter (P* A*)	Yes
BP machines & cuffs	Yes
Other equipment	
Emergency operating theatre	No

Adult ICU beds	6
Pediatric ICU beds	None

Key: P*=pediatric, A*=adult, ICU = intensive care unit

4.2.20 Availability of Essential Equipment for Circulation Management

The assessment reveals that basic resuscitation tools such as intravenous cannulas (14, 16, 18 gauge), central venous catheters, IV crystalloids, and fluid warming equipment are available. The equipment is crucial for rapid volume resuscitation and circulatory support. The blood pressure machines and cuffs ensure proper hemodynamic monitoring during emergencies. Additionally, Foley catheters are essential for monitoring urine output as an indicator of perfusion and fluid balance.

However, critical deficiencies exist in advanced monitoring and resuscitation capabilities. Focused Assessment Sonography for Trauma (FAST), central venous pressure monitoring, and arterial pressure monitoring. The absence of these tools significantly limits real-time assessment of internal bleeding, and hemodynamic instability, which are crucial in managing massive haemorrhage in trauma patients. Similarly, the emergency department lacks an emergency operating theatre essential for immediate surgical interventions in patients requiring urgent haemorrhage control. Furthermore, there is a severe shortage of critical care beds, with only six adult ICU beds available and no paediatric ICU beds, limiting the facility's ability to manage critically ill patients, particularly children, after initial stabilization.

4.2.21 Emergency preparedness for mass casualty incidents (MCIs) requires a well-equipped hospital with multidisciplinary trauma support services.

The availability of specialists significantly impacts a hospital's ability to provide life-saving interventions in collaboration with other specialties. The descriptive assessment of trauma support services highlights the strengths and gaps in specialist availability.

4.2.21.1 Table 4.12 shows some of the specialists available in the hospital.

Specialist	Available (Yes/ No)	Number
General Surgeon	Yes	2
Anesthesiologist	Yes	1
Pediatric Surgeon	No	
Orthopedic surgeon	Yes	2
Neurosurgeons	Yes	1
Vascular surgeon	No	
Thoracic surgeon	No	
Maxillofacial surgeon	Yes	1
Radiologist	Yes	1
Urologist	Yes	1
Nurse-anesthetists	Yes	9
ENT surgeon	Yes	1
Intensive care Nurse	Yes	2

The presence of key specialists indicates that the hospital has some capacity to handle major trauma cases, particularly in areas critical for emergency surgeries and resuscitation: General Surgeons (2), essential for performing emergency trauma surgeries, including abdominal and soft tissue injuries. Orthopaedic Surgeons (2) for managing fractures, musculoskeletal injuries, and limb preservation in high-impact trauma. Neurosurgeons (1) for treating head and spinal cord injuries, common in MCIs. Maxillofacial Surgeon (1), management of facial trauma and complex soft-tissue injuries. ENT Surgeon (1) for facial trauma, and specialized head-neck injuries. Radiologist (1) supports rapid imaging for trauma assessment, essential for decision-making in life-threatening cases. A urologist (1) is necessary for managing genitourinary trauma. Anaesthesiologist (1) and nurse anesthetists (9) are important for managing airway, pain management, and anaesthesia during emergency procedures. Lastly, Intensive Care Nurses (2) also play a key role in post-surgical and critical care management for severely injured patients. The limited availability of specialists in key areas may delay emergency procedures due to a low specialist-to-patient ratio, especially in neurosurgery and general surgery. This may necessitate patient referral to other facilities for specialized procedures leading to time-sensitive complications, and increased mortality.

4.3 Conclusion

The study reveals a complex landscape of emergency preparedness within the hospital based on data from 184 respondents (86% response rate). The analysis, conducted using SPSS, highlighted several key areas. The socio-demographic characteristics indicate the majority of respondents were female (68%), aged 31-35 years (29%), and held a Diploma/OND/NCE (82%). Most had 5-10 years of work experience (37%). On emergency preparedness, 66% of respondents reported the existence of guiding policies. However, the implementation and visibility to all staff remain limited as evidenced by only 30% reporting these policies were visible to all staff. Overall, emergency preparedness awareness was categorized as knowledgeable (36%), moderate knowledgeable (39%), and well knowledgeable (24%). Similarly, nurses demonstrated varying levels of awareness regarding emergency preparedness, with 41% categorized as low awareness. The varying levels of knowledge and attitudes toward emergency preparedness underscore the importance of targeted training initiatives. A significant proportion of respondents demonstrated below-average knowledge, emphasizing the necessity for comprehensive training programs. Participation in training or drill activities was also low, with 59% not having engaged in relevant educational activities within 1-2 years. Nurses' attitudes towards emergency preparedness activities indicated that 57% expressed a strong need for knowledge in emergency preparedness. About 55% exhibited a poor attitude towards participation in emergency response activities.

The near-equal distribution of nurses with good and poor knowledge of the primary survey in patient management indicates that almost half of the participants (50.5%) demonstrated poor knowledge, while 49.5% had good knowledge of the primary survey. This finding points to a crucial gap in essential patient assessment skills, necessitating focused training to improve nurses' ability to effectively assess and manage critically ill or injured patients during emergencies.

The Chi-square test results identified significant associations between emergency preparedness participation and job title, gender, work experience, knowledge level, and knowledge of the primary survey. Furthermore, the multivariate binary logistic regression analysis reinforced these findings, confirming the importance of job title (promotions), gender, work experience, and knowledge level as key determinants of good emergency preparedness. These factors should be prioritized in the design and implementation of future interventions.

On the assessment of physical medical resources, the hospital was generally well-equipped for airway and breathing management but lacked critical tools like Magill forceps and had limited ventilators. Advanced monitoring equipment was also insufficient. Furthermore, trauma support services and key specialists were available, including general and orthopedic surgeons. However, gaps in trauma readiness, the absence of the emergency theatre, and inadequate staffing ratios could hinder timely interventions.

Finally, statistical analysis significant associations were found between emergency preparedness and factors such as job title, gender, work experience, knowledge level, and attitude toward emergency preparedness. The hospital was also found to have made strides in emergency preparedness, however, significant gaps remain in trauma readiness, staff training, and resource availability that need to be addressed to improve response capabilities during emergencies.

CHAPTER 5

DISCUSSION OF THE RESULTS

5.1 Introduction

The chapter presents a comprehensive discussion of the results comparing professional knowledge, and findings from the current study, and incorporates relevant literature to provide an understanding of the current state of preparedness for MCIs at NRH. Furthermore, the chapter discussed factors influencing emergency preparedness regarding specific objectives. Furthermore, factors that were exposed during data analysis, but were not part of the objectives, were also discussed. These factors include socio-demographic characteristics, nurses' knowledge, attitudes, training on emergency preparedness, medical resources, trauma-related services, policy framework, and protocols. Given the complexity and unpredictability of MCIs, it was essential to assess the level of emergency preparedness among nurses and the institution in specific areas to identify factors influencing the current state of preparedness. The chapter commenced with a discussion on the socio-demographic characteristics of the participants, followed by other factors. The study findings' implications regarding the nursing practice, education, administration, and research as well as recommendations were also discussed. Furthermore, the findings dissemination strategy, strengths, and limitations of the study were also postulated.

5.2 Socio-demographic characteristics of participants

The demographic characteristics included academic qualifications, marital status, age, work experience, gender, group job title, and employment category**.** The sample was predominantly female nurses (68%), while males accounted for 32%. This sample was consistent with current literature, which indicates that nursing was considered to be predominantly female. A study by Alice et al (2022) highlighted that their study had a sample of nurses comprising of 64% females and 36% males with an age category of 21-40. However, a study by Masibo et al., (2024) found an increasing trend of male nurses, especially in emergency departments in Tanzania. Furthermore, most participants fell within the age range of 31-40 years, about 55% of the total sample. The dominant age category was also consistent with the results of a study by Suamchaiyaphum et al. (2024) that had an age distribution within the same range among emergency department nurses in India. This age range is considered a critical period in a nurse's career, as they have gained sufficient experience to develop expertise in triage to manage patients during emergency crises, and are still energetic and motivated to provide quality care (Wolf et al., 2018). Additionally, 42% of the participants were married, while 54% were single. These demographic factors can influence workforce characteristics and resilience during emergencies (Amaitari et al., 2020). The current study revealed that there was no statistically significant association between respondents' socio-demographic characteristics and the level of emergency preparedness. Age Group ($p = 0.563$), ($p = 0.025$ Marital Status ($p = 0.269$) Academic Qualification ($p = 0.492$) and Category of Employee (management or general duty) ($p = 0.403$) including those who participated in emergency preparedness' and Response Plan (EPRP) before ($p = 0.72$).

The analysis indicates that gender was another significant factor ($p = 0.025$), with male nurses showing a higher level of preparedness than their female counterparts. Similarly, in the moderate emergency preparedness category, females had significantly lower odds compared to males (AOR =

0.795, p = 0.011), indicating that male nurses might be more prepared for emergencies, despite female nurses dominating the respondent's pool. However, the relationship was not statistically significant. The multivariate analysis also indicated that gender was not a significant predictor of emergency preparedness (AOR = 0.67, p = 0.114). The analysis shows that gender did not influence emergency preparedness, both male and female respondents displayed similar levels of awareness and attitudes towards emergency response. This suggests that emergency preparedness training and protocols are universally applicable across genders. The results were consistent with a study by Alice et al., (2022) that found no statistically significant association between socio-demographic characteristics and emergency preparedness. Similarly, a study by Suamchaiyaphum et al., (2024) also found no significant association between gender and triage knowledge. However, some studies suggest that gender disparity in the nursing workforce can have implications for emergency preparedness. A study by Tichy et al. (2018) found that gender disparities in emergency preparedness were influenced by varying levels of participation in disaster training programs. Therefore, those who participate more in these preparedness activities may have an upper hand in preparedness than others. Similarly, a study by Azizpour et al., (2022) found that women in nursing often play a crucial role in patient-centered care and exhibit strong communication and teamwork skills, which are vital during mass casualty incidents. However, the study suggests that gender-related challenges such as physical demands, workplace discrimination, and role expectations may affect the overall efficiency of emergency response efforts. Additionally, a study by Blanchette et al., (2023) found that male nurses are more likely to take leadership roles in emergency scenarios, particularly in high-risk and physically demanding tasks, while female nurses may excel in patient care and emotional support. However, this lack of significant association between gender and emergency preparedness awareness is consistent with Alice et al (2022) and Suamchaiyaphum et al. (2024), which reveals that gender was not a predictor of good emergency preparedness awareness.

Furthermore, the finding indicates that the age groups (p = 0.563) were not statistically significant in emergency preparedness awareness. The results indicated that emergency preparedness is not influenced by age despite the majority of respondents categorized under aged 31-35 years (29%), followed by 36-40 years (26%) and 41 years and above (27%). This was consistent with a study by Alice et al (2022), it was found that age had no significant association with emergency preparedness. However, A study by Gabbe et al., 2020 found that work experience plays a crucial role in determining their ability to handle high-pressure emergencies effectively. The study continues to show that younger nurses, particularly those aged 20-25 years (4%) and 26-30 years (14%), may have less exposure to emergency scenarios, potentially affecting their confidence and efficiency in handling MCIs. This was consistent with the current results as younger and less experienced nurses showed less confidence in their triage abilities as compared to more experienced nurses. However, the literature indicates that younger nurses may be more adept at adopting new technologies or protocols related to emergency preparedness, while older and more experienced nurses may be entrenched in outdated practices, (Joshi et al., 2022). Therefore, targeted training programs should be developed to enhance the skills of younger, less experienced nurses and update older experienced nurses on new emergency preparedness techniques. This discrepancy suggests that while age may not be a significant factor in some settings, it could play a role in other areas, possibly due to differences in training and experience.

Marital status (p = 0.269) was not significantly associated with emergency preparedness. This finding suggests that a nurse's personal life circumstances, such as being married, single, or divorced, do not significantly influence their ability to respond effectively to mass casualty incidents. Prior research supports this notion, emphasizing that emergency preparedness is more closely tied to professional experience, training, and institutional support rather than individual domestic factors (Smith et al., 2020). Moreover, previous studies indicate that professional roles and responsibilities often take precedence over personal circumstances in determining emergency response effectiveness (Jones et al., 2019). This aligns with the findings from Almutairi et al. (2018), the study concluded that workplace culture and organizational preparedness programs are stronger predictors of emergency readiness than marital or family status. Consequently, institutions should prioritize competency-based training and simulation exercises over assumptions about personal circumstances when developing emergency preparedness programs. Therefore, marital status is not a predictor of good emergency preparedness awareness as per the study results.

Similarly, academic Qualification (p = 0.492) did not have a significant association with emergency preparedness or higher qualification did not translate into better emergency preparedness. The majority of respondents had a Diploma qualification (82%). A study in Indonesia by Widyani et al., (2020) found no significant association between the level of nursing education and triage knowledge among emergency department nurses). This suggests that formal education alone may not be sufficient to equip nurses with the practical skills needed for emergency response, emphasizing the need for targeted emergency training programs. On the contrary, higher educational attainment has been linked to better preparedness and decision-making in emergency response (Azizpour et al., 2022). Similarly, a study by Chu et al., (2022). found that higher academic qualifications correlated with a better understanding of emergency preparedness concepts and disaster response protocols. The study continues to show that nurses with higher education levels are more likely to engage in critical thinking and advanced problem-solving during emergencies. They are also likely to exhibit a greater understanding and agreement on the need for emergency training compared to those with lower qualifications. Similarly, a study done in Saudi Arabi by Medina et al, 2021) found that the level of knowledge on triage varied with the highest educational attainment. The study elaborates that the higher education the more decision-making capacity, those with a degree or master as a major in emergency management had good decision-making during triage. Therefore, given that the majority of respondents had a diploma qualification, there may be a gap in theoretical knowledge regarding emergency management. This highlights the importance of advanced education in fostering specialized knowledge and preparedness for disaster response. However, since the current study results are consistent with the study findings by Widyani et al., (2020), it suggests that academic qualifications may not translate into better emergency preparedness. This meat that formal education alone may not be sufficient in equipping nurses with the practical skills needed for emergency response. Therefore, emphasizing the need for targeted emergency training programs tailored for nurses with different educational backgrounds to bridge knowledge gaps and enhance overall preparedness.

The results also showed that most respondents were general duty or other staff (94%), while management staff accounted for only 6%. A study by Blanchette *et al*., (2023) found that although frontline nurses are indispensable and essential in emergency preparedness for mass casualty incidents,

as they provide immediate medical care, coordinate response efforts, and support affected individuals. Management staff are crucial in policy formulation, resource allocation, and coordination efforts. Therefore, limited representation of management personnel in the current study may suggest a potential gap in leadership perspective regarding strategic planning for MCIs (Gabbe et al., 2020). However, efforts should be made to integrate emergency preparedness training at all levels, ensuring that general duty staff and management personnel are adequately equipped to handle mass casualty incidents. The results showed that a type of employment, whether management staff or general duty nurses ($p = 0.403$) did not have a significant relationship with emergency preparedness. This could indicate that emergency preparedness is more dependent on direct exposure and training than job classification. Previous studies have highlighted that effective emergency response is more closely linked to hands-on experience and regular participation in preparedness drills rather than hierarchical position within an organization (Almutairiet al., 2018). Similarly, a study by Smith, et al., (2020) found that frontline healthcare workers often acquire practical emergency response skills through real-world experience, regardless of their job classification. Therefore, while management staff may play a crucial role in policy implementation and strategic planning, the actual emergency preparedness is shaped more by direct involvement in emergencies and training programs. Therefore, the category of employment was not a predictor of emergency preparedness. The statistical insignificance or lack of association between demographic factors and emergency preparedness in this current study suggests that emergency preparedness may be influenced by other factors, but not socio-demographic characteristics.

