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## Determinants of hospital emergency preparedness in the Ashanti Region of Ghana

Linda Otoo <sup>1\*</sup>, Yinghua Chen <sup>2</sup>, Harris Kwaku Duah <sup>3</sup>

<sup>1-2</sup> Jiangsu University, School of Management, Zhenjiang City, Jiangsu Province, P.R. China

<sup>2</sup> Nanjing University of Science and Technology, Nanjing City, Jiangsu Province, P.R. China

\* Corresponding Author: **Linda Otoo**

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### Abstract

This research explores the determinants of hospital emergency preparedness in the Ashanti Region of Ghana using a cross-sectional design. A convenience sampling method was used to select 360 health professionals. Data was collected using a structured questionnaire. The Statistical Package for Social Sciences (SPSS) Version 26.0 was used to analyze the data collected. After analyzing the data, the study revealed that the capacity of healthcare professionals played an essential role in hospital emergency preparedness. The capacity in which health professionals play a role in hospital emergency preparedness promotes primary health and prevents illness, enhances the day-to-day operation and readiness for emergency cases, and ensures access to quality health care. It was recognized that the factors that influence the determinants of hospital emergency preparedness were financial capacity or funding, top management decisions on emergency preparedness, infrastructure availability, hospital resource management, plan strategy or tool for hospital emergency preparedness, and hospital communication and triage system. The study established that the challenges of hospital emergency preparedness were inadequate staff or health professionals, improper management, lack of education and training drills on emergency preparedness management, inadequate finance, lack of necessary healthcare facilities and equipment, poor surveillance systems, inadequate resource capability, and lack of laid down plan or strategy for emergencies. It was recommended that training drills must be conducted regularly. Also, healthcare professionals should be informed about the training programs, and the hospital management should ensure that all plans and policies are maintained and updated regularly.

**Keywords:** Hospital emergency, preparedness, healthcare professionals, Ashanti region, Ghana

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### 1. Introduction

The World Health Organization (WHO) considers service delivery one of the health system's building elements. Risk management is an important component of public health security across the world. For the global health system, readiness, reaction, and risk management, planning for and responding to emergencies is critical (WHO, 2018). Preparedness for emergencies is an important factor in crisis planning, preparation, and response (Khan, 2018) <sup>[18]</sup>. Emergency preparedness is defined as the information, skills, abilities, and activities required to prepare for and respond to potential, existing, or suspected biological, chemical, nuclear, radiological or explosive catastrophes, artificial occurrences, natural disasters, or other related events. A public emergency is described as an unforeseen event with significant negative consequences for human health, the economy, and social stability. Furthermore, hospital emergency preparedness refers to the activities, plans, and systems that a hospital develops and implements in advance of a big disaster to increase the Hospital's readiness and capacity to respond to disasters and emergencies.

To raise the degree of preparedness in response to this appeal to prepare hospitals and employees for disasters, extensive reflection, analysis of reaction, and creative techniques to prepare hospital workers have to be done (Yamashita & Kudo, 2014). Policies, equipment, and employee training are part of emergency preparedness initiatives. Nurses are the most numerous employees in the Hospital and on any individual unit; thus, they must be at the centre of any emergency preparedness strategy. The Joint Commission requires that all healthcare institutions develop an emergency preparedness plan and exercise it twice a year with all workers (The Joint Commission, 2013). Resources for hospital emergency preparedness and response are supposed to help hospitals plan for and respond to all threats. Disaster preparation in health care ensures facility readiness prior to an emergency and a proven response, resiliency, and recovery framework. Planning, infrastructure, knowledge and capabilities, and training are the essential components of sustaining a high level of preparedness (Mulyasari *et al.*, 2013) [27]. Despite these rules, many healthcare institutions are not well equipped to deal with emergencies and disasters. Because nurses are confident in what they do regularly but are less experienced with unusual situations, poor confidence in emergency preparedness is unsurprising given the rarity of mass casualty incidents.

Hospital emergency preparedness is an integral part of the multisectoral community emergency plan and the health sector emergency plan. The process for preparedness is the same as that for communities or organizations and produces many outputs, only one of which is a written emergency plan. Hospital emergency preparedness has two aspects: protection of the Hospital, hospital services, patients and staff from harm caused either internally or externally; and the provision of hospital services to the community before, during, and after an emergency (National Health Security Preparedness Index, 2018). Consequently, hospital emergency preparedness should be based on the vulnerability assessment of the community to determine the likely medical needs of the community before, during and after emergencies. It must also be based on a vulnerability assessment of the Hospital to determine the likely harm caused to the Hospital by both internal and external emergencies; and an assessment of the reception and treatment capacities of the Hospital.

The goal of hospital emergency preparedness objectives is to improve emergency management in hospitals and health workers so that they can successfully plan for, mitigate against, respond to, and recover from any danger through planning, training, and exercises. While the main goal is to save lives, the extent of organizational and individual health professional readiness in the event of an emergency is unknown. Community preparedness, a staff augmentation strategy, and communications and public policies for supporting emergency readiness must be prioritized in hospital emergency preparedness. However, insufficient research gives a full picture of the facilities' preparedness, particularly for critical outlets.

Emergencies and calamities affect people, property, infrastructure, economies, and the environment worldwide. Death, injury, sickness, starvation, and psychological stress are all examples of harm to humans. If disasters and the dangers and vulnerabilities that generate them are not successfully handled, the aim of sustainable development is jeopardized. At the national and sub-national levels, special attention must focus on averting emergencies and planning

efficient emergency responses. Despite this necessity, there has been a notable absence of healthcare industry recommendations on emergency preparedness. Lack of adequate emergency preparedness in strategy hospitals increases the number of mortality and morbidity globally.

Ghana requires a practical national hospital and medical emergency response program based on a fair distribution of adequate equipment and supplies and well-trained emergency medical staff. The WHO advises that healthcare facilities' emergency response capabilities must be evaluated regularly (Sheikhbardsiri *et al.*, 2017) [34]. However, there is a skills shortage in the country's healthcare sector. There are several gaps in the efficiency of the nation's healthcare system's equipment and supplies. Decades of neglect and inadequate financial and human resource management have rendered Ghana's medical infrastructure vulnerable. Despite procurement laws and standards, there appeared to be open corruption in healthcare transactions. Systemic underfunding has aggravated this scenario. Frequently, hospitals lack completely functional labs, X-ray and diagnostic or rehabilitation equipment, a robust logistics and consumables supply chain, and enough graduate medical and support staff. Patients are overcrowding the beds, with some sleeping on mattresses in the halls and passageways. The bedding supplies are not in the finest of shape. Some hospitals do not have an Intensive Care Unit, or "ICU," nor do they have plans for surge capacity. Health care facilities should be able to operate not just in a typical hospital setting but also in addressing difficult cases during peak hours. Surge capacity is a health facility's ability to extend beyond regular services in the case of a large-scale disaster to satisfy increased demand for bed space, competent employees, medical services, and public health activities. Therefore, the study seeks to explore the determinants of hospital emergency preparedness in the Ashanti Region of Ghana.

## 2. Literature Review

### 2.1 The influence of healthcare professionals' capacity on hospital emergency preparedness

Healthcare is a collaborative endeavour. Each healthcare practitioner is a team member with a specific duty. Some team members are doctors or technologists who assist in an illness diagnosis. Others are specialists who treat sickness or provide physical and emotional support to patients. Healthcare professionals may include nurses, pharmacists, physician assistants, and administrative and support staff (Bridgeman *et al.*, 2018) [4]. Health professionals have a fundamental role in enhancing population access to and quality of health care. They provide vital services that promote health, prevent illness, and provide health care (World Health Organization, 2012) to people, families, and communities using a primary health care approach. Mechanisms for enhancing health professionals' strengths and talents will be critical to meeting the Strategic Development Goals (World Health Organization, 2015).

When patients visit the Hospital for usual healthcare matters, it involves more professionals other than just the doctor alone. Before a patient sees a doctor, the administrative staff members plan the appointment, locate the medical record, and contact to remind the patient, among other duties. Then, the nurse or medical assistant takes the patient's weight and vital signs and accompanies the patient to an exam room alongside the purpose of the appointment documents. Then, the doctor or physician performs their role, and if there is the

need for a laboratory or other test, the laboratory technician comes to perform their duties. After, the results will be discussed with the patient by a technician, nurse, or doctor. A pharmacist fills prescriptions for treatment, such as medicine if one is prescribed. Thus, it can be observed that different professionals are involved in the healthcare system (Hutchison *et al.*, 2011) <sup>[16]</sup>. Similarly, such as the situation when there is an emergency. Therefore, a hospital's number of healthcare professionals highly affects its day-to-day operation and readiness for emergency cases.