5.2.1 Work experience and emergency preparedness

The findings indicate that work experience significantly influences emergency preparedness among nurses ($p = 0.029$), 5-10 years (AOR 0.503 (1.67-2.61)) ($p = 0.021$) and 10-15 years (AOR 0.386 (2.78 – 3.03) ($p = 0.043$). Work experience had a statistically significant effect in emergency preparedness, despite its initial exclusion from the proposed tested objectives. Nurses with over 10 years of experience demonstrated higher odds of emergency preparedness than those with two or fewer years of experience. This showed that professional exposure, accumulated knowledge, and hands-on practice play a crucial role in equipping nurses with the skills and confidence needed to respond effectively in emergencies. These findings were consistent with studies that corroborated the link between work experience and emergency readiness. A study in Saudi Arabia by Al Thobaity et al. (2019) found that nurses with more than 10 years of experience had significantly higher confidence and competency in handling emergency cases, particularly in mass casualty incidents. The study concluded that repeated exposure to high-stress situations helps nurses develop critical decision-making skills, leading to better patient outcomes in emergencies. Similarly, a study by Labrague et al. (2018) found that those with extensive clinical experience scored higher in both theoretical knowledge and practical application. Experienced nurses were better at triage, resuscitation, and crisis management, indicating that real-world exposure fosters a deeper understanding of emergency protocols. Another study in Australia by Hammad et al. (2021) found that nurses with longer work experience exhibited greater situational awareness, better adherence to protocols, and superior teamwork skills. The authors highlighted that experienced nurses were more likely to take leadership roles during emergencies, ensuring a coordinated and efficient response. Literature continued to show that nurses with more experience tend

to exhibit greater competency in triage and emergency decision-making as they possess exponential hands-on experience and extensive knowledge (Ayenew et al., 2022). Furthermore, experienced nurses are likely to be more adept at crisis management, having encountered a broader range of emergencies (Joshi et al., 2022). On the contrary, some studies suggest that structured training and education can compensate for a lack of experience. A study by Baack and Alfred (2017) found that newly graduated nurses who underwent intensive emergency preparedness training performed at similar levels to their more experienced counterparts. The study found that well-designed simulation-based training programs can help bridge the experience gap, allowing less experienced nurses to develop competency in emergency management. Additionally, a study by Ingrassia et al. (2020) emphasized the impact of continuous education and drills over mere work experience. These findings revealed that nurses who participated in frequent disaster response simulations demonstrated higher preparedness levels regardless of their years of experience. This implies that hospitals should not rely solely on years of service as a determinant of competency but should instead invest in regular training programs to ensure all nurses are adequately prepared. However, the study results are consistent with the findings from Hammad et al. (2021); Labrague et al. (2018), therefore, work experience influenced emergency preparedness. Therefore, the study results reject the null hypothesis and adopt the alternative hypothesis.

5.3 The level of Awareness on policy and preparedness programs concerning emergency preparedness

The current study results highlight that the level of awareness on policy and preparedness programs significantly influences emergency preparedness, with statistical significance ($p = 0.001$). More specifically, nurses categorized under moderate awareness had an adjusted odds ratio (AOR) of 1.08 (1.84–4.34, $p = 0.011$), while nurses under the high awareness category had a higher AOR of 4.001 (0.57–0.94, $p = 0.021$). These results align with the literature indicating that enhanced knowledge through education and training improves emergency preparedness awareness (Schmidt et al., 2019). The study also highlighted the importance of knowledge in emergency preparedness among healthcare workers. According to Al Khalaileh et al. (2021), nurses with a solid understanding of disaster preparedness principles demonstrate superior competency in responding to emergencies. This is also supported by Labrague et al. (2018), who found that disaster preparedness training significantly enhances nurses' confidence and effectiveness during a crisis. Similarly, a systematic review by Baack & Alfred (2019) emphasizes that a lack of knowledge about emergency protocols directly correlates with lower preparedness levels and ineffective emergency responses.

For instance, about 55% of respondents agreed that they knew where to access the hospital's emergency preparedness and response plan, while a concerning 24% of respondents either disagreed or strongly disagreed. This indicates a gap in the implementation despite the availability of emergency preparedness policies and plans. However, these results are consistent with a study by Rehana et al (2017) who found that participants (nurses) demonstrated a good knowledge of disaster or emergency preparedness and its management. The study elaborated that the overall good knowledge or awareness was at 65.4%. However, the practices were found to be poor with overall poor practices at 83.3%. The lack of visibility could have hindered effective emergency response and suggested a need for improved communication and dissemination of the policy. The results at NRH also correlate with a study by

Hammad et al. (2021) which found that although emergency preparedness policies exist in many hospitals, their effectiveness is often hindered by poor dissemination and inadequate staff engagement. Similarly, Farra et al. (2022) report that healthcare workers frequently lack familiarity with emergency protocols despite their formal existence, leading to discrepancies in emergency preparedness and response. The overall emergency preparedness awareness shows that only 24% of respondents were categorized under the "high awareness". These results underscore the critical role of continuous education, training, and capacity-building programs in improving emergency preparedness among nurses. Studies have demonstrated that targeted educational interventions significantly enhance nurses' competencies in disaster response (Baack & Alfred, 2020). Similarly, Labrague et al. (2018) emphasized that simulation-based training and regular drills improve confidence and readiness among nursing professionals.

Furthermore, the current study results align with global trends as literature indicates that nurses and other healthcare staff often exhibit low-to-moderate preparedness levels due to limited training and experience with mass casualty incidents. A study by Ayenew et al. (2022) found that only 28% of healthcare workers in their study demonstrated high preparedness, similar to the 24% in the "high awareness" category. Similarly, Joshi et al. (2021) report that hospitals where ongoing emergency training is mandatory show significantly higher levels of staff preparedness compared to those where training is sporadic or optional. Studies suggest that hospitals implementing regular emergency drills, scenario-based simulations, and structured training programs significantly improve staff competency. This is supported by Chu et al. (2022), the study found that emergency preparedness scores improved by over 40% in hospitals that conducted bi-annual drills compared to those that did not. Similarly, on-going professional development, such as workshops, online courses, and hands-on training, has been identified as essential in equipping nurses with the necessary skills for emergency response (Smith *et al*, 2020). The integration of emergency preparedness training into nursing curricula has also been recommended as a proactive strategy to bridge knowledge gaps and ensure that newly trained nurses are adequately prepared for real-world disaster scenarios (Hammad et al., 2017). Additionally, studies suggest that organizational support in terms of access to training resources, mentorship programs, and clear emergency protocols plays a crucial role in maintaining high preparedness levels among nurses (Almutairi *et al*., 2018). A study by Al Thobaity et al. (2022) highlights that hospitals with well-publicized emergency plans tend to have better staff awareness and preparedness. The study found that institutions that use multiple communication channels (e.g., posters, digital alerts, training sessions) improve awareness and compliance with emergency policies. The low visibility in the study suggests that efforts should focus on making policies more accessible and incorporating them into daily operations, as recommended by WHO guidelines on hospital emergency preparedness (2023).

Participation in training and drills emerged as a major concern, with 59% of respondents acknowledging that they had not participated in any educational activity related to emergency preparedness in the past one to two years. However, the hospital was found to be at fault as it does not conduct such activities regularly. On the contrary, the literature demonstrates that training is crucial for ensuring preparedness, as supported by the findings of Medina et al. (2021). Additionally, the World Health Organization (2013) hospital emergency response checklist highlights training as a key component of hospital preparedness. The current study results indicated that an overwhelming 81% of

respondents strongly endorsed the need for more staff training and drills. This consensus highlights an opportunity for the hospital to implement structured training programs, guided by best practices outlined by the WHO (2020) and recommendations from Seeger et al. (2021) on strategic communication for disaster response. The current study results were consistent with the literature that the level of awareness on policy and preparedness programs influences emergency preparedness. Therefore, the study rejects the null hypothesis and adopts the alternative hypothesis as some factors influence emergency preparedness.

5.4 Attitudes and emergency preparedness

The study findings highlight a varied range of attitudes among nurses regarding emergency preparedness. A good attitude was associated with significantly higher odds of poor emergency preparedness (AOR = 2.588, p = 0.021), which is counterintuitive and suggests that positive attitudes alone do not translate into good preparedness. This finding may indicate that while enthusiasm and willingness to respond to emergencies are important, they do not necessarily equate to practical preparedness without adequate training and experience. Similar studies have found that despite positive attitudes toward disaster response, nurses may still lack the essential skills and competencies required for effective emergency management. A study in Indonesia by Salmawati et al (2022) found that there was no relationship between knowledge (p=0.774) and attitude (p=546) with emergency preparedness awareness. This suggests that a positive mindset alone does not guarantee adequate preparedness. This could be related to overconfidence, lack of awareness, passive reliance, or an "it won't happen to me" bias. On the contrary, a study in Venezuela by Maleki et al (2018) found that nurses with a good attitude had good knowledge of emergency preparedness. The study continues to show that the more training programs nurses were exposed to, the more their attitude improved. This suggests that a good attitude correlates with good knowledge. However, the study results are consistent with studies done by Salmawati et al (2022) indicating a limitation on the significance of the association of nurses' attitudes toward emergency preparedness.

Contrarily, in the moderate awareness category, those with a good attitude had significantly higher odds of being prepared (AOR = 3.186, p = 0.029), reinforcing the idea that attitude alone may not be sufficient but does contribute to moderate levels of preparedness. Research by Labrague et al. (2018) found that while positive attitudes encourage participation in training programs, sustained emergency readiness is ultimately dependent on continuous education, practical drills, and hands-on experience. Therefore, fostering a proactive attitude towards emergency preparedness should be coupled with structured training programs to ensure both enthusiasm and competency in disaster response. Similarly, Shanableh *et al.*, (2023) conducted a study in the United Arab Emirates and found that health professionals had moderate levels of knowledge, positive attitudes, and high readiness to engage in disaster management.

Although a significant proportion of respondents demonstrated a positive attitude toward disaster preparedness, a notable percentage exhibited hesitancy, raising concerns about overall readiness in the healthcare facility. The data presented in Table 4.4 indicated that a significant majority of respondents (99%) recognized the necessity of understanding disaster and emergency preparedness planning, with 57% strongly agreeing and 42% agreeing. This consensus aligns with existing literature emphasizing

the importance of equipping nurses with adequate knowledge and skills to manage disasters effectively (Medina et al., 2021; Joshi et al., 2022). Similarly, a study by Labrague et al. (2018) found that nurses' knowledge significantly influences their attitude and preparedness levels. This suggests that educational interventions are essential in enhancing disaster readiness. Additionally, a study conducted in Iran, by Tassew et al (2022) found that respondents who had good knowledge or awareness were more likely to have positive attitudes than those with poor awareness. The study also found that those with work experience of five years or more were more likely to have a positive attitude than those with less than five years. This literature was consistent with the study findings as most nurses with good attitudes and high awareness had work experience between 5-15 years. Similarly, Labrague et al. (2018) highlighted that a lack of training and experience may correlate with feelings of unpreparedness and decreased confidence in disaster response capabilities. The study underscores the necessity for comprehensive disaster preparedness programs and continuous education to enhance nurses' competencies in this area.

Furthermore, despite the overwhelming recognition of the need for knowledge on emergency preparedness planning (57% strongly agreed, 42% agreed), willingness to actively engage in emergency response varied. This suggests an understanding of the importance of preparedness at a cognitive level. However, this awareness doesn't necessarily translate into a willingness to participate actively. Additionally, when asked about willingness to report to work during a disaster despite being off-duty, a substantial 21% were undecided, and 11% explicitly disagreed or strongly disagreed. This hesitancy could stem from various factors such as concerns for personal safety, family responsibilities, or a lack of confidence in their preparedness. Studies have consistently shown that perceived self-efficacy and confidence in one's ability to handle emergencies significantly influence willingness to respond. A recent study by Park et al. (2023) found that nurses with higher self-efficacy were significantly more likely to report a willingness to respond to a disaster, even when off-duty. Similarly, a study by Labrague et al. (2018) noted that nurses' willingness to respond is often contingent upon their confidence in their skills and the support systems in place. Additionally, Janizadeh et al (2023) suggest that a work culture that does not prioritize emergency preparedness can lead to apathy among staff. The study continues to suggest that while many nurses are committed to participating in emergency responses, factors such as personal safety, family responsibilities, and perceived competence can influence their decisions. This corresponds to the reluctance of some nurses to report for duty during emergencies when off duty. Although 52% agreed and 17% strongly agreed to return to work in the event of a large-scale disaster, 21% were undecided, and a combined 11% (9% disagreed, 2% strongly disagreed) were unwilling. Literature suggests that factors such as personal safety, work-life balance, and institutional support influence healthcare workers' willingness to respond to disasters (Seeger, Islam & Seeger, 2021; Khirekar et al., 2023). Strengthening hospital preparedness and addressing the underlying concerns through policy improvements and incentives may enhance nurses' willingness to participate in emergency response efforts.

The survey also explored the issue of incentives. Although 53% agreed and 10% strongly agreed to participate in emergency response activities *without* incentives, a significant number (12% disagreed, 7% strongly disagreed). This underscores the need to explore the role of incentives, recognition, and support systems in motivating nurses and other healthcare workers to actively engage in emergency

preparedness. Literature suggests that healthcare workers are more likely to participate in emergency response when they feel valued, supported, and adequately compensated for their efforts. A systematic review by Manzoor et al. (2024) found that a combination of financial incentives, recognition programs, and access to mental health support significantly improved healthcare workers' willingness to participate in disaster response. Similarly, literature cited that trained staff with good knowledge, a supportive work environment, and adequate resources are more likely to have a positive attitude at work and participate accordingly, as they often have confidence, (Janizadeh et al 2023).

Foremost, considering the use of incentives, recognition, and compensation to motivate participation in emergency preparedness may also improve willingness to participate. A study by Kane et al. (2024) found that providing financial incentives and opportunities for professional development significantly increased nurses' willingness to participate in disaster response.

The perception of other healthcare personnel's attitudes toward emergency preparedness was also a concern. Nearly 41% of respondents either disagreed or strongly disagreed that their colleagues exhibited a positive attitude toward emergency preparedness. This finding aligns with previous studies indicating that a lack of collective preparedness culture among healthcare workers can hinder effective response efforts (Ojo, Oluwadiya & Akanni, 2022; Nik et al., 2018). Additionally, 88% of nurses agreed that untrained personnel contribute to the loss of lives and property during emergencies, further highlighting the need for ongoing training programs in emergency preparedness (Mwandri & Hardcastle, 2018).

A particularly notable finding was the perception of hospital preparedness. About 42% of nurses believed that their hospital was adequately prepared to manage disasters with a large influx of patients, while 44% disagreed or strongly disagreed. This suggests a lack of confidence in institutional emergency preparedness measures, consistent with findings from previous studies that have highlighted gaps in hospital disaster planning and response strategies (Khirekar et al., 2023; Medina et al., 2021). Hospitals must implement quality improvement strategies to enhance their emergency response capabilities, as proposed by Kovoor et al. (2022). Literature supports these findings as studies have highlighted a lack of adequate training in low- and middle-income countries, particularly the Sub-Saraha region, (Tassew *et al.*, 2022).

Furthermore, the overall attitude assessment showed that 55% of respondents had a poor attitude toward emergency preparedness, while only 45% demonstrated a good attitude. This contradicts the findings in Saudi Arabia by Nofal et al 2017, which found that overall physicians and nurses showed a satisfactory level of knowledge and positive attitude toward disaster and emergency preparedness. Similarly, Shanableh *et al.*, (2023) a study conducted in the United Arab Emirates found that health professionals have moderate levels of knowledge, positive attitudes, and high readiness to engage in disaster management. This suggested a pressing need for interventions, such as incorporating structured mass casualty incident preparedness programs, as suggested by Joshi et al. (2022), which may improve nurses' preparedness and overall attitudes toward emergency response. These programs may include mandatory training programs, policy reinforcement, and motivational strategies, to enhance nurses' and other health workers' commitment to emergency preparedness.

5.5 Nurses' Knowledge of the Primary Survey and Emergency Preparedness

The findings in Table 4.5 of the current study indicate a near-equal distribution between respondents with good knowledge (49.5%) and those with poor knowledge (50.5%) regarding the management and utilization of the primary survey. Nurses with good knowledge demonstrated a significantly higher adjusted odds ratio (AOR) of 2.384 (95% CI: 0.57 - 2.94, p = 0.021), highlighting a strong association between knowledge of the primary survey and improved emergency preparedness. This finding reinforces the importance of training and education in emergency assessment protocols as key determinants of preparedness. This aligned with the study by Azizpour et al. (2022), who found a direct correlation between nurses' knowledge of disaster preparedness and their ability to make effective triage decisions. The primary survey is a systematic approach used in emergency care to rapidly assess and manage life-threatening conditions, following the Airway, Breathing, Circulation, Disability, and Exposure (ABCDE) framework (American Heart Association [AHA], 2020). Proper execution of this process enables healthcare providers to prioritize life-saving interventions, reducing mortality and morbidity in critical care situations. The AHA (2020) emphasizes that adherence to primary survey protocols significantly improves patient outcomes by ensuring the timely identification and treatment of critical conditions.

Although the current study showed that nearly half of the respondents had adequate knowledge of the primary survey, a considerable proportion (50.5%) may struggle with its correct application. This gap in knowledge and application aligns with findings from other studies that highlight disparities in nurses' proficiency in emergency assessment procedures. Similar studies have reported varying levels of knowledge and competency among nurses regarding the primary survey and emergency preparedness. A study conducted by Alrazeeni et al. (2017) in Saudi Arabia found that only 46.8% of emergency nurses demonstrated adequate knowledge of the primary survey, a proportion comparable to the 49.5% in the current study. A study conducted in Iran (Azizpour et al., 2022) reveals that emergency nurses lacked knowledge of triage, leading to potential harm to victims. This suggests that knowledge gaps in emergency assessment protocols may be a widespread issue across different healthcare systems. Similarly, some studies have reported even lower knowledge levels among nurses regarding emergency assessment procedures. A study by Hammad et al. (2017) found that only 39% of nurses in Australia could correctly apply the primary survey, citing limited hands-on training and exposure to real-life emergency scenarios as major contributing factors. Similarly, Fung et al. (2020) identified a lack of confidence and knowledge gaps in performing rapid patient assessments among nurses in Hong Kong, emphasizing the need for continuous professional development and simulation-based learning. Furthermore, the results correlate with a study conducted in Botswana by Mwandri and Hardcastle,(2018). The findings showed inadequate knowledge on initial trauma care amongst emergency department healthcare providers. This inadequate knowledge was linked to poor patient outcomes during case management. However, the current study has gone further to sample nurses from the entire hospital as opposed to just the emergency department. Therefore, the study results gave a picture of the entire institution. Additionally, about 38% of respondents acknowledged the importance of preventing secondary brain injury by administering high-flow oxygen, and no respondents selected the correct response for ensuring airway protection. This reveals gaps in knowledge regarding

neurological stabilization in trauma patients, consistent with previous studies that highlight deficiencies in emergency care training among nurses (Labrague et al., 2018).

In contrast, a study by Labrague et al. (2018) in the Philippines revealed a slightly higher level of preparedness among nurses, with 62% demonstrating good knowledge of emergency assessment procedures. The authors attributed this to the integration of disaster preparedness training within nursing curricula, reinforcing the importance of formal education in improving competency levels. Additionally, a study conducted by Williams et al. (2021) in the United States found that nurses with structured training in trauma assessment exhibited significantly better performance in executing the primary survey, with 75% demonstrating proficiency. This highlights the potential impact of structured, recurrent training programs in enhancing nurses' emergency preparedness

These findings contrast with studies conducted in high-resource settings where emergency training is mandatory. For example, Patel et al. (2018) found that in countries with well-established emergency care systems, such as Canada and the United Kingdom, knowledge and competency in primary survey execution were significantly higher, ranging from 70% to 85%. This suggests that institutional support, standardized training programs, and regular drills contribute to better preparedness.

5.5.1 Implications for Emergency Preparedness and Training Interventions

The results from the current study, along with comparisons to previous research, highlight several critical implications for improving emergency preparedness among nurses. Given that nurses with good knowledge had significantly higher odds of better preparedness (AOR: 2.384, p = 0.021), healthcare institutions should implement standardized and mandatory emergency training programs. Previous research has demonstrated that structured training significantly improves nurses' ability to perform primary surveys effectively (Labrague et al., 2018). Advanced Trauma Life Support (ATLS) and Basic Life Support (BLS), can significantly improve nurses' abilities to manage emergency patients effectively (Ozkaynak et al., 2020). Moreover, simulation-based training has been recommended as a method to reinforce theoretical knowledge and provide hands-on experience in real-life emergency scenarios (Smith et al., 2019; Fung et al., 2020). Interactive learning experiences that replicate real-life emergency scenarios enhance nurses' confidence and decision-making skills, leading to better patient outcomes. Similarly, knowledge retention in emergency care declines over time if not reinforced through continuous education (Hammad et al., 2017). Regular refresher courses and competency assessments can ensure that nurses maintain a high level of preparedness. Additionally, some studies have pointed to barriers such as lack of access to training, high workloads, and limited institutional support as reasons for inadequate knowledge of emergency protocols (Patel et al., 2018). Therefore, addressing these challenges through policy changes and increased resource allocation can help bridge knowledge gaps. Foremost, the present study underscores the significant role of knowledge in emergency preparedness, particularly in the execution of the primary survey. The results thus nullify the null hypothesis as there were factors that influenced emergency preparedness.

5.6 General state of hospital emergency preparedness

The hospital's emergency preparedness assessment highlights key strengths in structured emergency preparedness such as planning, communication, and triage but identifies critical weaknesses in trauma preparedness, staffing, surge capacity, and post-disaster recovery. These findings align with previous

research emphasizing that while many healthcare facilities develop comprehensive emergency preparedness plans, significant gaps persist in the practical implementation of trauma response, resource allocation, and post-disaster management (World Health Organization [WHO], 2019).

5.6.1 Hospital Disaster Preparedness

The presence of structured emergency crisis planning indicates that the hospital has established protocols and frameworks to guide emergency response efforts. According to the Federal Emergency Management Agency (FEMA, 2020), effective disaster or emergency crisis planning involves risk assessment, contingency planning, and multi-agency coordination to ensure a cohesive response during emergencies. Furthermore, WHO (2019) found that structured disaster planning is one of the most developed aspects of hospital emergency preparedness, with many hospitals having established response frameworks aligned with national and international guidelines. A study by Labrague et al. (2018) found that hospitals with structured disaster preparedness plans demonstrated a higher level of organizational resilience during crises. This was attributed to clear guidelines articulated in the plan on roles, responsibilities, and coordination mechanisms. The presence of a Hospital Emergency Preparedness and Response Plan (HEPRP), a disaster committee, and structured planning indicates a foundational approach to emergency preparedness. The literature emphasizes that a structured emergency preparedness plan ensures better coordination and improves response capacity (Celso et al., 2019). However, the hospital's limited trauma preparedness suggests a gap in translating policy into practice, which is a common challenge in disaster medicine (Jayaraman et al., 2020). Therefore, the findings are consistent with the literature, especially in developing countries.

5.6.2 Trauma Preparedness and Emergency Preparedness

Trauma preparedness is notably limited, with only two out of ten essential components in place. The absence of a dedicated trauma team, activation protocols, and ongoing trauma training is

particularly concerning, as studies suggest that these elements are fundamental to improving patient survival rates, especially during mass casualty incidents (MCIs) (Hirshon et al., 2015). Hospitals with structured trauma teams and well-defined activation protocols have demonstrated significantly better patient outcomes, including reduced mortality, faster time to definitive care, and improved resource allocation (Cole et al., 2020). The lack of these critical components at Nyangabwe Referral Hospital (NRH) suggests major vulnerabilities in its emergency response capacity. Trauma teams are important during high-acuity emergencies, ensuring that patients receive rapid assessment, resuscitation, and definitive treatment. A well-trained multidisciplinary trauma team includes emergency physicians, surgeons, anaesthesiologists, critical care nurses, and radiologists who work together to provide timely interventions (Kaji et al., 2020). Research indicates that hospitals with dedicated trauma teams experience a 20-30% reduction in preventable trauma-related deaths compared to those without such teams (Celso et al., 2019). The absence of a formal trauma team at NRH increases the likelihood of delays in critical decision-making and resuscitation efforts, leading to suboptimal patient outcomes. The present assessment's findings align with previous studies showing that trauma management is one of the weakest areas in hospital emergency preparedness (Alrazeeni et al., 2017). Literature suggests that hospitals with inadequate trauma preparedness often face challenges in mass casualty incidents, including delayed interventions, lack of specialized training, and insufficient trauma supplies

(Hammad et al., 2017). In contrast, hospitals with dedicated trauma teams and specialized training programs report significantly better patient outcomes in disaster scenarios (Williams et al., 2021).

Similarly, structured trauma activation protocols are essential for a rapid and coordinated response to critically injured patients. Trauma activation systems allow for early notification of key personnel, pre-arrival preparation, and immediate mobilization of resources such as blood products and imaging services (Evans et al., 2021). Studies have shown that hospitals with predefined activation protocols reduce treatment delay by up to 50%, significantly improving survival rates in severely injured patients (Rhee et al., 2019). The absence of these protocols at NRH increases the risk of fragmented care, delays in intervention, and inefficient use of available resources.

5.6.3 Ongoing Trauma Training and Its Impact on Emergency Response

Continuous trauma training is another key component of hospital preparedness, ensuring that healthcare providers maintain competency in life-saving interventions. Simulation-based trauma training including Advanced Trauma Life Support (ATLS) and mass casualty drills has been shown to improve provider confidence, technical skills, and teamwork efficiency (Mock et al., 2019). A study by Matsumoto et al. (2020) found that regular trauma training led to a 40% improvement in adherence to trauma resuscitation protocols, reducing medical errors and improving patient stabilization rates.

The absence of ongoing trauma training at NRH suggests that healthcare workers may not be adequately prepared to manage critically injured patients, particularly in high-stress situations such as MCIs. This gap in training is particularly concerning given that trauma is one of the leading causes of morbidity and mortality worldwide, with preventable deaths often linked to delays in intervention and inadequate resuscitation practices (Peitzman et al., 2019). Establishing a structured trauma training program, incorporating hands-on simulation exercises, and regular refresher courses would enhance NRH's ability to respond effectively to trauma emergencies.

5.6.4 Implications for Mass Casualty Incident (MCI) Preparedness

In the event of an MCI, hospitals with established trauma systems and activation protocols are better equipped to manage the surge of critically injured patients. Evidence from disaster response studies indicates that hospitals with pre-existing MCI preparedness plans, including designated trauma teams, triage protocols, and surge capacity strategies, have significantly lower mortality rates following large-scale emergencies (Krausz et al., 2021). The lack of these preparedness measures at NRH suggests that the facility may struggle to manage a sudden influx of trauma patients, leading to increased morbidity and mortality.

Additionally, well-prepared trauma centres integrate real-time data collection and post-incident debriefing to continuously improve emergency response strategies. A study by Hardy et al. (2020) emphasized the importance of post-MCI evaluations in identifying system weaknesses and refining trauma care protocols for future incidents. The absence of a structured quality improvement framework at NRH further exacerbates its limited trauma preparedness, as there is no mechanism to assess performance gaps and implement corrective measures.

5.6.5 Communication and Safety Measures

Efficient communication systems are vital for emergency response, as they facilitate real-time information sharing among healthcare providers, emergency responders, and government agencies. A study by Kapucu *et al*., (2018) highlights that hospitals with robust communication strategies are better equipped to manage crises by reducing confusion and ensuring coordinated decision-making. The hospital's strength in communication aligns with findings from Fung et al. (2020), which emphasized that well-established communication networks improve emergency response efficiency and patient outcomes. The hospital has implemented four out of seven key communication measures, including standardized response steps and staff notification systems. The current hospital assessment highlights strong communication systems, aligning with findings by Rebmann et al. (2019), who reported that hospitals with well-integrated communication networks perform better in disaster scenarios. However, advanced communication technologies, such as real-time alert systems and digital information-sharing platforms, have been shown to improve emergency coordination (Patel et al., 2018). Similarly, the lack of a trauma registry and clearly defined trauma team membership reduces the hospital's ability to track and respond effectively to emergency incidents (Cone et al., 2018). Additionally, the absence of safety and security provisions raises concerns about the hospital's ability to manage emergency crises, reinforcing the need for enhanced security protocols (Fisher et al., 2016). This was a crucial gap, as controlled entry/exit points and crisis management procedures help maintain order during emergencies (Coccolini et al., 2017).

5.6.6 Triage and Logistics

Triage appears well-structured, with all four assessed elements in place. Triage plays a critical role in emergency preparedness by ensuring that patients receive care based on the severity of their condition. The hospital's strong triage systems align with studies indicating that effective triage protocols reduce mortality and optimize resource utilization during disasters (Jenkins et al., 2020). However, while triage may be well-developed in many hospitals, gaps in trauma preparedness and surge capacity often limit its effectiveness in large-scale emergencies. Logistics and supply management also show moderate preparedness, with three out of four key elements present, including decontamination protocols. However, previous studies highlight that even well-organized triage systems require regular testing through drills to ensure efficiency (Ingrassia et al., 2014). Finally, the literature showed that hospitals with robust triage protocols, such as the Simple Triage and Rapid Treatment (START) method, improved patient outcomes by ensuring efficient allocation of resources (Oztekin et al., 2015). The hospital's strength in this area suggests adequate staff training and adherence to evidence-based triage principles.