The idea that capacity is connected to performance is common to all descriptions of capacity growth. Capacity building has become a key component of plans for developing health systems worldwide (World Health Organization, 2010). We all know that more means better; hence hospitals with high numbers of healthcare professionals represent better services that can be provided. In recent times, studies done portray the existence of major concerns of physician shortage that will affect patients. Data from world health proves that the ratio of physicians to the world is vital to qualify for the healthcare service a patient receives (World Health Organization, 2013). Hence, countries with the least doctor to patient ratio (developed countries) have better healthcare systems or services than those with a high doctor-patient ratio (developing countries). All these statistics say a lot about the importance of the healthcare profession to emergency preparedness. For example, a hospital where one doctor attends to five patients will have much ability to care for victims compared to one doctor to fifty patients. Thus, high healthcare professional capability contributes to emergency readiness as there will be enough physicians on standby to help in times of emergency. However, the large capacity of healthcare professionals does not always transform into better service (Yip *et al.*, 2020) <sup>[50]</sup>. There are quite some instances that it is not beneficial. Thus, the capacity of healthcare professionals is only considered effective if it results in improved performance.

Dealing with the healthcare professional capacity of a hospital entails employing more workers or staff or vice versa (Koinis *et al.*, 2015) <sup>[20]</sup>. However, hiring more staff or professionals is beneficial to the healthcare system in providing better health services to patients (Mosadeghrad, 2014) <sup>[26]</sup> and easing pressure on its staff. Not having enough staff in a hospital hinders the day-to-day tasks required to create and maintain a high-functioning healthcare system. Hospitals without enough staff are understaffed in emergency management (Farley *et al.*, 2017) <sup>[13]</sup>. Healthcare professional capacity of a hospital is dependent on the level of risk of disasters or incidents. Hospitals in areas with a high risk of disasters based on their location, reputation, technology, and others tend to have many health workers and vice versa. Finally, healthcare professional capacity plays a key role in emergency preparedness because, in times of a disaster, more professionals will need to help care for affected victims.

## 2.2 The factors that influence the determinants of hospital emergency preparedness

Several factors influence the preparedness for an emergency in the Hospital, such as financial capacity or funding (Toner, 2017) <sup>[38]</sup>, planning strategies (Skryabina *et al.*, 2017) <sup>[36]</sup>, resource management, infrastructure availability, availability of healthcare personnel, education and training skill availability of staff among other factors (Veenema, 2018) <sup>[40]</sup>. Aside from these factors, other attributes influence hospital

emergency readiness: their mission or purpose, capabilities, competencies, resources, location, etc. As mentioned earlier, hospitals or institutions in high-risk zones must plan and train strategies for disasters' high probability and impact. Planning programs and tools affect hospital emergency preparedness (World Health Organization, 2017) that are overseen by the hospital administration department. Several planning programs exist, which are incorporated into hospital managerial activities that can influence emergency preparedness. Examples of such plans and tools include strategic preparedness planning (World Health Organization, 2016) and hazard vulnerability analysis tools (California Hospital Association, 2017). Strategic preparedness planning offers a framework for addressing concerns and reaching a consensus on how the Hospital should proceed. Hospitals can only build a realistic strategy that minimizes catastrophe exposure and maximizes disaster response through the strategic preparedness planning process. A systematic procedure often enables all assumptions and evidence to be reconsidered, discussed, and documented. Hence, be ready for any emergency that occurs.

Hospital administrators may struggle to implement strategic preparedness planning if they do not follow a well-planned procedure. Ideas are never debated, conclusions are never reached, decisions are never taken, strategies are never implemented, and strategic thinking is never documented if there is no process. Thus, hospital administrators execute a process to plan, debate, conclude and document how to deal with emergencies.

Moreover, Hazard Vulnerability Analysis (HVA) tool is a framework for danger, risk, and preparedness, among other processes, to analyze institutions' level of readiness for catastrophes (California Hospital Association, 2017). Its application in hospitals or healthcare systems is a good way to promote emergency preparedness. Administrators can use it to grade and assess the services interruption and risk to know how prepared the healthcare institute is. This tool provides hospital managers with better insight and awareness of emergency crises to know how susceptible they are to emergencies to allow faster response and handling.

Besides having a plan strategy or tool, a healthcare institute's ability to develop a plan is also crucial to being prepared for emergencies (Mulyasari *et al.*, 2013) <sup>[27]</sup>. Despite having plans and tool laid down does not mean it is the final deal because time changes; hence there is the need for a review of these plans or tools to be amended to suit changes in time that the Hospital may find itself. Successful hospitals have leaders or managers who understand the nature and implications of external change and can develop effective change strategies overtime to manage the Hospital's momentum to crisis seasons actively. The realities of the twenty-first century indicate that hospitals and their managerial department must constantly develop and adapt to different strategic preparation planning to keep them at bay from emergency chaos.

Financial capability is another determinant factor influencing healthcare emergency preparedness (Khan *et al.*, 2018) <sup>[18]</sup>. Healthcare institutes can acquire more infrastructure to support their growth or development with strong and stable finance. Moreover, it can stockpile needed drugs or antibiotics and buy medical tools and equipment besides performing experiments to learn more about a biological hazard disease or virus. The issue of finance is a bigger problem for healthcare sectors (Simou & Koutsogeorgou,

2014)<sup>[34]</sup>, especially the public sector with a limited budget. A strong public health system means financial stability of hospitals to enable efficient and effective health care delivery, particularly in times of emergencies.

Hospitals with strong finance can acquire necessary materials for operational activities like personal protective equipment (PPE) and ventilators, among other machinery and tools (Turer *et al.*, 2020)<sup>[39]</sup>. This equipment aids in the day-to-day activities of the Hospital and during crucial times or times of emergency. The ability to acquire these materials serves as a determinant of how prepared a hospital is for emergencies. Hence, Hospital with the financial capability to purchase the needed tools and equipment is well prepared for emergencies and vice versa. Moreover, strong finance helps health institutes supply or satisfy all their patients' requirements, such as bedpans, linens, and other items. Thus, having all these capable tools or supplies shows how a hospital is prepared for any crisis (Chen *et al.*, 2017; Turer *et al.*, 2020)<sup>[9, 39]</sup>. Finally, how financial stability of a hospital determines how prepared it can be or not.

Resource management is another determinant factor in a hospital institute's preparedness (Chen *et al.*, 2020; Veenema, 2018)<sup>[50, 40]</sup>. Resource management is emerging as a field for integrating the healthcare delivery process (Kabene *et al.*, 2006)<sup>[17]</sup>. Money, people (staff), buildings, equipment, information, medications, and others are examples of resources (Ventola, 2014)<sup>[41]</sup>. The abundance of resources at the disposal of a hospital determines how prepared it is for emergency crises. Some large quantities of resources or materials that hospitals can have include vaccines and antitoxins. Moreover, a hospital's capacity to produce huge amounts of antibiotics on its own in effort to increase its resources shows how determined and prepared it is. Not all healthcare institutes have this capability, thus serving as a determinant of how prepared a health institute can be. Having this kind of capability as a health institute means that the Hospital has a strong financial capacity.

Other aspects of resources include having an emergency department unit, infectious disease department, inpatient units, and many more infrastructures buildings vital to the Hospital's daily operations. And the ability for early expansion (temporary or permanently) of these infrastructures in a catastrophic event like an infectious disease outbreak proves how strong it is as a determinant of hospital preparedness. Hospitals with high resource capacity in their various departments can pool them together in times of emergency to manage and control situations efficiently and effectively (Liu *et al.*, 2020)<sup>[22]</sup>.

### 2.3 The challenges of hospital emergency preparedness

Many challenges hinder hospital preparedness for an emergency. These include; lack of education and training drills (Veenema, 2018)<sup>[40]</sup> for emergencies or cases; inadequate resources (McEntire, 2021)<sup>[23]</sup> and improper management (Baack & Alfred, 2013)<sup>[2]</sup>; inadequate finance (Bullock *et al.*, 2017)<sup>[5]</sup>; inadequate laboratory (Samsuddin *et al.*, 2018)<sup>[33]</sup> and surveillance systems (Bullock *et al.*, 2017)<sup>[5]</sup>, no laid down plan or strategy (Canton, 2019)<sup>[7]</sup> for emergencies among others. Fiscal constraint is one major challenge that affects the preparedness of hospital response to an emergency (Sheikhbardsiri *et al.*, 2017)<sup>[34]</sup>. Most hospital managers must accomplish the duties of the Hospital, ensuring that the day-to-day activities go smoothly, and all of these involve money. Regarding finance, public health is at a

great disadvantage compared to private hindering programs like training as it is much more challenging for the public sector to offer than the private. Within the public health sector, Hospital's services generated income is critical budget for its operation. Thus, using these incomes for other activities like training other than its operations, appointments, laboratory work, and administrative tasks will cause serious consequences for the Hospital.

Funding which falls in the category of capital is another challenge faced by healthcare institutes or hospitals. As bluntly put always, "There is not enough", so it has been for a long-time. Healthcare systems are constantly pressed for funds to hire and maintain employees, provide education and training and exercises, and locate and purchase supplies (Howe *et al.*, 2021)<sup>[5]</sup>. Without funds, the Hospital cannot secure drugs to take care of patients, *let alone* hire staff. Federal or state constraints on grant expenditure, the requirement to satisfy grant deliverables, or the difficulty of reaching consensus on financial decisions make prioritization of spending a challenge. Lack of education and training or exercise for hospitals and their staff is another challenge to healthcare preparedness for an emergency (Veenema, 2018)<sup>[40]</sup>. This challenge is linked to several factors like capital limitations, especially in the public sector. Besides inadequately trained personnel for emergency purposes, hospital managers lack the fiscal power to organize vital training for their personnel. Studies have found that providing healthcare staff with skills and knowledge on biological hazards is crucial to controlling their widespread and saving lives (Rim & Lim, 2014)<sup>[31]</sup>. To organize education and training sessions for staff, one needs money. However, not much is received by the sector to perform such activities. Since staff do not get the chance for these training and educational activities, their ability to respond to the emergency crisis will be bad. Hence, they will be overwhelmed during an emergency.

Hence, without these training, exercises or drills, it would be very difficult to identify health workers flaws, teamwork cohesion, increase skills, knowledge, abilities, and coordination improvement. Without these drills for healthcare personnel in the health system, these staff will be prepared for an emergency, and this can cause chaos. Inadequate resource capability hinders hospital preparedness for emergencies (Sheikhbardsiri *et al.*, 2017)<sup>[34]</sup>. Healthcare's limited capability with the number of beds, health personnel, and equipment, among other resources, is a challenge that hinders emergency preparation. As a result of these hindrances, healthcare centres become overwhelmed during a crisis or biological hazards. Thus, they become incapable of responding quickly to suffering patients who need immediate medical attention. Also, physical infrastructure limitation or physical space availability is another hindrance. Most healthcare institutes, especially the public sector, lack physical space availability; hence resource capacity increment is not possible to make ready and prepare for emergency situations. Healthcare institutes would not be ready for emergencies without physical space available, thus a challenge.

Lack of appropriate plan for resource increment like employing more staff and setting up more infrastructures (Sheikhbardsiri *et al.*, 2017)<sup>[34]</sup>. Hospitals do not have a strategic plan to increase their Hospital capabilities, such as personnel, tool and equipment, and space, for development or growth (Kwon *et al.*, 2016)<sup>[21]</sup>. During emergencies, victims

requiring medical treatment cannot receive the healthcare services they require without such plans. Limited supplies of healthcare products for healthcare institutes is another challenge (Oballah *et al.*, 2015) <sup>[28]</sup>. Unable to stockpile medical drugs and needed healthcare materials like antibiotics to have a high consequence proves how unprepared the healthcare system is for emergencies. With no means to double up supplies like vaccines, antibiotics and others, the healthcare institute will be stunned when there are emergencies.

Lack of crucial healthcare facilities and equipment like a laboratory. In developing countries, most hospitals do not have this vital infrastructure, *let alone* the needed tools and equipment. However, it is vital in the day-to-day activities of the healthcare system. Laboratory did help detect and get vital information about COVID-19, and without it, it would not have been possible. Experiments and studies performed in this structure helped us be where we are today with the development of vaccines. Besides, a better understanding of diseases or viruses infects people or spread (Chen *et al.*, 2017; Turer *et al.*, 2020) <sup>[9, 39]</sup>.

Inability to detect biological hazards on time due to lack of special systems like surveillance monitors, temperature measurement devices and other equipment that aids in faster detection. COVID-19 showed the world how unprepared we were even though the world has experienced pandemics before. In light of this, the world has become much more aware of the importance of these health surveillance devices, especially in public or crowded areas like the metro. This area is another measure of hospital preparedness. An example is the current pandemic issue world is facing now. Using COVID-19 as a case study, if it had been detected very early and scrutinized very well, it might not have turned into a pandemic crushing the whole world healthcare system. Currently, most nations rely highly on syndromic surveillance systems or high tech equipped camera systems (Whitelaw *et al.*, 2020) <sup>[43]</sup> to detect certain conditions or characteristics that offer early warning of epidemic symptoms of people likely infected with the COVID-19. Nations without these surveillance systems find it difficult to track COVID-19 cases and quickly detect and control the virus spreading. The surveillance system has proved to be vital in controlling biological hazards. Hence, a healthcare system or institute without these systems will likely have emergency readiness challenges (Whitelaw *et al.*, 2020) <sup>[43]</sup>.

Emergency operations plan update difficulty, particularly in the training of healthcare personnel. Operational plans or tools like Hazard Vulnerability Analysis (HVA) are known to exist. Still, its application in the day-to-day activities of healthcare systems is limited mostly to public health sectors (Du *et al.*, 2015) <sup>[12]</sup>. HVA is a framework known to evaluate the likelihood of dangerous occurrence, besides organizational risk and preparedness level in circumstances of disaster happening. It plays a role in promoting emergency preparedness in hospitals. It helps in planning for assessing risk, services disruption, and hospital preparedness. Its usage by hospitals and their management help to detect risks and the organization's susceptibility in case of sudden hazards by providing them with better insight.

#### 2.4 Measures to improve hospital emergency preparedness

Hospitals face several challenges in being prepared for an emergency. However, these challenges can be mitigated through several means, such as having an executable for the

plan emergency period. In this section, we look at some of the ways by which we can improve hospital emergency preparedness. The healthcare system's effective and efficient strategy or plan execution will make them prepare for emergencies (Veenema, 2018) <sup>[40]</sup>. Strategic thinking must be directed toward an appraisal of what is happening around a health centre and determining which are important to the success or failure of the Hospital. Through researching and studying, Hazard Vulnerability Analysis (HVA) tool was found to be one of the good means to promote emergency preparedness in hospitals. Its framework can analyze the likelihood of danger, organization risk, and preparedness for disaster. It is good means because, in solving any issue, there is the need for a well-drawn or laid down plan.

Through this tool, planners can use a grading system to assess known risk, historical data (probability), a hazard to life and health, disruption of services (risk), current plan state, and training status. Hospitals and their management can use this tool to identify hazards and the organization's vulnerability, giving them more insight and alert to emergency incidents for quick response and handling of situations (Veenema, 2018) <sup>[40]</sup>. Resource generation capability is another area seen as a possibility to promote rapid responses to an emergency (Rose *et al.*, 2017) <sup>[32]</sup>. Increasing the capability of a healthcare institute in terms of beds, health personnel, equipment, and other resources is another means to be prepared for an emergency as a hospital. The Health system's ability to expand capabilities is critical; it gives them the ability to respond quickly to take care of emergencies. This is a key component of hospitals to prepare and respond to catastrophes. As mentioned, staff, equipment, and organization all have a role in increasing capability. The managerial infrastructure and the physical space necessary to care for patients are all included in the resource capacity increment to make the Hospital read and prepared for emergencies (Rose *et al.*, 2017) <sup>[32]</sup>.

A hospital with resource acquisition does need to have strategic planning accompany. Hospitals must have a preparation strategy to strengthen their readiness to respond to emergency issues. Plans to increase the Hospital's capabilities internally first, then to alternative care facilities, may be able to assist reduce the damage. Personnel, materials and equipment, and space are all needed for expansion. Without such a plan or alternatives and a case of an emergency, there will be an enormous number of victims requiring medical treatment that would quickly overwhelm hospital resources (Canton, 2019) <sup>[7]</sup>.