5.6.7 Human Resources and Training

Human resource preparedness remains a concern, with only two out of five assessed criteria met. Although designated emergency response areas exist, there is insufficient staffing to address resource overstretch situations. A study by Labrague et al. (2018) underscores that inadequate staffing during emergencies can severely impact patient outcomes. Training and education efforts show moderate readiness, with five out of nine components available. Regular emergency preparedness education is provided, but the absence of a structured casualty management system and communication structures for emergency staff is a major gap. Prior studies highlight that continuous training enhances overall

emergency response capacity (Baack & Alfred, 2013). Hospital staffing is a critical determinant of emergency preparedness. The assessment identifies staffing shortages as a major challenge, which is consistent with global research findings. Patel et al. (2018) report that many hospitals experience personnel shortages during disasters, leading to increased workloads and burnout among healthcare providers. In contrast, hospitals that invest in cross-training and surge staffing models are better able to manage disaster situations effectively (Labrague et al., 2018).

5.6.8 Surge Capacity and Post-Disaster Recovery

Surge capacity is a critical weakness, as none of the assessed measures are in place. The hospital lacks formalized plans for handling a sudden influx of patients, which could lead to system overload in a mass casualty event (Hick et al., 2014). Similarly, post-disaster recovery efforts are inadequate, with no emergency preparedness drills, casualty management drills, or post-action reporting in place. Studies emphasize that post-disaster debriefing and analysis are crucial for continuous improvement in emergency response (Landesman, 2017).

Overall, while the hospital has foundational emergency preparedness measures in place, there are significant gaps in trauma readiness, human resources, surge capacity, and post-disaster recovery. Strengthening these areas through targeted training, staffing enhancements, and regular emergency drills is essential to improving overall emergency readiness. Future strategies should prioritize integrating trauma response protocols, enhancing security measures, and developing structured post-disaster evaluation procedures to ensure a comprehensive approach to emergency preparedness. Furthermore, investing in modular emergency units and mobile medical teams can enhance hospitals' ability to manage patient surges during disasters (Smith et al., 2021). Stockpiling essential medical supplies and expanding ICU capacity can also improve hospital resilience in high-demand situations (Hick et al., 2020). Similarly, implementing emergency staffing pools, cross-training healthcare workers, and recruiting volunteer healthcare personnel can address staffing shortages during crises (Rebmann et al., 2019). The institution should also develop comprehensive recovery plans that include psychological support for healthcare workers, financial assistance programs, and infrastructure rebuilding efforts, which may enhance long-term hospital resilience (Hammad et al., 2017).

5.7 Descriptive assessment of physical resources for the management of airway and breathing

Ensuring adequate airway and breathing support is crucial in emergency response, particularly in trauma and critical care settings. This assessment indicates that Nyangabwe Referral Hospital (NRH) is well-equipped with oxygen supply, oropharyngeal airways, suction units, bag-valve masks (BVMs), endotracheal tubes, nasogastric tubes, laryngoscopes, hard neck collars, spine boards, pulse oximeters, ventilator machines (two available), and crash cart trolleys (two available). These resources are critical in maintaining airway patency, facilitating ventilation, and preventing hypoxia during emergencies (Smith et al., 2018). Several studies have reported similar findings regarding the availability of basic airway management equipment in emergency settings. A study by Lee et al. (2021) assessing emergency airway preparedness in hospitals across sub-Saharan Africa found that most institutions had oxygen supplies, BVMs, endotracheal tubes, and laryngoscopes, ensuring basic airway management capability. Similarly, a review by Williams et al. (2020) on emergency preparedness in low- and middle-income countries (LMICs) found that while many hospitals had essential airway equipment,

they often faced shortages of specialized tools such as Magill forceps and portable ventilators, impacting the ability to manage complex airway obstruction cases.

Furthermore, a study by Otu et al. (2019) evaluated emergency airway preparedness in Nigerian tertiary hospitals and reported similar limitations, particularly regarding the lack of portable ventilators and Magill forceps. Their findings emphasized that although hospitals often had sufficient primary airway management tools, the absence of specialized equipment significantly compromised their ability to handle critical airway obstruction cases, leading to increased mortality rates in emergency scenarios. On the contrary, a study by Fischer et al. (2020) in high-income countries found that the presence of protocolized airway management strategies, combined with adequate equipment, significantly reduced hypoxic events and improved survival rates. Furthermore, hospitals in high-income settings have broader access to advanced airway tools, including fiberoptic bronchoscopes, video laryngoscopes, and extracorporeal membrane oxygenation (ECMO) machines, which significantly enhance airway management in critically ill patients (Patel et al., 2019). These technologies facilitate visualization of the airway, thus improving intubation success rates, and reducing complications associated with difficult airway management. The study contrasts with NRH's situation, where limited equipment availability may hinder rapid airway intervention in critically ill patients. Additionally, studies indicate that portable ventilators are critical in maintaining respiratory support for patients with acute respiratory failure, yet they remain scarce in many Low-income and Middle-Income countries (LMICs). A study by Mowafi et al. (2019) found that fewer than 40% of hospitals in low-resource settings had access to mechanical ventilation, leading to suboptimal patient outcomes in cases of severe respiratory distress.

5.8 Advanced Diagnostic and Monitoring Equipment and Emergency Preparedness

Several essential diagnostic tools such as X-ray machines, CT scanners, MRI, chemistry analysers, hematology analysers, ECG monitors, and defibrillators (one available) are present. These resources are critical in trauma assessment and resuscitation (Lee et al., 2017). However, their availability across different hospital departments rather than exclusively in the casualty/emergency unit may delay rapid diagnosis and intervention (Patel et al., 2021). The lack of immediate access to imaging and laboratory services in the emergency unit can lead to delays in life-saving procedures, emphasizing the need for a more centralized emergency diagnostic infrastructure (Anderson et al., 2016). Studies have suggested that having immediate access to point-of-care ultrasound (POCUS) and portable X-ray units within the emergency department (ED) significantly improves diagnostic speed and patient outcomes (Farahmand et al., 2019). In countries like the United States, Canada, and Germany, emergency departments are often equipped with dedicated CT scanners, portable X-ray machines, and POCT laboratories, reducing turnaround times (Schuur & Venkatesh, 2020).

On the contrary, literature indicated that hospitals implementing in-ED radiology and laboratory services experience a 30–50% reduction in diagnosis time for critical conditions such as stroke, myocardial infarction, and sepsis (Fitzgerald et al., 2018). Many hospitals in LMICs, including those in sub-Saharan Africa, operate with a decentralized diagnostic model due to resource constraints (Osei et al., 2021). A study conducted in Kenya by Gachau et al. (2020) found that 60% of emergency patients experienced delays exceeding one hour in obtaining imaging and laboratory results due to

decentralization, significantly impacting trauma and critical care outcomes. Similarly, a study by Wong et al. (2020) found that delays in obtaining laboratory results in the emergency setting correlate with increased morbidity and mortality, particularly in sepsis and polytrauma cases. Integrating point-of-care testing (POCT) devices in emergency units can mitigate these delays by providing immediate biochemical and hematological data, allowing for quicker decision-making (Rashid et al., 2018). Similarly, the American Heart Association (AHA, 2020) recommends that multiple defibrillators be strategically placed within emergency and high-risk patient care areas to improve survival rates in cardiac emergencies. Furthermore, training emergency staff in early defibrillation and ACLS (Advanced Cardiac Life Support) protocols enhances cardiac arrest survival rates (AHA, 2020). The development of clear protocols for prioritizing emergency imaging and lab tests ensures that critically ill patients receive timely interventions (Moore et al., 2022). Implementing real-time tracking systems for laboratory samples and radiology requests can improve efficiency and reduce turnaround times.

5.9 Availability of Essential Equipment for Circulation Management and Emergency Preparedness

A well-prepared emergency department requires adequate resources for managing circulation, particularly in trauma and critically ill patients. The assessment at Nyangabwe Referral Hospital (NRH) indicates that essential resuscitation tools such as intravenous cannulas (14, 16, 18 gauge), central venous catheters, IV crystalloids, and fluid warming equipment are available. These resources are crucial for rapid volume resuscitation and maintaining hemodynamic stability in emergency settings (Peitzman et al., 2019). Additionally, the availability of blood pressure (BP) machines and cuffs ensures proper hemodynamic monitoring, while Foley catheters aid in urine output monitoring, which is an essential marker for perfusion and fluid balance in critically ill patients (American College of Surgeons (ACS), 2022).

However, there are significant deficiencies in advanced circulatory monitoring and resuscitation capabilities. The absence of Focused Assessment Sonography for Trauma (FAST), central venous pressure (CVP) monitoring, and arterial pressure monitoring limits the facility’s ability to assess internal bleeding and hemodynamic instability effectively. FAST is particularly essential in emergency settings as it allows for non-invasive rapid assessment of intra-abdominal haemorrhage, significantly influencing early decision-making in trauma patients (Stengel et al., 2018). Similarly, CVP and arterial pressure monitoring are critical for guiding fluid resuscitation and vasoactive drug administration in hemodynamically unstable patients, a limitation that may impact patient outcomes at NRH (Evans et al., 2020).

5.10 Emergency Operating Theatre and Critical Care Capacity and Emergency Preparedness

The absence of an emergency operating theatre within the casualty department at Nyangabwe Referral Hospital (NRH) presents a critical gap in emergency preparedness. This limitation necessitates the transportation of patients requiring urgent surgical intervention to a separate section of the hospital, which may result in significant delays and increased mortality rates, particularly in cases of life-threatening hemorrhage (Cole et al., 2021). Additionally, the hospital's limited ICU capacity, with only six adult ICU beds and no dedicated paediatric ICU beds poses challenges in managing post-resuscitation care, especially for critically injured paediatric patients who may require specialized

intensive care (Rhodes et al., 2017). Similar challenges have been identified in a study by Mock et al. (2019) when assessing trauma care infrastructure in sub-Saharan Africa. The study found that most hospitals lacked dedicated emergency operating theatres, leading to delays in time-sensitive surgeries. It emphasized that delayed access to surgical intervention was associated with poorer patient outcomes, including higher mortality rates and increased complication risks. Likewise, a study by Jumbam et al. (2021) highlighted that in many LMICs, trauma patients often experienced prolonged transport times to operating theatres, which significantly impacted survival rates, particularly in cases of haemorrhagic shock.

In contrast, high-resource trauma centres in developed countries have established emergency operating theatres within their emergency departments to facilitate immediate surgical intervention. A study by Livingston et al. (2020) analyzing trauma system efficiency in the United States found that hospitals with dedicated trauma operating rooms reduced time-to-surgery by an average of 40 minutes, leading to significantly improved survival rates among patients with severe haemorrhagic injuries.

The limited ICU capacity at NRH is another significant constraint in emergency care. Studies indicate that inadequate ICU bed availability is a common challenge in many LMICs. A study by Murthy et al. (2021) assessing ICU capacity across African hospitals found that most institutions had fewer than ten ICU beds, with many lacking dedicated paediatric ICU facilities. The study emphasized that the scarcity of ICU beds led to resource allocation challenges, often forcing hospitals to triage patients based on severity, sometimes resulting in preventable deaths due to the lack of intensive care support. Similarly, Riviello et al. (2020) conducted a study evaluating critical care resources in sub-Saharan Africa and found that paediatric ICU capacity was particularly deficient, leading to high mortality rates among critically ill children requiring intensive care. These findings align with NRH's situation, where the absence of paediatric ICU beds limits the hospital's ability to provide specialized care for severely injured paediatric patients.

5.11 Specialist Availability and Impact on Emergency Preparedness

A resilient multidisciplinary trauma support system is essential for timely and effective management of critically injured patients, particularly in mass casualty incidents (MCIs). The availability of specialists at Nyangabwe Referral Hospital (NRH) plays a crucial role in determining the institution's ability to handle complex trauma cases. NRH has a core team comprising general surgeons (2), orthopedic surgeons (2), a neurosurgeon (1), a maxillofacial surgeon (1), an ENT surgeon (1), and a radiologist (1). However, its specialist workforce remains insufficient to address all trauma-related emergencies. The presence of an anaesthesiologist (1) and nine nurse anaesthetists is beneficial for airway management and perioperative support. However, gaps in key surgical disciplines pose significant challenges to emergency preparedness. A study by Celso et al. (2019) demonstrated that trauma centres with dedicated multidisciplinary teams such as specialists in vascular, thoracic, and paediatric surgery, experienced significantly lower mortality rates among critically injured patients compared to hospitals with limited specialist availability. The results align with NRH's current limitations, where the absence of paediatric, vascular, and thoracic surgeons necessitates frequent patient referrals, potentially delaying life-saving interventions. The findings are also consistent with a study by Pape et al. (2020).

A study conducted in high-resource settings by DuBose et al. (2020) demonstrated that hospitals with dedicated trauma teams, including vascular and thoracic surgeons, had a 30% higher survival rate in patients with penetrating trauma. The study underscores the direct correlation between specialist availability and trauma survival rates, emphasizing the importance of expanding the specialist workforce at NRH. The lack of paediatric, vascular, and thoracic surgeons at NRH mirrors findings from other resource-limited hospitals. A review by Henry et al. (2018) of trauma care systems in sub-Saharan Africa found that specialist shortages were common, leading to increased mortality in cases requiring urgent interventions such as vascular repair or paediatric surgical expertise. On the contrary, a study by Roberts et al. (2021) examining trauma systems in lower-resource settings noted that even in the absence of a full trauma specialist team, well-structured referral networks and telemedicine support could improve trauma care outcomes. Their findings suggest that while having in-house specialists is ideal, enhancing referral pathways, investing in specialist training programs, and leveraging digital health technologies could mitigate some of the deficiencies seen at NRH.

5.12 Discussion of results within the context of the Donabedian Model

The Donabedian Model (1988) adapted for this study provides a comprehensive framework for evaluating emergency preparedness for mass casualty incidents at Nyangabwe Referral Hospital (NRH) through its three interconnected components: structure, process, and outcomes. Through the application of this model, the study examined how structural resources, procedural training, and measurable outcomes contribute to NRH's emergency response capabilities.

5.12.1 Structural Components

The structural component includes physical infrastructure, human resources, and equipment availability, which are essential for emergency preparedness (Donabedian, 1988). The study found that while NRH has the basic structural requirements for handling mass casualty incidents, certain deficiencies hinder optimal response. The hospital lacks a dedicated emergency operating theatre within the casualty department, relying instead on the general theatre, which may delay life-saving surgical interventions. This aligns with a study by Cole et al. (2021), which emphasizes the critical role of timely surgical interventions in reducing trauma-related mortality.

Additionally, NRH has only six adult ICU beds and no dedicated paediatric ICU beds, presenting a critical care limitation similar to those reported by Rhodes et al. (2017), who highlighted that inadequate ICU capacity negatively affects post-resuscitation care and increases mortality rates. Although the hospital was equipped with the most necessary medical equipment, deficiencies such as the absence of Magill forceps and only two portable ventilators limited its ability to respond effectively to mass casualty incidents. Sharma et al. (2019) found that resource-strapped hospitals with equipment shortages face significant emergency response challenges.

The human resource limitations further constrain NRH’s emergency preparedness. The hospital lacks key specialists such as paediatric, vascular, and thoracic surgeons, which significantly affects its ability to manage complex trauma cases. A study by Mock et al. (2019) found that hospitals with multidisciplinary trauma teams showed significantly better patient survival rates. These findings highlight the need for investment in structural enhancements, including workforce capacity expansion and improved infrastructure.