In the case of resources, another area that can help increase the preparedness of healthcare institutes and its staffs is increasing their supplies of products for healthcare provision and equipment. Stockpiling of vital drugs, supplies, and equipment is a major factor in the preparation for epidemic or pandemic outbreaks, as it is with COVID-19 in this day and age. Even while hospitals normally have enough treatments and pharmaceutical processes, their supplies (medications) might be restricted during the rise of COVID-19 cases. The existence of the COVID-19 virus now is casualties are as new variant outbreak and continue to spread widely like the Omicron variants. It affects treatments causing supply to be shortages. Thus, there is a need to increase resources like vaccines and other potentially effective drugs to control the virus, such as nearby medical institutions, pharmacies, medical suppliers, and veterinarians.

A hospital's ability to increase the preparation of large quantities of antibiotics, vaccines, and antitoxins; standard precautions equipment; personal protective equipment (PPE); disposable clothing for decontaminated patients; ventilators; deem it prepared for an emergency. In addition, routinely supplies or meets all patients' requirements, such as bedpans, linens, and other materials over expected demand, classified such health institutes as prepared. Finally, an increase in resources is crucial for hospital emergency preparedness to properly control and manage disasters or diseases or pandemic outbreaks (Kwon *et al.*, 2016) [21].

Early detection alongside a scrutiny system is another great measure of hospital preparedness. An instance is found with the current pandemic issue of the world. An example will be the case of COVID-19, which was early detected and scrutinized very, it might not have turned into a pandemic that overwhelmed the whole world healthcare system. Currently, most nations rely highly on syndromic surveillance systems or high tech equipped camera systems to detect a certain condition that does offer early warning of an epidemic beginning or people infected with the COVID-19. In addition, these surveillance systems help in tracking and rapid detection of epidemics like a COVID-19 case in an area allowing for more effective healthcare intervention. For example, in the case of COVID-19, early discovery is critical for preparedness which includes prevention of spread, early correct medical care, and immunization to enhance survival chances, as well as public health measures like quarantine and isolation. Furthermore, surveillance systems can limit pathogen infection to detect disease or an epidemic (Chen *et al.*, 2017; Turer *et al.*, 2020) [9, 39].

Another means for promoting healthcare readiness is the solid existence of coalitions between healthcare systems. These means or measures it vital for healthcare systems in areas that do not have enough resources for an emergency. Patients of emergency incidents can be given first aid and transferred. With a strong coalition bound between the healthcare system, pressures are eased during emergency times. In several ways, among others, diverting or relocating patients from one Hospital to another is beneficial while easing pressure or tension rather than focusing on boosting capacity (bed, equipment) within a facility with limited finances. The training and staffing of more volunteers, identifying the assets necessary for high-acuity patients to be transported in and out of speciality-care facilities, and how to sustain facility surge for a longer length of time are all important and help in the enhancement of healthcare preparedness (Liu *et al.*, 2020) [22].

Education alongside training or exercise can help prepare a healthcare institute and its staff for emergency cases in their environment. All hospital workers should be taught and informed on infectious disease outbreaks, biological chemical attacks, or pandemic routes (Khan *et al.*, 2018) [18]. Agent detection and recognition, hospital incident command structure, response support, personnel safety and protection, decontamination, isolation and quarantine, infection-control policies and procedures, triage, prophylaxis activities, psychological effect management, risk communication, treatment, and fatality management are all major components of an education plan. To measure performance and guarantee proper staff reaction, hospitals should begin by evaluating their preparation plan with frequent drills. Exercises should be done to identify flaws, increase teamwork, improve coordination, and promote skills, knowledge, and abilities.

Hospital drills might be designed to represent the Hospital's preparedness for biological assaults, catastrophic epidemics, and pandemics, prompting the Hospital to assess its readiness (Khan *et al.*, 2018) [18].

Mobilizing hospital personnel and volunteer forces is a means or measure that promote preparedness. One of the most difficult parts of emergency preparedness is training hospital professionals to handle the rapidly increased demand for services and staff in the aftermath, such as a biological hazard like COVID-19. Some employees may become sick due to their exposure to biological agents, as was the case for COVID-19 with healthcare personnel getting infected, or they may choose not to come to work for various reasons, such as caring for their family. However, with the Hospital having various department lists of alternate staff, a recall procedure for marshalling sufficient on-call people should be compiled. Personnel like physicians, emergency medicine staff, surgeons, intensivists, nurses, pharmacists, radiology technicians, infection control, clinical laboratory experts, among other staff and volunteers, all put together will be sufficient numbers of hospital employees whom they can be relied on in the case of emergency (Sheikhbardsiri *et al.*, 2017) [34].

In the event of an infectious disease epidemic, this sort of personnel will be extremely important. Staff from other hospitals, closed clinics, outpatient surgical departments; hospital retirees; medical, nursing, and allied healthcare students, and volunteer forces are also possible sources of extra workers. Pre-identified health care volunteers from within or outside the afflicted community might be one answer to the scarcity of specialist hospital staff. These people will need to be properly educated and oriented, and they may be required to execute tasks that are above their level of competence under supervision. Because terrorists would likely volunteer, these people must be carefully chosen.

Availability of physical space is another strategy in dealing with an emergency. Having enough available physical space to cater for patients during an emergency does prove the preparedness of a healthcare institute. A case study is China building a new hospital in 10 days during the COVID-19 outbreak in 2020 to cater for infected people. This shows how prepared their healthcare system was in dealing with emergency cases. In just ten days, China constructed a 60,000-square-metre facility with 1,000 beds and 30 intensive care units, showing that physical space is vital to healthcare preparedness for an emergency. For example, countries with physical space have patients lying in all their healthcare infrastructures without beds, making it tedious to treat patients. When a building cannot be contrasted at a faster rate, using alternate places of treatment is one technique for coping with large casualties.

The emergency department, infectious disease department, inpatient units, mortuary, laundry, and perhaps decontamination facilities may all require early expansion in the event of an infectious disease release. Increased hospital capacity can be achieved by establishing a secondary emergency department in another region of the Hospital or close to major units. Elective and unneeded surgeries might be cancelled or rescheduled to improve the number of active hospital beds. For example, in the case where the emergency type can prolong like COVID-19 presently, use of available land for temporary hospital sites can collaborate with the community or available space around such hotels, schools,

churches, public halls or hospitals and medical institutions for patients transferred and treatment to promote better healthcare service provision alongside pressure release. In summary, a whole lot can be done by the healthcare system to promote the readiness or preparedness of healthcare systems or institute against disasters or emergency cases.

### 3. Method

#### 3.1 Study Design

A cross-sectional design was used in the study to explore the determinants of hospital emergency preparedness in the Ashanti Region of Ghana. A cross-sectional design refers to a formal, objective and systematic process of describing and testing relationships and examining cause-and-effect interactions between variables (Burns, Grove & Gray, 2015). It is cross-sectional in that the study involved the administration of questionnaires and interviews once only to the sample, and the data generated on the measured characteristics will be limited to the specific period of the study.

#### 3.2 Study Population

Bryman (2016) describe a study population as the whole group that the research focuses on. A research population is also known as a well-defined collection of individuals or objects known to have similar characteristics. All individuals or objects within a certain population usually have a common, binding characteristic or trait (Robson and McCartan, 2012). The study population comprises the health professionals at the Komfo Anokye Teaching Hospital, the biggest Hospital in the Ashanti Region of Ghana.

#### 3.3 Sampling Technique and Sample Size

Sampling refers to the act of selecting from a population to draw conclusions regarding the entire population (Neuman, 2014). A convenience sampling method was used to select the health professionals. Convenience sampling is a type of nonprobability sampling in which people are sampled simply because they are "convenient" sources of data for researchers (Neuman, 2014). A convenience sampling method was used because the health professionals are easily available and accessible in the Ashanti Region of Ghana to explore the determinants of hospital emergency preparedness, who can best answer the research questions.

The sample size was derived using the Taro Yamane model formula for academic research.

$$n = \frac{N}{1 + N(\alpha)^2}$$

Where;

n = Sample size

N = Total health professionals at the Komfo Anokye Teaching Hospital in the Ashanti Region of Ghana which is 3702.

$\alpha$  = The level of significance (0.05)

1 = Absolute or constant figure

Using 95% confidence interval

$$n = \frac{3702}{1 + 3702(0.05)^2} = \frac{3702}{10.255} = 360.99$$

Approximately 360 health professionals at the Komfo Anokye Teaching Hospital in the Ashanti Region of Ghana were recruited for the study.

#### 3.4 Tools for data collection

Saunders *et al.* (2009) describe questionnaires as a data collection technique in which each respondent is asked to respond to the same set of questions in a pre-determined order. Data was collected using a structured questionnaire. The study used both open-ended and close-ended questions to find out information from the target population. The questionnaire was the major instrument of data collection; it is the kind of instrument that can cover a wide range of most of the issues raised in this study. The questionnaire is designed based on the literature review but not adopted from any study. The items in the questionnaire are based on the research objectives and reviewed literature and are designed to capture all the relevant information regarding the proposed research topic by employing a variety of question types. The interest is to use the questionnaire to obtain the respondents' background information, the influence of healthcare professionals' capacity on hospital emergency preparedness, the factors that influence the determinants of hospital emergency preparedness, the challenges of hospital emergency preparedness, and the recommendations to improve hospital emergency preparedness.

#### 3.5 Validity and Reliability

Reliability refers to how consistently a method measures something. If the same result can be consistently achieved using the same methods under the same circumstances, the measurement is considered reliable (Saunders *et al.*, 2009). The researcher ensured reliability by using appropriate sample sizes and avoiding biases. The study was conducted by researchers who were not influenced by funding or the desire to seek certain results. Validity refers to how accurately a method measures what it is intended to measure. If research has high validity, it produces results that correspond to real properties, characteristics, and variations in the physical or social world (Saunders *et al.*, 2009). The researchers ensure validity by seeing that the method and measurement technique are high quality and targeted to measure exactly what they want to know based on existing knowledge.

#### 3.6 Data Collection Method

The health professionals at the Komfo Anokye Teaching Hospital would be approached by the researcher after their consent has been sought for participation. The use of questionnaires would enable the researcher to ask closed-ended questions with a provided list of possible answers. This method is easier for respondents, as they pick from a list of responses. Data would be collected over two months.

#### 3.7 Data Management and Analysis

The researcher solely collected data for this research. This ensured completeness of the questionnaires to avoid missing data issues. The Statistical Package for Social Sciences (SPSS) Version 26.0 software (International Business Machines (IBM) Corporation; New York, United States) was used to analyze the data collected. Descriptive analysis of the data was carried out after coding and successful data entry. Thus, showing the frequencies, means and standard deviations of the variables. This was presented in the form of

frequency distribution tables and charts.

## 4. Results

### 4.1 Demographic Analysis

This section consists of the respondents' background characteristics, including gender, age, level of education, job category, and number of years working in the Hospital.

**Table 1:** Background Characteristics

Gender	Frequency	Percent (%)
Male	151	41.94%
Female	209	58.06%
Total	360	100%
Age	Frequency	Percent (%)
20-29 years	36	10.00%
30-39 years	101	28.06%
40-49 years	130	36.11%
50 years and above	93	25.83%
Total	360	100%
Educational level	Frequency	Percent (%)
Undergraduate Degree	266	73.90%
Master Degree	66	18.33%
PhD	28	7.77%
Total	360	100%
Job Category	Frequency	Percent (%)
Nurse	110	30.55%
Doctor	61	16.95%
Midwife	80	22.22%
Administration	43	11.95%
Lab Technician	30	8.33%
Pharmacist	36	10.00%
Total	360	100%
Years of working	Frequency	Percent (%)
Less than 2years	25	6.94%
2-5 years	53	14.72%
6-10 years	72	20.00%
11-15 years	80	22.22%
16-19 years	83	23.06%
20 years and above	47	13.06%
Total	360	100%

Source: Field Data (2022)

Concerning the gender of the respondents, the majority (209) of them, representing 58.06%, were females, whilst 151 of them, representing 41.94%, were males.

Regarding the age of respondents, the majority (130) of them, representing 36.11%, were between 40-and 49 years, whilst a few (36) of them, representing 10.00%, were between 20-and 29 years. Additionally, 101 (28.06%) of the respondents were between 30-and 39 years old, and 93 (25.83%) were 50 years and above.

Moreover, in terms of the level of education, the majority (266) of the respondents representing 73.90%, had an

undergraduate degree, 66 (18.33%) of the respondents had a master's degree, and 28 (7.77%) of the respondents also had PhD.

Regarding the job category of respondents, the majority (110) of the respondents representing 30.55%, were nurses, whilst a few (30) of the respondents representing 8.33%, were lab technicians. Additionally, 80 (22.22%) of the respondents were midwives, 61 (16.95%) of the respondents were doctors, 43 (11.95%) of the respondents were also administrators, and 36 (10.00%) of the respondents were pharmacists.

It was observed from Table 1 that in terms of the number of years working in the Hospital, most (83) of the respondents representing 23.06%, had worked in their Hospital for 16-19 years, whilst few (25) of the respondents representing 6.94% had worked in their Hospital for less than two years. Moreover, 80 (22.22%) of the respondents had worked in their Hospital for 11-15 years, 72 (20.00%) of the respondents had worked in their Hospital for 6-10 years, 53 (14.72%) of the respondents had worked in their Hospital for 2-5 years, and 47 (13.06%) of the respondents had worked in their Hospital for 20 years and above.

### 4.2 Validity and Reliability Test

#### 4.2.1 Validity Test

Both internal and external validity of the research method measures how the model employed measures the underlying concepts of the study. Whereas the measure of external validity is more qualitative in nature, the internal validity is done quantitatively. To establish the external validity of the research, the sample size, area, time and particular venue for distributing the questionnaire were taken into proper consideration, as described in Tables 2 and Table 3. However, regarding the internal validity, KaiserMeyer-Olkin (KMO) measure of sample adequacy and Barlett's test of sphericity were conducted before any further factor analysis was conducted. According to, a KMO value  $>0.7$  and Barlett's test of sphericity within a 99% confidence interval is accepted. Results of the KMO and Barlett's test of sphericity is displayed in Table 2.

**Table 2:** Output from validity test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.722
Bartlett's Test of Sphericity	Approx. Chi-Square	454.083
	Df	171
	Sig.	.000

Source: Field Data (2022)

The KMO measure of sampling adequacy was 0.722, with Barlett's test of sphericity significant at  $p < 0.0001$ . This indicates that the data and sample are fit for further factor analysis.

**Table 3:** Result of Reliability Test on Individual Variables

Variables	No. of items	Cronbach's Alpha
Healthcare Professionals Capacity	6	0.901
Financial capacity or funding	3	0.873
Infrastructure availability	4	0.898
Plan strategy or tool for hospital emergency preparedness	6	0.901
Hospital resource management	4	0.898
Hospital communication and triage system	3	0.873
Top management decision on emergency preparedness	6	0.901

Source: Field Data (2022)

#### 4.2.2 Reliability Test

A reliability test was conducted to check the consistency in the measurement of the various factors or items (questions/statements). According to Kumar (2014), the reliability of a measurement can be accepted as the coefficient of the Cronbach Alpha  $> 0.7$  and unacceptable if vice-versa. However, many researchers posit that a Cronbach alpha  $> 0.7$  is usually the best fit for further factor analysis. Table 3 shows the results of the reliability test.

With the exclusion of the section, the individual variables were tested for consistency and reliability. Regarding the healthcare professionals' capacity variable, the Cronbach of 0.901 in Table 3 passed the test for further analysis to be conducted without any possible deletion of a statement or question. Concerning the financial capacity or funding variable, the Cronbach of 0.873 passed the test for further analysis to be conducted without any possible deletion of a statement or question. Regarding the infrastructure availability variable, the Cronbach of 0.898 passed the test for further analysis to be conducted without any possible deletion of a statement or question. Concerning the plan strategy or tool for hospital emergency preparedness variable, the Cronbach of 0.901 passed the test for further analysis to be conducted without any possible deletion of a statement or question.