5.12.2 Process Components

Process factors play a crucial role in emergency preparedness, as they encompass training, knowledge acquisition, and procedural adherence. The study revealed that specific process variables, including work experience (AOR = 6.989), attitude (p = 0.036), knowledge of policies and protocols (p = 0.001), and understanding of primary survey protocols (p = 0.043), were significantly associated with emergency preparedness. This indicates that individuals with higher knowledge levels and more experience are more likely to participate effectively in emergency response efforts. These findings align with Baack & Alfred (2017), who emphasized the importance of hands-on emergency training in improving preparedness levels.

Moreover, the association between knowledge and emergency preparedness reinforces the importance of continuous education. Nurses with higher awareness regarding policies and emergency protocols exhibited improved preparedness, consistent with a study by Labrague et al. (2018), which found that frequent training sessions significantly enhanced emergency preparedness competencies. However, the paradoxical finding that some knowledgeable respondents had higher odds of poor emergency preparedness (AOR = 4.001, p = 0.034) suggests that theoretical knowledge alone is insufficient. This reinforces the necessity of simulation-based learning and real-world drills, as advocated by Hammad et al. (2021).

Work experience demonstrated a dual impact on emergency preparedness. Although greater experience correlated with moderate preparedness (AOR = 6.989, p = 0.036), it was also linked to poor preparedness in some cases (AOR = 0.386, p = 0.043). This finding aligns with Ingrassia et al. (2020), who reported that long-serving nurses may rely on outdated knowledge and require refresher training to maintain high preparedness levels.

Attitude was another significant determinant of emergency preparedness. A positive attitude increased the likelihood of moderate preparedness (AOR = 3.186, p = 0.029) but was also paradoxically linked to higher odds of poor preparedness (AOR = 2.588, p = 0.021). This suggests that a positive mindset alone is not enough; structured and continuous emergency training is necessary for sustaining preparedness levels, as highlighted by Labrague et al. (2018).

5.12.3 Outcome Components

The study identified two categories of outcomes: factors with no significant association with emergency preparedness and those with a significant association. Sociodemographic characteristics, including age, marital status, professional qualification, and gender, were found to have no statistically significant association with emergency preparedness. This suggests that individual demographic characteristics alone may not be strong determinants of emergency preparedness awareness. These findings align with research by Al Thobaity et al. (2019), which found that factors such as age and academic qualification had minimal impact on actual emergency response capabilities. Instead, practical exposure and training play a more substantial role.

The Donabedian Model highlights the importance of tracking outcomes to improve emergency preparedness. Regular assessments and performance evaluations can help identify gaps in training, workforce capacity, and infrastructure needs. The findings of this study reinforce the necessity of ongoing training programs, structured simulation exercises, and investments in hospital infrastructure

to enhance emergency preparedness at NRH. By addressing the identified structural and process deficiencies, NRH can strengthen its emergency response capabilities and improve patient outcomes in mass casualty incidents.

5.13 Conclusion

The study evaluated Nyangabwe Referral Hospital's (NRH) emergency preparedness among nurses and the casualty department for mass casualty incidents (MCIs). The results highlighted the key strengths and critical gaps in trauma response, staffing, infrastructure, and training. Although NRH has an established emergency preparedness framework, deficiencies in trauma activation protocols, surge capacity, and specialist availability hinder its ability to manage high-acuity emergencies effectively.

The results indicate that socio-demographic factors do not significantly impact preparedness. On the contrary, work experience, staff attitudes, awareness of policy guidelines, and knowledge of the application of the primary surveys were key determinants of preparedness. Nurses with over 10 years of experience demonstrated higher preparedness, but widespread gaps in training, particularly in airway management, circulatory stabilization, and neurological assessment, emphasize the need for structured emergency programs. Many nurses had not participated in recent training, and poor policy visibility further impeded readiness.

NRH lacks a dedicated trauma team, structured activation protocols, and sufficient ICU and emergency surgical capacity, compromising its ability to handle patient influx during disasters. Additionally, limited access to advanced diagnostic tools and a shortage of specialists delay life-saving interventions. Addressing these issues through expanded ICU capacity, recruitment of specialists, and investments in trauma assessment tools is critical.

Institutional factors such as workplace culture, incentives, and policy support influence nurses' willingness to participate in emergency response activity. Strengthening trauma protocols, increasing training opportunities, and implementing quality improvement frameworks will enhance NRH's emergency response capabilities.

The Donabedian Model (1988) applied to this study was relevant and insightful in evaluating factors that influenced nurses and the casualty department's preparedness for incidents of mass casualty at Nyangabwe Referral Hospital (NRH). As a quality-of-care framework, the Donabedian model systematically dissects healthcare performance into three interconnected components: structure, process, and outcome, allowing for a holistic examination of preparedness gaps and strengths. The structural component helped assess the availability and adequacy of physical infrastructure, equipment, and human resources necessary for emergency response. The process component of the model enabled an evaluation of how nurses engage with emergency protocols, training, and practical knowledge. Lastly, the outcome component facilitated analysis of the results of preparedness efforts, including how different factors translated into actual emergency preparedness. This model was crucial in identifying key strengths and limitations at NRH that could hinder timely and effective care during mass casualty events. Furthermore, the model served as a comprehensive evaluative tool that helped structure the study's methodology, guided the interpretation of results, and provided a logical framework for identifying specific areas of improvement. Its relevance lies in its ability to connect

infrastructure and procedural elements with measurable results applicable in a setting like NRH. The resource limitations and training variability can directly impact emergency response capacity.

5.14 Implication of the Finding to Emergency Nursing

The results of this study have a significant implication in emergency nursing practice, administration, and research, particularly in the context of emergency preparedness. Although there were no significant associations between respondents' characteristics (age, gender, qualifications, and category of work) and preparedness levels, the study challenges traditional assumptions about the relationship between these factors and readiness. This calls for a shift in approach, where hospitals and nursing schools move away from relying solely on experience and academic credentials as indicators of emergency preparedness. Instead, a stronger emphasis should be placed on competency-based training, regular assessments, and practical skill-building exercises to ensure nurses are adequately prepared to respond effectively to emergencies.

The study highlights that knowledge, attitude, and experience influence emergency preparedness. Therefore, continuous professional development programs should be implemented, including structured training sessions, hands-on simulations, and real-time feedback on emergency response decisions to capacitate nurses. Further research is needed to explore other factors influencing preparedness, ensuring that future interventions are evidence-based and focused on improving overall preparedness and patient outcomes. By targeting these key factors, the effectiveness of emergency nursing can be significantly enhanced, ultimately improving response capabilities and patient outcomes during crises.

5.14.1 Emergency and Trauma Nursing Practice

The minimal significant association between emergency preparedness and work experience suggests that clinical exposure alone may not enhance nurses' readiness for mass casualty incidents. This finding underscores the need for structured and standardized emergency preparedness training programs rather than relying solely on experience-based learning. In an effort to ensure nurses remain well-equipped to handle emergencies, continuous refresher training, hands-on simulation exercises, and periodic assessments should be implemented. These initiatives will help reinforce preparedness knowledge, practical application of the primary survey, and response efficiency in high-pressure situations.

Moreover, the absence of a link between emergency preparedness and academic qualifications indicates that simply holding a diploma, degree, or certification does not guarantee competency in emergency response. This highlights the importance of competency-based assessments rather than relying on academic credentials on stuff emergency preparedness. Emergency nurses should be regularly evaluated using practical skill tests, including primary survey assessments, decision-making drills, and real-time emergency simulations, to ensure they can effectively manage critical situations.

Additionally, the study emphasizes the role of knowledge level and attitude in emergency preparedness. Although a positive attitude towards emergency response is valuable, it must be supported by practical skills and knowledge. Nurses must engage in continuous education, structured training programs, and real-time feedback mechanisms to bridge gaps in preparedness and improve overall emergency response capabilities.

For emergency nurse administrators,

The findings call for re-evaluating the hospital's hiring, training, and staff development policies. Since neither academic qualifications nor demographic factors were significantly associated with emergency preparedness, administrators must reconsider how they assess nurses' readiness during performance appraisals. Furthermore, NRH should not only rely solely on education level or years of nurses' experiences, hospitals should implement practical emergency preparedness assessments as part of the competency verification process.

Furthermore, the results emphasize the need for continuous professional development (CPD) programs that go beyond one-time training sessions, as emergency preparedness requires ongoing reinforcement and practical application. Administrators should integrate structured emergency drills, mentorship programs, and periodic refresher courses into routine training. Additionally, hospital leadership should foster a culture of preparedness by providing real-time feedback, encouraging reflective practice, and promoting active engagement in emergency response efforts. Since knowledge level, experience, and attitudes significantly influence preparedness, targeted interventions should focus on bridging knowledge gaps, enhancing hands-on experience, and fostering a proactive mindset among nurses to ensure a more effective emergency response system.

5.14.2 Emergency Nursing Education

Nursing schools and training institutions should consider increasing hands-on training components, including simulation-based learning, case-based discussions, and real-world drills, to bridge the gap between theoretical knowledge and clinical application. Additionally, interdisciplinary training involving nurses, doctors, and paramedics can improve teamwork and decision making in emergency settings. Moreover, these results suggest that traditional classroom-based learning alone may not be sufficient to develop skills on emergency crisis management (e.g., mass casualty incidents). Nursing educators should adopt active learning strategies such as problem-based learning (PBL) and virtual reality simulations to enhance engagement and retention of emergency crisis management.

5.14.3 Research in Emergency Practice

The study findings indicate that knowledge level, experience, attitude, and understanding of the primary survey in trauma are significant factors influencing emergency preparedness among nurses. Higher knowledge levels were strongly associated with better preparedness, emphasizing the need for continuous education and competency-based training. Additionally, nurses with more experience demonstrated greater readiness, highlighting the importance of hands-on exposure in emergencies. However, experience alone was not sufficient, as gaps in practical skills and decision-making were observed among some experienced nurses, reinforcing the need for structured training programs.

Attitudes toward emergency preparedness also played a crucial role, as nurses with proactive mindsets and confidence in their abilities were more likely to engage in emergency response efforts. Furthermore, a strong understanding of the primary survey in trauma was linked to better preparedness, as it enables rapid assessment and intervention during mass casualty incidents. These findings suggest that emergency preparedness is multifaceted, requiring a combination of knowledge, experience, practical application, and a positive attitude.

Further research is needed to explore additional factors influencing emergency preparedness, including institutional support, access to training resources, workplace culture, and psychological readiness. Qualitative studies involving interviews or focus group discussions with emergency nurses could provide deeper insights into barriers affecting preparedness. Additionally, future research should assess the effectiveness of different training models, such as simulation-based learning, interdisciplinary drills, and competency-based assessments, to develop more targeted and evidence-based interventions for improving emergency preparedness.

5.15 Recommendations

5.15.1 For Practice

1. Emergency department nurses at Nyangabwe Referral Hospital should prioritize competency-based emergency preparedness training to enhance their knowledge, skills, and confidence in responding to mass casualty incidents (MCIs). Since experience alone does not guarantee emergency preparedness, structured training programs should incorporate case-based discussions, simulation exercises, and real-time feedback from mentors. These sessions should include diverse emergency scenarios, from minor injuries to life-threatening trauma cases, to improve decision-making, adaptability, and rapid assessment skills.

5.15.2 For Policy

1. The Botswana Ministry of Health and Wellness should develop national policies and standardized guidelines for emergency preparedness training, ensuring that all staff especially nurses and doctors receive consistent and structured preparedness education to enhance their ability to respond to MCIs effectively.
2. The Ministry should make continuous emergency preparedness training mandatory for all relevant hospital staff, integrating it into professional development programs to ensure ongoing skill reinforcement and competency.
3. The Ministry should allocate resources and institutional support to hospitals for implementing structured emergency preparedness programs. The lack of statistical significance in some factors does not imply training is ineffective but may highlight gaps in the frequency, consistency, or methodology of existing programs. Ensuring that nurses receive frequent, practical, and evidence-based training will improve emergency response outcomes.

5.15.3 For Future Research

1. Future research should explore the long-term impact of emergency preparedness training on nurses' competency and patient outcomes through longitudinal studies. This will help determine whether continuous training programs lead to sustained improvements in emergency response, decision-making, and patient survival rates over time.
2. Further studies should assess the effectiveness of different emergency training models. These include simulation-based learning, interdisciplinary disaster drills, and competency-based assessments. This helps identify the most impactful strategies for improving emergency preparedness.

3. Qualitative research involving in-depth interviews or focus group discussions with emergency nurses should be conducted to explore barriers and facilitators of emergency preparedness, including institutional support, workplace culture, and psychological readiness, ensuring that future interventions are evidence-based and targeted at strengthening emergency nursing practice.

5.16 Plan for Dissemination and Utilization of Results

The study findings will be disseminated to relevant stakeholders to promote the implementation of recommendations. A hard copy of the document will be distributed to the Ministry of Health-Botswana, University of Zambia - School of Nursing Sciences, UNZA Medical Library, and Nyangabwe Referral Hospital for management. The findings will be published in peer-reviewed journals such as the Journal of Emergency Nursing. The study results will also be presented during conference proceedings such as the African Emergency Medicine Symposium. This will give the study findings a wider scholarly exposure for scrutiny and healthcare professionals and policymakers who can use them to improve emergency preparedness for mass casualty in hospitals and relevant institutions. The researcher hopes that the study results will contribute to the development and implementation of strategies that will improve emergency preparedness among nurses hence improving patient outcomes during incidents of mass casualty. Additionally, associated factors that enhance emergency preparedness will be promoted and advocated to be implemented. The results will also assist policymakers in the formulation of policies that support effective emergency preparedness for mass casualty incidents.

The study aimed at establishing factors associated with emergency preparedness for mass casualty amongst staff, especially nurses and the hospital in general at Nyangabwe Referral Hospital (NRH) in Francistown, Botswana. The study's findings drew the following key conclusions. Socio-demographic factors have limited influence on emergency preparedness**.** The study indicates that factors like age, marital status, academic qualifications, gender and employment category (management vs. general duty) do not significantly predict emergency preparedness awareness among nurses at NRH. This suggests that preparedness is less about inherent demographic characteristics and more about external factors. Similarly, emergency preparedness training and protocols are generally applicable across genders, though existing literature suggests potential differences in roles and strengths during emergency response. Furthermore, work experience significantly influences emergency preparedness, highlighting the importance of practical exposure and accumulated knowledge in developing the skills and confidence necessary for effective emergency response. The lack of association between demographic factors and preparedness underscores the importance of targeted training, hands-on experience, and institutional support in shaping nurses' ability to respond effectively to MCIs. Educational qualifications alone are insufficient, emphasizing the need for tailored emergency training programs that bridge knowledge gaps and enhance practical skills.

Although, demographic characteristics play a limited role, practical experience and targeted training programs are crucial in enhancing emergency preparedness among nurses at NRH. These findings highlight the need for healthcare institutions to prioritize competency-based training, simulation exercises, and continuous professional development to ensure all staff are adequately equipped to handle mass casualty incidents, regardless of their demographic background.