Regarding the hospital resource management variable, the Cronbach of 0.898 passed the test for further analysis to be conducted without any possible deletion of a statement or question. Concerning the hospital communication and triage system variable, the Cronbach of 0.873 passed the test for further analysis to be conducted without any possible deletion of a statement or question. Finally, regarding the top

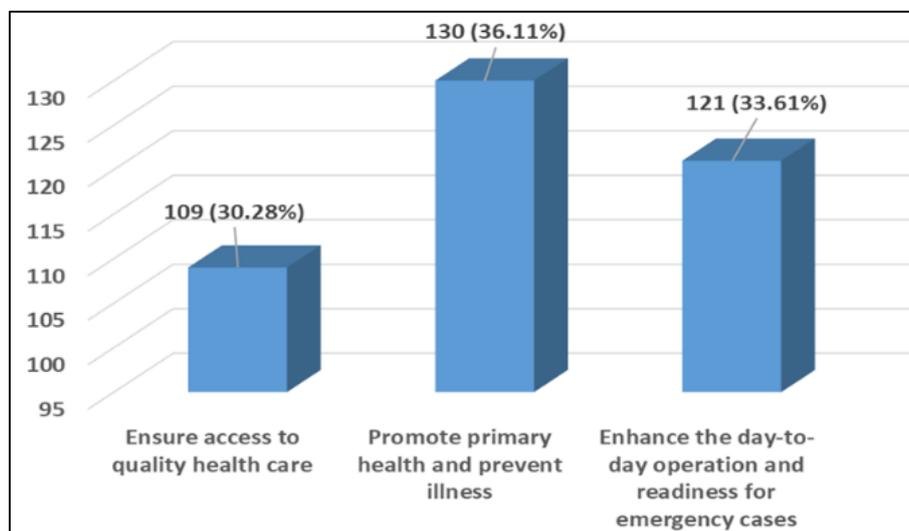
management decision on the emergency preparedness variable, the Cronbach of 0.901 passed the test for further analysis to be conducted without any possible deletion of a statement or question. Therefore, the Cronbach alpha reliability test score was within acceptable 0.7 limits suggesting that the measurement was highly reliable within the score ranging from 0.873 to 0.901.

#### 4.3 Descriptive Statistics

The study examined the influence of healthcare professionals' capacity on hospital emergency preparedness, the factors that influence the determinants of hospital emergency preparedness, the challenges of hospital emergency preparedness, and the measures to improve hospital emergency preparedness. These are analyzed in the next sections.

##### 4.3.1 The influence of healthcare professionals' capacity on hospital emergency preparedness

The study examined the influence of healthcare professionals' capacity on hospital emergency preparedness. It was revealed that all (100%) of the respondents acknowledged a hospital emergency preparedness plan was in place in the facility. In examining the role of health professionals' capacity they play in hospital emergency preparedness, it was revealed that 130 (36.11%) of the respondents indicated that health professionals promote primary health and prevent illness, 121 (33.61%) of the respondents also specified that health professionals enhance the day-to-day operation and readiness for emergency cases, and 109 (30.28%) of the respondents acknowledged that health professionals ensure access to quality health care. This information is presented in Figure 2.

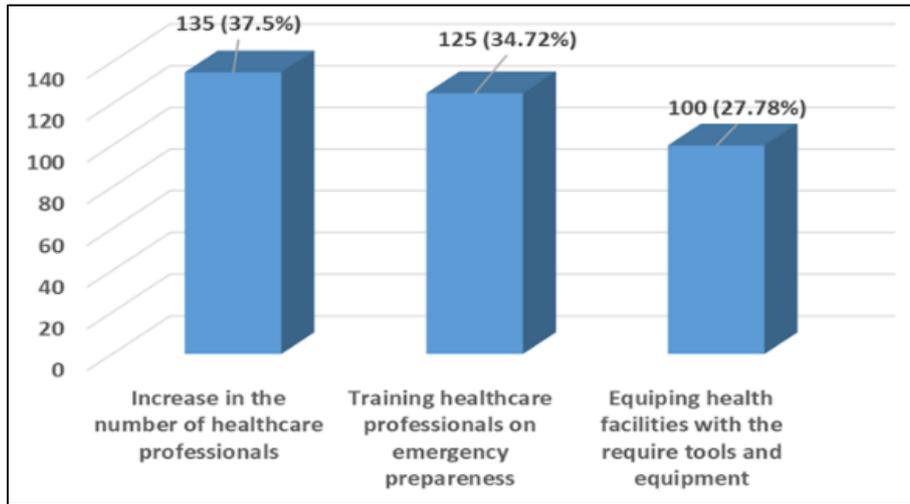


Source: Field Data (2022)

Fig 2: Role in hospital emergency preparedness

As indicated in Figure 3, the study examined how the Hospital can enhance health professionals' capacity in hospital emergency preparedness plans. It was revealed that 135 (37.5%) of the respondents specified that increase in the number of healthcare professionals enhance health professionals' capacity in hospital emergency preparedness plan, 125 (34.72%) of the respondents stated that training

healthcare professionals on emergency preparedness enhance health professionals' capacity in hospital emergency preparedness plan, and 100 (27.78%) of the respondents indicated that equipping health facilities with the required tools and equipment enhance health professionals' capacity in hospital emergency preparedness plan.

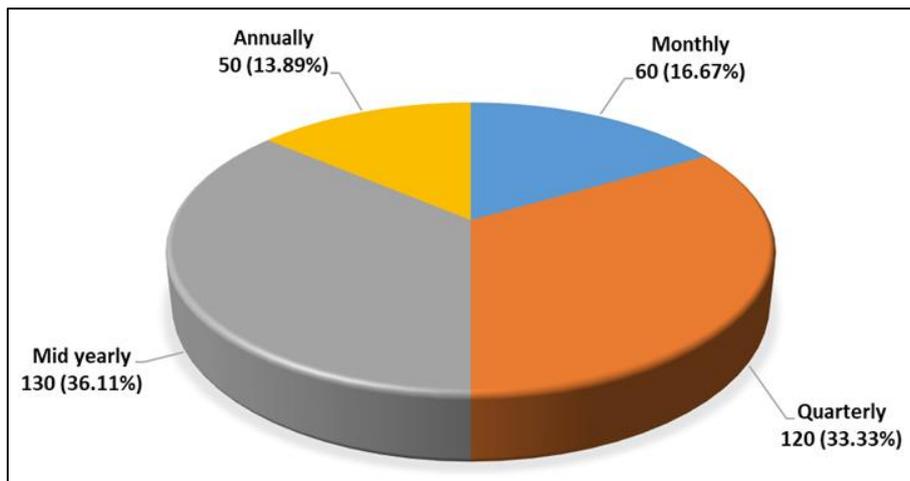


Source: Field Data (2022)

Fig 3: Ways the Hospital enhance health professionals' capacity in hospital emergency preparedness plan

Moreover, the study examined how often the hospital provides health professionals training on emergency preparedness. It was revealed that 130 (36.11%) of the respondents acknowledged that the Hospital provides training to health professionals on emergency preparedness mid yearly, 120 (33.33%) of the respondents admitted that the Hospital provides training to health professionals on

emergency preparedness quarterly, 60 (16.67%) of the respondents also said that the Hospital provides training to health professionals on emergency preparedness monthly, and 50 (13.89%) of the respondents indicated that the Hospital provides training to health professionals on emergency preparedness annually. This information is highlighted in Figure 4.

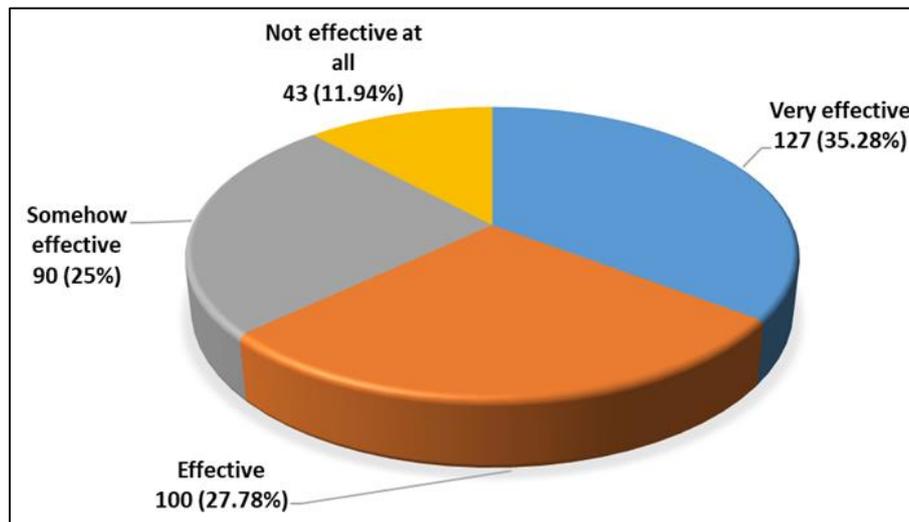


Source: Field Data (2022)

Fig 4: How often does the Hospital provide training to health professionals on emergency preparedness

Finally, the study examined the respondents' ratings on the hospital emergency preparedness plan in the Hospital. It was revealed that 127 (35.28%) of the respondents rated the hospital emergency preparedness plan to be very effective, 100 (27.78%) of the respondents rated the hospital

emergency preparedness plan to be effective, and 90 (25%) of the respondents rated the hospital emergency preparedness plan to be somehow effective. However, 43 (11.94%) of the respondents rated the hospital emergency preparedness plan as ineffective. This information is highlighted in Figure 5.