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APPENDICES

5.17 Appendix B: Participants information sheet

RESEARCH TITLE: Assessment of the state of emergency preparedness for mass casualty incidents at Nyangabwe Referral Hospital in Francistown, Botswana

Principal Research: Mr Gaoduelwe Lekesi, BNS, RN

Program of Study: MSc in Emergency and Trauma Nursing

Year of Study: 2nd

Institution: University of Zambia, School of Nursing.

Institution of investigation: Nyangabwe Referral Hospital, Francistown, Botswana

Contact Information: +260972102548/ +26772420429/ gaoslekesie@gmail.com

Dear Participants

Introduction:

My name is Gaoduelwe Lekesi. I am currently pursuing Master of Science in Emergency and Trauma Nursing at the University of Zambia. Research is required as a partial fulfilment of the programme requirement. Therefore, this letter serves as an invitation to participate in a research study conducted within your institution. The study seeks to assess the state of emergency preparedness for mass casualty incidents in Nyangabwe Referral Hospital.

Background

The global trend of increasing mass casualty incidents has resulted in increased fatalities, serious injuries, financial and social losses, disruptions in health institutions and communities globally. Health facilities like Nyangabwe Hospital are often overwhelmed by the surge of critically injured or ill patients, thus compromising the ability to provide timely and effective medical care. Emergency preparedness strategies and proactive actions are crucial for improving institutional capacity and resilience, (Ayenew et al, 2022). Therefore, the study seeks to assess the current state of preparedness for mass casualty incident in Nyangabwe and formulated recommendation to ensure problem targeted intervention to improve quality of patient care and outcome.

The purpose of this study

This study seeks to assess the hospital's capacity to respond effectively during incidents of mass casualty, identify areas for improvement and provide recommendation. This will ensure effective response through combined efforts from all stakeholders thus improving patient outcome, and reduced associated complication and mortality.

Procedure

Participation in the study will involve answering questions in a form of survey regarding the knowledge, perceptions, resources, protocols and guidelines related to Nyangabwe referral hospital's emergency preparedness. The survey will take approximately 30-60 minutes to complete. The desire is

for participants to attempt all the survey questions truthfully for the study to illicit concrete information to help the hospital improve it preparedness strategies.

Who will participate in the study?

The study will be conducted on nurses at all levels of management currently employed at Nyangabwe Hospital in Francistown. These nurses should be licenced to practice, willing to consent to participate in the study.

Risks and Benefits:

There are no direct benefits for individuals participating in this study. However, information gathered from this research may help improve the hospital's emergency preparedness and ultimately benefit the institution, staff and patients in terms of improving quality of care. There are no known or anticipated risks associated with participating in this study.

Confidentiality:

The privacy and confidentiality of participants will be strictly protected throughout the study. The information generated from the survey will be kept confidential and only used for research purposes. The individual identity will also remain anonymous in any reports or publications.

Voluntary Participation:

The participation in this study is completely voluntary. Therefore, participants have the right to refuse to participate or withdraw from the study at any time without penalty. The decision to participate or not will not affect their current or future relationship with the employer, Nyangabwe Referral Hospital, and the Ministry of Health.

The questions or concerns about this study can be directed to the principal investigator as indicated above. However, further questions about any rights as a research participant may be forwarded to the Botswana Ministry of Health Human Research and Development Committee (HRDC), as well as the Nyangabwe Referral Hospital Research and Ethics Committee for further clarification.

The participant will need to sign a consent form to be part of the study. Through signing the consent form, the participant indicates that they have read and understood the information provided and the questions about the study have been answered to their satisfaction.

Thank you for considering to participate in this study. Your contribution is greatly appreciated.

5.17.1 Appendix B: Participants' information sheet (Setswana)

SETLHOGO SA PATLISISO: Tshekatsheko ya seemo sa ipaakanyetso go fa dithuso tsa tshoganyetso ya ditiragalo tsa dikgobalo tsa batho ba le bantsi kwa Bookelong jwa Nyangabwe Referral kwa Francistown, Botswana**.**

Motlhotlhomisi mogolo: Mr Gaoduelwe Lekesi, BNS, RN

Lenaneo la thuto: MSc in Emergency and Trauma Nursing

Ngwaga wa dithuto: 2rd

Sekole: University of Zambia, School of Nursing.

Lefelo la dipatlisiso: Nyangabwe Referral Hospital, Francistown, Botswana

Megala: +260972102548/ +26772420429/ gaoslekesie@gmail.com

Batsayakarolo ba ba rategang

Kitsiso:

Leina la me ke Gaoduelwe Lekesi, ke moituti kwa sekoleng se segolwane sa University of Zambia ke dira dithuto tsa Masetase ya maranyane mo go tsa malwetse a Tshoganyetso le Dikgobalo ke le mooki. Go fitlhlelela dithuto tse, moithuto o tshwanetse a dira dipatlisiso e le bontlhabongwe jwa go fitlhelela dithuto tsa gagwe. Ka jalo, lo lalediwa go tsaya karolo mo patlisisong tse di dirwang mo kokelong ya lona. Thutopatlisiso e e batla go sekaseka seemo sa go ipaakanyetsa maemo a go fa dithuso tsa tshoganyetso. Bogolo jang fa go nale ditiragalo tsa dikgobalo kana tlhagogo ya malwetse ebile go amang batho ba le bantsi mo nakong e le ngwee mo go ka kgoreletsa go fiwa ga ditlamelo kwa bookelong jwa Nyangabwe.

Lemorago

Lefatshe ka bophara go tumile gore go nale koketsega ya ditiragalo tsa dikgobalo le tlagogo ya malwetse tse bontsi di dirang gore go nne le koketsego ya dintsho le dikgobalo tse di masisi. Ditatlhegelo tsa matlole, dikago, dikgoreletsi mo ditheong tsa boitekanelo le mo baaging lefatshe ka bophara le tsone di supile fa di amegile fela thata. Dikokelo jaaka Nyangabwe, gantsi di imelwa ke go fa batswasetlhabelo dithuso tsa botsogo ka dipalo tsa bone di a bo di tlhatlogile mo go imelang ditlamelo le metswedi ya dithuso. Ka jalo go ama boleng le bokgoni jwa go tlamela ka kalafi le dithuso tsa potlako. Maano a go ipaakanyetsa maemo a tshoganyetso le dikgato tsa go itlhaganela di botlhokwa thata mo go tokafatseng bokgoni jwa kokelo le go itsetsepela, (Ayenew et al, 2022). Ka jalo, thutopatlisiso e e batla go sekaseka seemo sa go ipaakanyetsa tiragalo ya go fa dithuso tsa potlako le dikgobalo fa batho ba amegile ka bontsi. Gape maikaelelo ke go abelana megopolo le go tswa ka methale ee ka dirsiwang go netefatsa gore kokelo e ipaakantse go fa dithuso tsa potlako tsa maemo a ntlha go sireletsa matshelo a batswasetlhabelo ga mmogo le badiri. Thutopatlisiso eno, e batla go sekaseka le go supa mafelo a a tshwanetseng go tokafadiwa le go tlamela ka dikgakololo. Se se tla netefatsa tsibogo e e atlegileng ka maiteko a a kopanetsweng ke bannaleseabe botlhe ka jalo go tokafatsa dipoelo tsa molwetse, le go fokotsa go tiego ya kalafi le dintsho tse di amanang le go tlhoka bokgoni**.**

Tsamaiso

Go tsaya karolo mo patlisisong go tla akaretsa go araba dipotso ka mokgwa wa patlisiso malebana le kitso, dikakanyo, didirisiwa le melawana ee amanang le go ipaakanyetsa maemo a tshoganyetso ga bookelo jwa Nyangabwe. Patlisiso e tla tsaya metsotso e ka nna metsotso e le masome a mararo go ya go masome a mane. Keletso ke gore batsayakarolo ba leke dipotso tsotlhe tsa patlisiso ka boammaaruri gore thutopatlisiso e nne le tshedimosetso e e faphegileng go tokafatsa maano a go ipaakanyetsa ditiragalo tsa masetlapelo.

Batsayakarolo

Thutopatlisiso e tlaa dirwa mo baoking ba maemo otlhe a botsamaisi ba ka jaana ba thapilweng kwa kokelong ya Nyangabwe kwa Francistown. Baoki bano ba tshwanetse go nna le laesense ya go dira, ba iketleeleditse go dumela go tsaya karolo mo patlisisong. Dikotsi le Mesola: Ga go na dipoelo tse di tlhamaletseng jaanong jaana tsa batho ba ba tsayang karolo mo patlisisong eno. Le fa go ntse jalo, tshedimosetso e e kokoantsweng go tswa mo patlisisong eno, e ka thusa go tokafatsa go ipaakanyetsa maemo a tshoganyetso ga bookelo mme kwa bofelong ya solegela kokelo, badiri le balwetse molemo malebang le go tokafatsa boleng jwa tlhokomelo. Ga go na dikotsi tse di itsiweng kgotsa tse di solofetsweng tse di ka amanang batsayakarolo mo patlisisong eno. Sephiri le tshireletsego ya tshedimosetso ya batsayakarolo: Sephiri le tshireletsego mo tshedimosetso ya batsayakarolo di tla sirelediwa ka thata mo thutopatlisisong yotlhe. Tshedimosetso e e tla tlhagisiwang go tswa mo patlisisong e tla bolokwa e le sephiri mme e tla dirisediwa fela go dira dipatlisiso. Boitshupo jwa motho ka bongwe bo tla nna bo sa itsiwe mo dipegong kgotsa mo dikgatisong.

Go Tsaya Karolo ka Boithaopo:

Go tsaya karolo mo thutong eno ke ga boithaopo gotlhelele. Ka jalo, motsayakarolo o na le tshwanelo ya go gana go tsaya karolo kgotsa a ka ikgogela morago mo thutopatlisisong nako nngwe le nngwe ntle le kotlhao kana ditlamorago dipe. Tshwetso ya go tsaya karolo kgotsa go se tseye karolo ga e kitla e ama kagisano ya mothapi le mothapiwa mo isagong jaaka, Nyangabwe Referral Hospital le Lepha la Botsogo.

Dipotso kgotsa matshwenyego ka ga thutopatlisiso e a ka lebisiwa kwa mmatlisisi yo mogolo jaaka go supilwe fa godimo. Le fa go ntse jalo, dipotso tse dingwe ka ga ditshwanelo dipe jaaka motsayakarolo wa patlisiso, di ka romelwa kwa Komiting ya Patlisiso le Tlhabololo ya Batho ya Lefapha la Boitekanelo la Botswana, mmogo le Komiti ya Patlisiso le Maitsholo ya Bookelo jwa Thomelo jwa Nyangabwe go bona tlhaloso e nngwe.

Motsayakarolo o tla tlhoka go saena foromo ya tumalano ya karolo ya thutopatlisiso. Ka go saena foromo ya tumelano, motsayakarolo o tlaabo a supa gore o badile le go tlhaloganya tshedimosetso e a e neetsweng mme dipotso ka ga thutopatlisiso di arabilwe ka tsela e e mo kgotsofatsang.

Re lebogela go bo o akanyeditse go nna le seabe mo thutong eno. Seabe sa gago se anaanelwa thata

Consent form

5.18 Appendix C: Participant Consent Form

Research title: The assessment of the state of emergency preparedness for mass casualty incidents at Nyangabwe Referral Hospital in Francistown, Botswana.

Introduction

The global trend of increasing mass casualty incidents has resulted in increased fatalities, serious injuries, financial and social losses, and disruptions in health institutions and communities globally. Health facilities are often overwhelmed by the surge of critically injured or ill patients, thus, compromising the ability to provide timely and effective medical care. Emergency preparedness strategies are crucial for improving institutional capacity and resilience to enhance quality of care and patient outcome, (Ayenew et al, 2022). Therefore, this serves as an invitation to participate in the study conducted within your institution.

The purpose of this study

The study seeks to assess the state of emergency preparedness for mass casualty incidents at Nyangabwe Referral Hospital accident and emergency department in Francistown, Botswana. Through the study findings, the recommendation forwarded to the hospital will guide on the targeted intervention to improve the institution's response capacity during mass casualty incidents. The participation in the study will involve answering some questions in the form of a survey regarding the knowledge, experience, and perceptions related to the hospital's emergency preparedness. The survey will take approximately 25-30 minutes to complete.

Eligibility

The study population will comprise of all nurses currently employed at Nyangabwe Referral Hospital. The target population will be all nurses currently employed and available during the study period at NRH.

• All Nurses working at Nyangabwe Referral Hospital (NRH).

INCLUSION CRITERIA

Nurses working at NRH and are involved during mass casualty incidents with a minimum of 6 months of work experience.

EXCLUSION CRITERIA

Nurses who were sick during data collection.

Study procedure

A check list and a four sectioned survey questionnaire, will be used as the instrument for data

collection. The data collection process will begin by creating a list of targeted nurses in different departments at Nyangabwe Referral hospital with at least six months working experience. Through developed internal communication channel, an informational email or notice will be sent to explain the study's purpose, procedures, and the importance of participation. This will then be followed by distributing invitations that include detailed study information, consent forms and survey questionnaires at all relevant department. Written informed consent will be obtained from those who agree to participate and 10% of the nurses' sample will be given survey questionnaires to answer before the actual data collection to test the tool. The survey questionnaires will then be given to each participant to answer for the actual data collection after the tool has been verified. The completed questionnaires will then be collected from participants for data analysis.

Alternative procedure

There are no alternative form of participation or treatment currently other than the procedure explained above. However, participants can always inquire about their participation on the study at any time. The relevant assistance will also be provided.

Blood tests

The study involves participants answering questions in a form of questionnaire, therefore no blood tests or treatment trial is involved during this study. The study does not involve collection of any kind of specimen, thus the storage arrangement for specimen is not applicable.

Risks and/or Discomfort

There are no known or anticipated risks associated with participating in this study. However,

psychosocial issues may arise as participants are attempting the questionnaire due to their previous encounter with certain situations or patients. A form of counselling will be provided to the participants showing any form of psychosocial problems related to the study through the department of social work at Nyangabwe Referral Hospital.

Handling of Research related Injury

There are no known or anticipated injuries associated with participating in this study. However,

any injury that may arise as a result of participation in the study will be managed accordingly

through Nyangabwe staff referral system by trained health care experts.

Benefits

There are no direct benefits for individuals participating in this study. However, the information

gathered from this research may help improve the hospital's emergency preparedness. This will

ultimately benefit the institution, staff and patients in terms of improve quality of care and patient outcome through targeted intervention guided by study recommendations.

New information

Participants will continuously be engaged with respect to the study process and any new uncovered information or findings during the process will be shared. This will help participants to have an informed decision on whether to continue with the study or withdraw depending on the kind of information found.

Costs to subjects and compensation

Participants will not incur any cost during the period of the study. There is also no compensation for participating on the study, participation is completely voluntary.

Confidentiality, Privacy and anonymity

The privacy and confidentiality will be strictly protected throughout the study. The information generated from the survey will be kept confidential and only used for research purposes. The individual identity will also remain anonymous in any reports or publications.

Voluntary Participation

The participation in this study is completely voluntary. Therefore, participant have the right to refuse participating or can withdraw from the study at any time without any penalty. The decision to participate or not will not affect their current or future relationship with the employer, Nyangabwe Referral Hospital and Ministry of Health.

I ……. ……..(Name) give my consent to participate in the research study.

I understand the nature of the research and that my participation is voluntary. I know I can withdraw at any time without consequences. I have had the opportunity to ask questions and have received satisfactory answers.

Signature…… Date…….

Principal researcher/Assistant researcher name: …….

Signature: ……... Date: …….

Research related inquiries

The questions or concerns about this study, please contact the principal investigator as indicated below. However, further questions about any rights as a research participant, may be forward to other contacts provided below:

Principal Investigator: Mr Gaoduelwe Lekesi

Contact Information: +26772420429/+260972102548/gaoslekesie@gmail.com

Botswana Ministry of Health Human Research and Development Committee (HRDC): Tel 3632751, Email: hhealthresearch@govbots.onmicrosoft.com

Nyangabwe Research and Ethics Committee: Tel 2411000 for further clarification.

Thank you for considering participation in this study. Your contribution is greatly appreciated.

5.18.1 Appendix D: Consent form

Mekwalo wa ditumalano

Setlhogo: Tshekatsheko ya ipaakanyetso seemo sa tshoganyetso mabapi le ditiragalo tse di ka bakang dikgobalo kana bolwetse ka nakwana ebile go ama batho kana batswasetlhabelo ba le bantsi ebile dithuso tsa botsogo go tlamela ba kokelo ya Nyangabwe Referral kwa Francistown mo Botswana.

Tshedimosetso ka thutopatlisiso

Lefatshe ka bophara go tumile gore go na le koketsega ya ditiragalo tse di bakang dikgobalo le tlagogo ya malwetse tse bontsi di dirang gore go nne le koketsego ya dintsho le dikgobalo tse di masisi. Ditatlhegelo tsa matlole le dikago le dikgoreletsi mo bodireding le dikago tsa dikokelo le mo baaging lefatshe ka bophara le tsone di supile fa di amegile fela thata. Dikokelo jaaka Nyangabwe, gantsi di imelwa ke go fa batswasetlhabelo dithuso tsa botsogo ka dipalo tsa bone di a bo di tlhatlogile mo go imelang ditlamelo le metswedi ya dithuso. Ka jalo go ama boleng le bokgoni jwa go tlamela ka kalafi le dithuso tsa potlako. Maano a go ipaakanyetsa maemo a tshoganyetso le dikgato tsa go itlhaganela di botlhokwa thata mo go tokafatseng bokgoni jwa kokelo le go itsetsepela, (Ayenew et al, 2022). Ka jalo, thutopatlisiso e e batla go sekaseka seemo sa go ipaakanyetsa tiragalo ya go fa dithuso tsa potlako le dikgobalo fa batho ba amegile ka bontsi. Ka jalo, se se tla jaaka taletso ya gore a o kana nna le seabe mo thutopatlisiso e e tlaa dirwa mo kokelong ya lona.

Maikaelelo a thutopatlisiso

Thutopatlisiso e maikaelelo a yone ke go sekaseka seemo sa go ipaakanyetsa maemo a tshoganyetso a ditiragalo tse di ka bakang dikgobalo tse di masisi ga batswasetlhabelo ba le bantsi. Thutopatlisiso e tlaabo e dirwa kwa kokelong ya Nyangabwe Referral Hospital go itebagantswe le lephata la dikotsi/dikgobalo le malwetse a potlako. Diphitlhelelo tsa thutopatlisiso e di solofetswe go thusa kokelo ka supa fa ba tlhaelang teng ka ipakaango ya go tsibogelo diemo tsa tshoganyetso go itebagantswe le bokgoni jwa fa dikgobalo ama batho ba le bantsi. Go nna le seabe mo thutopatlisisong go akaretsa go araba dipotso ka patlisisong mabapi le kitso, maitemogelo le seemo sa go ipaakaanya ga bookelo. Go tla tsaya metsotso e ka nna 25 go ya go e le 30 go wetsa patlomaikutlo a thutopatlisiso.

Tshedimosetso ka go nna motsaya karolo

Thutopatlisiso e tlaa dirwa mo baoking ba maemo otlhe a botsamaisi ba ka jaana ba thapilweng kwa kokelong ya Nyangabwe kwa Francistown. Baoki bano ba tshwanetse go nna le setlanakana sa go dira ebile ba iketleeleditse go dumela go tsaya karolo mo patlisisong.

Tshedimosetso ya ba ba solofetsweng go tsaya karolo

Baoki ba ba direlang kwa Nyangabwe Hospital mme ba na le seabe go thusa ka nako ya ditiragalo tsa dikgobalo tsa batswasetlhabelo ba le bantsi mme ebile ba na le dikgwedi di le thataro le go feta tsa maitemogelo a tiro.

Melawana ya ba go solofetsweng go seka ga nna karolo ya dipatlisiso

Baoki ba ba sa theogelang ka nako ya tshedimosetso kana thutosekadipatlisiso, e ka tswa e le ka mabaka a go lwala, go ya dithutong kgotsa go tsaya malatsi a botapoloso.

Tsamaiso ya thutopatlisiso

Lenaane la patlomaikutlo le tlhatlhobo ya kitso le tlaa dirisiwa go tlhatlhoba dikarolo tse nne tsa ipaakanyetso matlhotlhapelo go kokoanya tshedimosetso. Thulaganyo ya go kokoanya

tshedimosetso e tla simolola ka go tlhama lenaane la go romela le go amogela puisanyo le melaetsa mo baoking ba ba eletsang go tsaya karolo mo maphateng a a farologaneng kwa kokelong. Baoki ba tshwanetse go bo ba na le maitemogelo a tiro a dikgwedi tse thataro le go feta. Ka tsela e e kgethilweng ya tlhaeletsano melaetsa ya tshedimosetso kgotsa kitsiso e tla romelwa go tlhalosa maikaelelo a thutopatlisiso, ditsamaiso le botlhokwa jwa go nna le seabe. Se se tla latelwa ka go aba mekwalo e e akaretsang tshedimosetso ya batsaya karolo, patlomaikutlo, le diforomo tsa tumalano ya go tsaya karolo ee tlhokang go bewa monwa kwa lefapheng lengwe le lengwe le le maleba. Batsayakarolo ba tlaa baa monwana foromo go rurifatsa fa ba dumelana le go tsaya karolo. Se se tlaa salwa morago ke go kopa batsayakarolo ba palo ya diphesente dilo lesome kana palo ya masome a mabedi le boraro go araba dipotso tsa tshedimosetso le patlomaikutlo. Dikarabo tse di filweng di tlaa dirisiwa go sekaseka boleng jwa dipotso le go di baakanya. Morago batsayakarolo ba palo ya makgolo a mabedi le masome a mabedi le metso e meraro ba tlaa araba dipotso tsa patlomaikutlo le tshedimosetso. Tshedimosetso tse di tlaa dirisiwa sekakwa go dirisiwa mo thutodipatlisiso.

Mefuta e mengwe ee teng ya go tsaya karolo

Ga go na mokgwa o mongwe wa go nna le seabe kwa ntleng ga mokgwa o o tlhalositsweng fa godimo. Le fa go ntse jalo, batsayakarolo ba nna le tshono ya go botsa ka ga go nna le seabe mo thutopatlisisong nako nngwe le nngwe. Gape go tla newa thuso e e maleba pele ga batho ba tsaya tswetso ya go nna le karolo mo thutopatlisisong.

Ditlhatlobo tsa madi a mmele

Patlisiso e akaretsa go araba dipotso ga batsayakarolo mo foromong ya dipotso, ka jalo ga go na ditlhatlhobo tsa madi kgotsa diteko tsa kalafi tse di amegang mo thutopatlisiso e. Ditlhotlhomiso ga di akaretse go dirisa mofuta mongwe le mongwe, ka jalo thulaganyo ya go boloka madi ga e a tlhokafale.

Borai jwa go tsaya karolo mo thutopatlisisong

Ga go na dikotsi tse di itsiweng kgotsa tse di solofetsweng tse di ka amang batsayakarolo go nna le seabe mo thutopatlisisong eno. Le fa go ntse jalo, fa batsayakarolo ba ka tlhagelwa ke borai bope mabapi le go tsaya karolo mo thutopatlisisong e, ba tlaa fiwa dithuso tse di maleba go ya ka tsamaiso ya kokelo ya go thusa badiredi go dirisiwa baitseanape ba tlhokomelo.

Dipoelo mabapi le go tsaya karolo mo thutopatlisisong

Mosola wa go nna le seabe mo thutopatlisisong e ga o supafale gone foo mo batsayakarolong. Le fa go ntse jalo, tshedimosetso e e tswang mo thutopatlisisong eno e ka thusa go tokafatsa go ipaakanyetsa seemo sa tshoganyetso sa kokelo. Se se tla tswela mosola kokelo, badiri le balwetse ka go tokafatsa boleng jwa tlhokomelo le dithuso tse di ka fiwang balwetse go lebilwe ditlhaelo go tswa mo dikgakolong tsa dipatlisiso.

Tshedimoso ka melaetsa e mešha

Batsayakarolo ba tlaa tswelela ka go nna le seabe le go tsibosiwa ka dithulaganyo tsa thutopatlisiso le tshedimosetso ka phitlhelelo nngwe le nngwe e nšhwa. Se se tla thusa batsayakarolo go nna le tshwetso e e nang le kitso mabapi le gore a ba tswelela ka thutopatlisiso kgotsa go tlogela go ya ka mofuta wa tshedimosetso o o bonweng.

Ditshenyegelo tsa dituelo mabapi le go tsaya karolo

Batsayakarolo ga ba na go nna le ditshenyegelo dipe mabapi le go tsaya karolo mo thutopaltisisong ka go tlaa bo go direlwa mo kokelong ka nako ya tiro. Ga go na dituelo tse di tlaa fiwang batsayakarolo mo thutopatlisisong e.

Sephiri le tshireletsego ya tshedimosetso le go nna motlhokaleina mo dipatlisisong

Tshedimosetso e e tla fiwang ke batsayakarolo e tlaa nna sephira sa motlhotlhomisi mogolo le ba ba maleba fela, ebile e tlaa bo e sireletsegile mo go dirisiweng botlhaswa. Tshedimosetso e tla boloka e le sephiri mme e tla dirisediwa fela go dira dipatlisiso. Boitshupo jwa motho ka bongwe bo tla nna bo sa itsiwe mo dipegong kgotsa mo dikgatisong. Fomo ya ditumalano ee akaretsang maina le sepe se se ka supang motsayakarolo ka bongwe jwa gagwe e tlaa farologangwa le tshedimosetso ebile e tlaa bewa ka tshireletsego.

Molaetsa wa go supa fa go tsewa karolo ka boithaopo

Go nna le seabe mo thutopatlisisong eno ke ga boithaopo gotlhelele. Ka jalo, batsayakarolo ba na le tshwanelo ya go gana go tsaya karolo kgotsa ba ka tlogela tshedimosetso ka nako nngwe le nngwe ntle le kotlhao. Tshwetso ya go tsaya karolo kgotsa go sa tsaya karolo gago na go ama botsalano jwa mohiriwa le mohiri mo gompienong le mo isagong ebong Nyangabwe Hospital le ba Lephata la Botsogo le boitekanelo.

Rurifatsa fa o tsayakarolo ka go tlatsa maina le go baya monwa mo diphatleng tse di

tlogetsweng.

NNA……. (leina), Ke

tlhaloganya ka botlalo diteng tsa pampiri ya tshedimosetso ya motsayakarolo. Ke ne ka fiwa le sebaka sa go botsa dipotso, mme dipotso tse di neng di boditswe di ne tsa arabiwa ka tsela e e neng ya nkgotsofatsa. Ke tlhaloganya gore nka ikgogela morago mo tsamaisong ya dipatlisiso nako nngwe le nngwe kwantle ga kotlhao epe kana ditlamorago. Go tlhomamisitswe gape fa tshireletsego ya tshedimosetso ya batsaya karolo mo dipatlisiso e le ya maemo a a kwa godimo ebile e sala morago melawana ya dipatlisiso ya mafatshe. Ka jalo dumelana le go tsaya karolo mo dipatlisisong:

…….. ……..

Tshaeno (Motsayakarolo) Letsatsi

…….. …… …. ……..

Maina (motlhotlhomisi kana Mothusi) (tshaeno) Letsatsi

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5.19 Appendix E: HOSPITAL EMERGENCY PREPAREDNESS CHECKLIST TOOL

Adapted from World Health Organisation HOSPITAL EMERGENCY PREPAREDNESS CHECKLIST (HEAT) (2008-2013).

Part A

SECTION A

Respondents profile

1.0, Name of the unit/ department station: …….

INSTRUCTION: TICK on the space provide (√**)**

2.0, Gender: Male ( ) Female ( )

3.0, Age: 20-25 ( ), 26-30 yrs ( ), 31-35 yrs ( ), 36-40 ( ),

41 yrs and above ( ).

4.0, Marital Status: Married ( ), Single ( ), Divorced ( ), Separated ( ), widow ( ), Widower( )

5.0, Academic qualification, Ph.D., MBA/MA/M.Sc./Med, BA/B.SC/B.Ed./HND: (please state) ……

6.0, Speciality qualification if any: ……

7.0, Work experience: 6 months-2years ( ), 2-5 yrs ( ). 5-10 yrs ( ),

10-15 yrs ( ), 15yr and above ( )

8.0, Category of employee: Management Staff ( ) general duty/other ( )

9.0, Courses undertaken e.g. Basic Life Support: ……

SECTION B

Emergency preparedness and response policy (CIRCLE YE or NO or undecided where applicable)

10.0, Does the hospital have a policy framework guiding emergency preparedness and response planning: **Yes** **Not** **undecided**:

11.0, Does the hospital implement this policy guiding emergency preparedness and response planning? If the above is yes: Yes No undecided

---

12.0, Is this hospital emergency management policy visible to all category of

employees in the hospital? **Yes** **No** **undecided**:

13.0, The hospital emergency management policy is reviewed annually or as planned and or anytime the need arises

: **YES** **NO** **Undecided**

SECTION C

Knowledge on emergency preparedness and response planning (circle the appropriately as you understand the statement)

Statement **Strongly Agree,** **Agree,** **Disagree, Strongly Disagree, undecided/(Yes or No)**

14.0, Emergency preparedness and response refers to the ability of health care systems, communities, and individuals, to prevent, prevent against, quickly respond to and recover from health care emergencies.

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

15.0, Hospital emergency preparedness plan consist of structural and non-structural, Functional and human resource components.

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

16.0, There is an emergency preparedness and response plan in the hospital and I know where to access it.

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

17.0, Over the past 1 or 2 years I have participated in educational activity(training) dealing with emergency preparedness and response.

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

18.0, Emergency Operation Centre or Incident Command Centre is a predetermined location chosen for emergency operations.