Source: Field Data (2022)

Fig 5: Rating the hospital emergency preparedness plan in the Hospital

**4.3.2 Factors that influence the determinants of Hospital Emergency Preparedness**

The study examines the factors that influence the determinants of hospital emergency preparedness. The Five-

point Likert scales were used to measure the opinions of the respondents on the factors that influence the determinants of hospital emergency preparedness, with the lowest score being 1 (strongly disagree) and the highest 5 (strongly agree).

**Table 4:** Factors that influence the determinants of Hospital Emergency Preparedness

Factors	Min	Max	Mean	Std. D
Financial capacity or funding	0	5	4.91	1.956
Infrastructure availability	4	5	4.87	1.823
Plan strategy or tool for hospital emergency preparedness	4	5	4.11	1.613
Hospital resource management	4	5	4.87	1.823
Hospital communication and triage system	3	5	3.89	1.313
Top management decision on emergency preparedness	0	5	4.91	1.956

Source: Field Data (2022)

As indicated in Table 4, the majority of the respondents strongly agreed that financial capacity or funding influences the determinants of hospital emergency preparedness (mean= 4.91, SD= 1.956). Moreover, most of the respondents strongly agreed and agreed that top management's decision on emergency preparedness (mean= 4.91, SD= 1.956). Furthermore, the majority of the respondents strongly agreed and agreed that infrastructure availability influences the determinants of hospital emergency preparedness (mean= 4.87, SD= 1.823). Also, the majority of the respondents strongly agreed and agreed that hospital resource management influences the determinants of hospital emergency preparedness (mean= 4.87, SD= 1.823). Additionally, most of the respondents strongly agreed and

agreed that a plan strategy or tool for hospital emergency preparedness influences the determinants of hospital emergency preparedness (mean= 4.11, SD= 1.613). Finally, most of the respondents strongly agreed that hospital communication and triage system influence the determinants of hospital emergency preparedness (mean= 3.89, SD= 1.313).

**4.3.3 Challenges of Hospital Emergency Preparedness**

The study examined the challenges of Hospital Emergency Preparedness. The Five-point Likert scales were used to measure the opinions of the respondents on the challenges of Hospital Emergency Preparedness, with the lowest score being 1 (strongly disagree) and the highest 5 (strongly agree).

**Table 5:** Challenges of Hospital Emergency Preparedness

Challenges	Min	Max	Mean	Std. D
Inadequate staff or health professionals	0	5	4.91	1.956
Lack of education and training drills	4	5	4.87	1.823
Inadequate resource capability	4	5	4.45	1.512
Improper management	0	5	4.91	1.956
Inadequate finance	4	5	4.87	1.823
Lack of crucial healthcare facilities and equipment	4	5	4.64	1.745
Poor surveillance systems	4	5	4.60	1.731
Lack of laid down plan or strategy for emergencies	4	5	4.45	1.512

Source: Field Data (2022)

From Table 5, the study revealed that the majority of the respondents strongly agreed and agreed that inadequate staff or health professionals were a challenge to hospital emergency preparedness (mean= 4.91, SD= 1.956). Similarly, the majority of the respondents strongly agreed and agreed that improper management was a challenge to hospital emergency preparedness (mean= 4.91, SD= 1.956). Moreover, most of the respondents strongly agreed that lack of education and training drills on emergency preparedness management was a challenge for hospital emergency preparedness (mean= 4.87, SD= 1.823). Furthermore, most of the respondents strongly agreed that Inadequate finance was a challenge to hospital emergency preparedness (mean= 4.87, SD= 1.823). Additionally, the majority of the respondents strongly agreed and agreed that the lack of crucial healthcare facilities and equipment was a challenge to hospital emergency preparedness (mean= 4.64, SD= 1.745). Again, the majority of the respondents strongly agreed and

agreed that poor surveillance systems were a challenge to hospital emergency preparedness (mean= 4.60, SD= 1.731). Moreover, the majority of the respondents strongly agreed and agreed that inadequate resource capability was a challenge to hospital emergency preparedness (mean= 4.45, SD= 1.512). Finally, the majority of the respondents strongly agreed and agreed that the lack of a laid down plan or strategy for emergencies was a challenge to hospital emergency preparedness (mean= 4.45, SD= 1.512).

**4.3.4 Measures to improve Hospital Emergency Preparedness**

The study identified the measures to improve hospital emergency preparedness. The Five-point Likert scales were used to measure the opinions of the respondents on the measures to improve hospital emergency preparedness, with the lowest score being 1 (strongly disagree) and the highest 5 (strongly agree).

**Table 6:** Measures to improve Hospital Emergency Preparedness

Measures	Min	Max	Mean	Std. D
Increasing staff or health professionals	0	5	4.91	1.956
Adequate education and training drills	4	5	4.87	1.823
Adequate resource capability	4	5	4.81	1.803
Proper management	4	5	4.81	1.803
Adequate finance	4	5	4.85	1.819
Availability of crucial healthcare facilities and equipment	0	5	4.85	1.819
Effective surveillance systems	4	5	4.64	1.745
Effective and efficient strategy or plan execution	4	5	4.85	1.819

Source: Field Data (2022)

As indicated in Table 6, the majority of the respondents strongly agreed that increasing staff or health professionals improve hospital emergency preparedness (mean= 4.91, SD= 1.956). Moreover, most of the respondents strongly agreed and agreed respectively that adequate education and training drills improve hospital emergency preparedness (mean= 4.87, SD= 1.823). Furthermore, the majority of the respondents strongly agreed and agreed that effective and efficient strategy or plan execution improves hospital emergency preparedness (mean= 4.85, SD= 1.819). Additionally, most of the respondents strongly agreed and agreed respectively that the availability of crucial healthcare facilities and equipment improves hospital emergency preparedness (mean= 4.85, SD= 1.819). Similarly, most of the respondents strongly agreed and agreed respectively that adequate finance improves hospital emergency preparedness

(mean= 4.85, SD= 1.819). Moreover, most of the respondents strongly agreed and agreed respectively that adequate resource capability improves hospital emergency preparedness (mean= 4.81, SD= 1.803). Again, the majority of the respondents strongly agreed that proper management improves hospital emergency preparedness (mean= 4.81, SD= 1.803). Finally, majority of the respondents strongly agreed and agreed respectively that effective surveillance systems improve hospital emergency preparedness (mean= 4.64, SD= 1.745).

**4.4 Correlation Analysis**

The study conducted a correlation analysis to measure the strength of association between variables and the direction of the relationship. In terms of the strength of the relationship, the correlation coefficient's value varies between +1 and -1.

**Table 7:** Correlation Analysis

	Healthcare Professionals Capacity	Financial capacity or funding	Infra structure availability	Plan strategy or tool for hospital emergency preparedness	Hospital resource management	Hospital communication and triage system	Top management decision on emergency preparedness
Healthcare Professionals Capacity	1						
Financial capacity or funding	.808**	1					
Infrastructure availability	.773**	.630**	1				
Plan strategy or tool for hospital emergency preparedness	.740**	.561**	.683**	1			
Hospital resource management	.467**	.297**	.435**	.428**	1		
Hospital communication and triage system	.399**	.203**	.315**	.321**	.408**	1	
Top management decision on emergency preparedness	.818**	.350**	.401**	.420**	.512**	.672**	1

Source: Field Data (2022)

Pearson Correlation results in Table 7 showed that financial capacity or funding capacity is positively and significantly correlated with hospital emergency preparedness ( $r = .808, p < 0.01$ ). The results also shows that infrastructure availability is positively and significantly correlated with hospital emergency preparedness ( $r = .773, p < 0.01$ ). Moreover, Plan strategy or tool for hospital emergency preparedness, Hospital resource management, Hospital communication and triage system, and Top management decision on emergency preparedness is positively and significantly correlated with hospital emergency preparedness ( $r = .740, p < 0.01$ ), ( $r = .467, p < 0.01$ ), ( $r = .399, p < 0.01$ ), and ( $r = .818, p < 0.01$ ) respectively. From the above, there is a linear relationship between financial capacity or funding, infrastructure availability, plan strategy or tool for hospital emergency preparedness, hospital resource management, hospital communication and triage system, and top management decision on emergency preparedness. This showed more ground to do a multiple regression analysis.