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

19.0, The steps to follow in the hospital when there is an emergency with sudden influx of patients is well documented in the emergency plan and well understood by staff, including me. (Mass casualty)

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

20.0, I have the competence to perform the acceptable triage principles used in disaster and emergency incidents:

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

21.0, There is need for staff to be training and exercise or drill to prepare for incidents for mass casualty or emergency**?**

Answer: Strong Agree, Agree, Disagree, Strongly Disagree, Undecided

---

SECTION D: Attitude of health workers on emergency preparedness and response

---

STATEMENT Strongly Agree, Agree, Disagree, Strongly disagree, Undecided

---

22.0, I need to know about disaster and emergency preparedness planning:

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

23.0, If you were not on duty and were asked to come to work because the hospital had a large number of casualties to take care of as a result of a disaster, would you be willing to do so?

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

24.0, I need to participate when there is an emergency incident and the hospital emergency department calls for help through the emergency alarm

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

What prevents you from responding or participating when the emergency alarm calls at the emergency department during incidents of mass casualty or drills? (select the answer with an X across it) chose from the following.

Answer: **Unclear roles, Limited skills on triage, high Unit Work load, Not my responsibility**

(Please state if your reason is not included):

25.0, Potential hazards likely to cause disasters should be identified through risk assessment and **mitigation** should be put in place.

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

26.0, Emergency preparedness and response is for doctors and nurses only:

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

27.0, I can willingly participate on emergency response activities including infectious diseases outbreak without incentives:

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided

---

28.0, The attitude of health personnel to emergency preparedness and response in the hospital in very good.

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided.

29.0, I am willingly to participate on emergency response hospital activities including infectious diseases outbreak whenever the need arises.

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided.

30.0, Lives and properties are lost during emergencies due to untrained personnel in the hospital:

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided.

31.0, The hospital is adequately prepared to manage internal or external or any type of disaster or emergency incidents in which there is an influx of patients:

Answer: Strongly Agree, Agree, Disagree, Strongly Disagree, undecided.

SECTION E

31.0 ASSESSMENT OF BASIC KNOWLEDGE AND SKILL ON MANAGEMENT OF PATIENT UTILIZATION OF PRIMARY SURVEY:

Mr James, a front seat unrestrained passenger was thrown out of the car after head-on collision.

Half an hour later he was picked up by road patrol and rushed to Nyangabwe hospital, and he was found semiconscious, BP 80/50, with noisy breathing, pulse rate of 110/min, and his trousers soaked with blood.

(a) Considering primary survey (ABCDE), what would you do to manage him? Possible findings and related management (within your capacity) (total score 27 marks)?

A. Airway and

B. Breathing (4): Assess for airway and breathing by (what to look for)

Answer

A. Check temperature, pulse blood pressure and bleeding

B. check for airway patency, check trachea position, look breathing patterns/signs of respiratory distress, bilateral air entry

C. Refer to higher practitioner, give fluids and painkiller Possible management for Airway and Breathing? (4

Possible management for Airway and Breathing?

Answer

A. Apply compressive bandage, order X ray or CT scan and give painkillers

B. Give normal saline 0,9%, nebulise, give antibiotics as per need.

C. Protect C spine, secure airway (inserting oral/nasal airway device, perform jaw thrust) and

give oxygen.

C. Assessment of Circulation and presence of shock by (10). (what to look for)

Answers

A. Assess for pallor, capillary refill, check heart rate and blood pressure

B. control external haemorrhage, insert a large bore cannular and run 1 L warm crystalloid fast

and place 12 lead ECG

C. draw blood for cross matching, CBC, chemistry, insert foley and record urine output

D. all above

4.0. Disability. Assess for consciousness (what to look for)

Answers

A. assess for consciousness using AVPU and Glasgow scale (pupil dilation/motor/verbal response

B. Prevent secondary brain injury by administering high flow oxygen

C. Feed patient solid foods to increase their glucose

D. All the above

5.0. Exposure and it purpose

Answer

A. Head to toe examination (check for injuries/bleeding/ deformities/rashes/swelling)

B. Prevent hypothermia in the process of exposure

C. To assist a patient to calm down if in distress

D. None of the above

Part B

5.19.1 SECTION B

Guide: 1). Indicate the presence of the item or not by writing YES or NO). Write your comment on the space provided, 3) Where possible conduct a physical assessment of the hospital to check the presence of the listed component or facility and make comment on the space provided.

I. Does the hospital have Hospital Disaster Plan /Hospital emergency preparedness and response plan (HDP)? YES NO; …….

II. Is there Hospital DP Committee? YES NO .....

III. Does the HDP cover both internal and external disasters? YES NO .....

IV. Is the HDP available in every department of the hospital? YES NO .....

V. Is the HDP based on an "all hazards" approach? (Please indicate the hazards covered by the plan): YES NO …….

VI. Does the HDP have details on any agreements with other Hospitals or healthcare centres to accept patients during disasters? YES NO .....

VII. Presence of trauma team (if yes explain composition): YES NO …….

VIII. Presence of trauma team activation protocol (If yes explain composition): YES NO ……

IX. Presence of ongoing in-service trauma training (If yes explain who are the conveners): YES NO …

X. ……

XI. If answer to 3 is yes, how many times did the trauma training (mentioned above) run in the past year: YES
NO ……
……

XII. Is there presence of Quality Improvement initiatives, (mortality- and morbidity-meetings, panel review etc.): YES
NO ……
……

XIII. If yes mention which one is conducted and how many times per quarter (3 month) and who are the members: YES
NO ……
…….

XIV. Presence of protocol for handover of polytrauma patients (If yes describe): YES
NO ……
……..

XV. 7. Presence of protocol for transferring polytrauma patients between specialists or facilities (If yes describe): YES
NO ……
……

XVI. 8. Dedicated trauma registry: YES
NO ……
.

SECTION C: Guide: 1). Indicate the presence of the item or not by circling YES OR NO. Write your comment on the space provided, if any 3) Where possible conduct a physical assessment of the hospital to check the presence of the listed component or facility and make comment on the space provided

COMMAND AND CONTROL	Yes	No	Comment

1. Is there a designated hospital command centre or area. .i.e

a specific area prepared to convene and coordinate

hospital-wide emergency response activities and

equipped with effective means of communication? (Please state the area).

Yes No

2. Is there a designated individual (focal person/point)

to ensure the appropriate management and coordination

of related response activities? (please their designation) Yes No

3. Does the hospital consult the internal and external

Documents (e.g national health publication and WHO)

Related to hospital emergency management to ensure

Application of the basic principles and accepted strategies

related to planning and implementing a hospital incident

action plan? Yes No

4. Is there implementation or development of the job action sheets that briefly list the essential qualification, duties, and resources required of EOC members, hospital managers and staff for emergency-response activities? Yes No Comments

A. COMMUNICATION (circle the answer)	Yes	No	Comment

5. Are there clear stipulations of what communication systems should be used during disasters or emergency Mass casualty incidents (Please state the communication system used. E.g. telephone if yes)? Yes No comment

---

6. Are there any provision for alternative communication systems in the event that the normal system (for example Telephone and cell phones) are overloaded and are unserviceable during disaster or emergencies (note which ones)? Yes, No Comment

---

7. Does the plan utilize an organized runner or messenger system as backup during disaster? Yes No

---

8. In the event of a power outage, does the plan detail what forms of communication systems will be used? Yes No

---

9. Are there any arrangements with the local telecommunication companies for the provision of adequate uninterrupted communication systems during disasters/emergencies? Yes No

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10. Are the standardized messages or systems for alerting hospital staff with a description of each stage? Yes No

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11. Does the plan specify who is responsible to activate the emergency/disaster plan? Yes No

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12. Are there specifications under which the plan should be activated? Yes No Comment:

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13. Does the plan specify how the staff will be notified? Please comment if yes Yes No

B. SAFETY AND SECURITY Yes No Comment

14. Does the hospital have a hospital security team responsible for all hospital safety and security activities in collaboration with the hospital incident Command group (ICG) to identify areas of anticipated or increased vulnerability (e.g control entry/exist)? Yes No

15. Does the emergency plan details how control patients and victims, relatives and community will be controlled? Yes No

16. Are there clear stipulation on how staff will be identified during crisis management? Yes No

17. Are there details of personal protective equipment and precautions to be taken in an event of possible infectious diseases or when victims need decontamination? Yes No

C. **TRIAGE** Yes No Comment

18. Do the hospital have an experienced triage officer/s to oversee all triage operations (e.g. a trauma or emergency physician or a well-trained emergency nurse in a supervisory position? Yes No

19. Do the hospital have a triage system in place to categories patients in terms of severity of illness or injuries and agency

of treatment and management of care required? Yes No

20. Does the emergency department have special areas such as the Decontamination and Isolation areas for special cases? Yes No

21. Is there a separate entry for contaminated patients into Emergency department? (Chemical or biological hazards victims) Yes No

22. Does the decontamination area have hot and cold water with run off that can be contained, with isolated ventilated area and a device for decontamination? Yes No

D. LOGISTICS AND SUPPLY MANAGEMENT	**Yes**	**No**	**Comment**

23. Is there stockpiling of drugs and other clinical equipment for use during disaster or mass casualty incidents? Yes No

24. Is there supply of Personal protective Equipment for staff members when necessary? Yes No

25. Does the institution have availability of appropriate back-up arrangement for essential life lines such as water, power and oxygen? Yes No

26. Are there agreement or arrangements with supplies to supply necessary clinical equipment and other clinical supplies that may be required during disaster or mass casualty crisis in-case over stretch? Yes No

27. Does the hospital have system in place for determining and storing the optimal number of pharmaceuticals, laboratory operating equipment and blood products for mass casualty event? Yes No

E. HUMAN RESOURCES	Yes	No	Comment
28. Does the institution have a database of staff trained on emergency management?	Yes	No	
29. Does the hospital have a training and education plan available for staff involved in mass casualty situation?	Yes	No	
30. Does the management update the hospital staff and contact list, (how often, please state if possible)?	Yes	No	
31. Does the institution have a system for recruiting and training additional staff according to need?	Yes	No	
32. Does the hospital have a system to ensure multidisciplinary Psychosocial support teams such as social workers, counsellors, interpreters and clergy for families, staff and patients?	Yes	No	

F. TRAINING AND EDUCATION	Yes	No	Comments
33. The plan indicates who is responsible of training and educating staff?	Yes	No	
34. The plan shows how hospital staff will be familiarized			

with their roles during disasters? Yes No

35. The hospital conducts in-service trainings or workshops to facilitate staff awareness on emergency preparedness and their roles? Yes No

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36. All staff receives orientation to the Hospital Disaster or emergency Plan? (Comment on the number if known). Yes No

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37. Does the hospital plan drills? Yes No

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38. Hospital has conducted an exercise with casualties? Yes No

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39. At least one exercise in the last two years was conducted unannounced? Yes No

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40. Hospital has had drill evacuation of staff and patients in the last 2 years? Yes No

---

G. SURGE CAPACITY **Yes** **No** **Comment**

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41. Does the institution have designated care areas for patients overflow? Yes No

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42. Does the hospital have a contingency plan for interfacility patients transfer or non-critical patients in case of overflow to increase capacity? Yes No

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43. Can the institution sustain operation at maximum occupancy for 72 hrs or more during mass casualty

Incidents with respect to the available resources? Yes No

Post-delivery Recovery Yes No Comment

H. Does the disaster or emergency plan include de-briefing and

Post-action report? Yes No

-

I. Are there documentation on previous mass casualty incidents de-briefing Yes No

5.19.2 Adapted from WHO GENERIC ESSENTIAL EMERGENCY EQUIPMENT LIST 2012 format

5.19.2.1 **TABLE 2. Assessment of physical resources for management of airway and breathing problems in emergency room at Nyangabwe Referral Hospital:**

NB: write how many are each item if available (+) or N/B if not available and number where possible*:*

ASSESSMENT IETM	AVAILABILITY (+)/NO AVAILABLE(-)	NUMBER WHERE POSSIBLE
1. Oxygen supply/cylinders: Yes No		
2. Oropharyngeal airway: Yes No		
3. Suction unit-powered: Yes No		
4. Suction tubes (*Paediatric *Adult): Yes No		
5. Yankauer or stiff suction tip: Yes No		
6. Bag-valve-mask: Yes No		
7. Nasogastric tubes (*P *A): Yes No		
8. Laryngoscope (*P *A): Yes No		
9. Magill forceps: Yes No		
10. Endotracheal tube (*P *A): Yes No		
11. Hard neck collars: Yes No		
12. Spine boards: Yes No		
13. Pulse oximeter: Yes No		
14. Ventilator machine: Yes No		
15. Underwater drain set (*P *A): Yes No		
16. Crash cart trolleys (*P *A): Yes No		
17. Crash cart trolleys maintenance protocol: Yes No		
18. Portable x-ray machine: Yes No		

KEY *P- pediatrics, *A-Adults

5.19.2.2 TABLE 2. Assessment of physical resources for the management of airway and breathing problems in the emergency room at Nyangabwe Referral Hospital:

NB: write how many are each item if available (+) or N/B if not available and number where possible*:*

ASSESSMENT ITEM	**AVAILABLE/NOT AVAILABLE (PUT NO IF POSSIBLE)**
1. Cannular (14, 16, 18) (*P*A)	Yes No
2. Central venous catheters	Yes No
3. Intraosseous needles	Yes No
4. IVF crystalloids	Yes No
5. Rapid infusion equipment:	Yes No
6. Fluid warming equipment:	Yes No
7. Focused Assessment Sonography for Trauma (FAST):	Yes No
8. Central venous pressure monitoring:	Yes No
9. Arterial pressure monitoring:	Yes No
10. Emergency operation theatre:	Yes No
11. Foley catheters (*P *A):	Yes No
12. BP machines & cuffs (*P *A):	Yes No
13. Blood transfusion capacity:	Yes No

5.19.2.3 TABLE.3. Trauma-care supporting services and resources in the emergency room.

Assessment unit	Write Number if available	
1. **Emergency Bay beds /Emergency Bay surge**	Yes	No
2. **Capacity Wheeled trolleys:** **Yes** **No**		
3. **Wheelchairs** **Yes** **No**		
4. **Defibrillator**	Yes	No
5. **ECG Monitors**	Yes	No
6. **Hematology Analyzer**	Yes	No
7. **Chemistry Analyzer**	Yes	No
8. **Ventilators**	Yes	No
9. **Ultrasound scan machine**	Yes	No
10. **X-ray machine**	Yes	No
11. **CT scanner**	Yes	No
12. **MRI scanner**	Yes	No
13. **ABG Analyzer**	Yes	No

5.19.2.4 TABLE: 4. Trauma-care supporting services at Nyangabwe Referral Hospital

ASSESSMENT ITEM (SPECIALISTS)	NUMBER AVAILABLE
1. General surgeons:	Yes No
2. Anaesthesiologists:	Yes No
3. Nurse-anaesthetists:	Yes No
4. Paediatric surgeons:	Yes No
5. Orthopedic surgeons:	Yes No
6. Neurosurgeons:	Yes No
7. Vascular surgeons:	Yes No
8. Thoracic surgeons:	Yes No
9. Maxillofacial surgeons:	Yes No
10. Radiologists:	Yes No
11. Urologists:	Yes No
12. ENT surgeons:	Yes No
13. Plastic surgeons:	Yes No
14. Intensive care nurses:	Yes No
15. Multiple theatres for multi-specialties:	Yes No

16. Dedicated emergency theatre:	Yes No
17. Adult ICU beds:	Yes No
18. Neonatal ICU beds:	Yes No