## 4.5 Discussion

### 4.5.1 The influence of healthcare professionals' capacity on hospital emergency preparedness

The study found that the capacity of healthcare professionals played an essential role in hospital emergency preparedness as the majority (36.11%) of the respondents indicated that health professionals promote primary health and prevent illness. The majority (64.06%) rated the hospital emergency preparedness plan as effective. This result cognates the results of WHO (2012) that healthcare professionals provide vital services that promote health, prevent illness and provide health care to people, families, and communities using a primary health care approach.

Moreover, the study found that (33.61%) of the respondents also specified that health professionals enhance the day-to-day operation and readiness for emergency cases. This result supports Turer *et al.* (2020)<sup>[39]</sup> and Hutchison *et al.* (2011)<sup>[16]</sup> findings which revealed that healthcare professionals' capacity aid in the day-to-day activities of the Hospital as well as during crucial times or times of emergency.

Furthermore, it was observed in the study results that 30.28% of the respondents acknowledged that health professionals ensure access to quality health care. This result is similar to the WHO (2012) assertion that health professionals have a fundamental role in enhancing population access to and quality of health care.

The current study revealed that 37.5% of the respondents specified that increase in the number of healthcare professionals enhance health professionals' capacity in hospital emergency preparedness plan. This result supports Farley *et al.* (2017)<sup>[13]</sup>, Koinis *et al.* (2015)<sup>[20]</sup> and WHO (2012) findings which revealed that more means better. Hence hospitals with high numbers of healthcare professionals represent better services that can be provided. Notably, 34.72% of the respondents stated that training healthcare professionals on emergency preparedness enhance health professionals' capacity in hospital emergency preparedness plan. Notwithstanding this result, the current study revealed that the Hospital provides training to health professionals on emergency preparedness mid yearly (36.11%) and quarterly (33.33%). These results were cognate to Sheikhbardsiri *et al.* (2017)<sup>[34]</sup> findings that emergency preparedness training for hospital professionals is essential to handle the rapidly increased demand for service. Training

increase volunteers that can be put together to be sufficient numbers of hospital employees whom they can be relied on in the case of emergency.

Finally, 27.78% of the respondents indicated that equipping health facilities with the required tools and equipment enhances health professionals' capacity in hospital emergency preparedness plans. This result supports Toner's (2017)<sup>[38]</sup> observation that Hospital's acquisition of equipment and tools, drug supplies, and interoperable communication systems, among others, promotes their preparedness.

### 4.5.2 Factors that influence the determinants of Hospital Emergency Preparedness

It was found in the study results that the majority (mean= 4.91, SD= 1.956) of the respondents acknowledged that financial capacity or funding influences the determinants of hospital emergency preparedness. This result is in line with Khan *et al.* (2018)<sup>[18]</sup>, Toner (2017)<sup>[38]</sup>, and Simou & Koutsogeorgou's (2014)<sup>[35]</sup> studies, which revealed that a strong public health system means financial stability of hospitals to enable efficient and effective health care delivery, particularly in times of emergencies. Therefore, Hospital with the financial capability to purchase the needed tools and equipment is well prepared for emergencies. Moreover, the study found that top management decisions on emergency preparedness influence the determinants of hospital emergency preparedness (mean= 4.91, SD= 1.956). This result supports Mulyasari *et al.* (2013)<sup>[27]</sup> observation that Successful hospitals have leaders or managers who understand the nature and implications of external change and can develop effective change strategies to manage the Hospital's momentum during crisis seasons actively.

Furthermore, the study results revealed that infrastructure availability influences the determinants of hospital emergency preparedness (mean= 4.87, SD= 1.823). This result supports Veenem's (2018) findings, revealing that infrastructure availability influences hospital emergency readiness: their mission or purpose, capabilities, competencies, resources, location, and others.

Also, hospital resource management influence the determinants of hospital emergency preparedness (mean= 4.87, SD= 1.823). This result aligns with Chen *et al.* (2020)<sup>[50]</sup> and Veenem's (2018) findings, which revealed that resource management is emerging as a field for integrating the healthcare delivery process. The abundance of resources at the disposal of a hospital determines how prepared it is for emergency crises.

Additionally, the study results revealed that plan strategy or tool for hospital emergency preparedness influence the determinants of hospital emergency preparedness (mean= 4.11, SD= 1.613). This result supports Mulyasari *et al.* (2013)<sup>[27]</sup> assertion that besides having a plan strategy or tool, a healthcare institute's ability to develop a plan is also crucial to being prepared for emergencies.

Finally, the study results revealed that hospital communication and the triage system influence the determinants of hospital emergency preparedness (mean= 3.89, SD= 1.313). This result is cognate to Greenhalgh and Papoutsis's (2018) conclusion that more specific activities within preparedness include specialized and interoperable communication systems.

### 4.5.3 Challenges of Hospital Emergency Preparedness

The study indicated that inadequate staff or health professionals were a challenge to hospital emergency preparedness (mean= 4.91, SD= 1.956). This result is cognate to Farley *et al.* (2017) <sup>[13]</sup> findings, which revealed that not having enough staff in a hospital hinders the day-to-day tasks required to create and maintain a high-functioning healthcare system. Hospitals without enough staff are understaffed in emergency management.

Additionally, the study results revealed that improper management was a challenge to hospital emergency preparedness (mean= 4.91, SD= 1.956). This result supports Baack & Alfred's (2013) <sup>[2]</sup> observation that hinders hospital preparedness for an emergency. Most hospital managers must accomplish the duties of the Hospital, making sure that the day-to-day activities go smoothly.

Moreover, the study results revealed that a lack of education and training drills on emergency preparedness management was a challenge for hospital emergency preparedness (mean= 4.87, SD= 1.823). This result aligns with Veenema's (2018) <sup>[40]</sup> findings, which revealed that lack of education and training or exercise for hospitals and their staff is another challenge to healthcare preparedness for an emergency. This challenge is linked to several factors like capital limitations, especially in the public sector.

Furthermore, the study results revealed that inadequate finance challenges hospital emergency preparedness (mean= 4.87, SD= 1.823). This result supports Khan *et al.* (2018) <sup>[18]</sup>, Bullock *et al.* (2017) <sup>[5]</sup>, and Simou & Koutsogeorgou (2014) <sup>[35]</sup> findings, which revealed that the issue of inadequate finance is a bigger problem for the healthcare sector, especially the public sector with a limited budget.

Additionally, the study results revealed that the lack of crucial healthcare facilities and equipment was a challenge for hospital emergency preparedness (mean= 4.64, SD= 1.745). This result is similar to Chen *et al.* (2017), and Turer *et al.* (2020) <sup>[39]</sup> observe that most hospitals do not have this vital infrastructure, let only the need for tools and equipment for their operation, especially in developing countries.

Again, the study results revealed that poor surveillance systems were a challenge to hospital emergency preparedness (mean= 4.60, SD= 1.731). This result supports Bullock *et al.*'s (2017) <sup>[5]</sup> observation that the inability to detect biological hazards on time is due to the lack of unique systems like surveillance monitors, temperature measurement devices and other equipment that aid in faster detection. Nations without these surveillance systems find it difficult to track COVID-19 cases and quickly detect and control the virus spreading. Moreover, the study results revealed that inadequate resource capability was a challenge to hospital emergency preparedness (mean= 4.45, SD= 1.512). This result supports Sheikhbardsiri *et al.* (2017) <sup>[34]</sup> findings, which revealed that healthcare's limited capability with the number of beds, health personnel, and equipment, among other resources, is a challenge that hinders emergency preparation. . Most healthcare institutes, especially the public sector lacks physical space availability. Hence resource capacity increment is not possible to prepare for emergence situations. Finally, the study results revealed that a lack of a plan or strategy for emergencies was a challenge to hospital emergency preparedness (mean= 4.45, SD= 1.512). This result supports Canton's (2019) <sup>[7]</sup> assertion that there is no plan or strategy for emergencies. Therefore hospital administrators may struggle to implement strategic

preparedness planning if they do not follow a well-planned procedure.

### 4.5.4 Measures to improve Hospital Emergency Preparedness

The study revealed that increasing the staff of health professionals improves hospital emergency preparedness (mean= 4.91, SD= 1.956). This result is in line with Koinis *et al.* (2015) <sup>[20]</sup> assertion that dealing with the healthcare professional capacity of a hospital entails employing more workers or staff to be prepared for emergency cases in their environment.

Additionally, study results revealed that adequate education and training drills improve hospital emergency preparedness (mean= 4.87, SD= 1.823). This result supports Khan *et al.*'s (2018) <sup>[18]</sup> study, which revealed that education alongside training or exercise could help make a healthcare institute and its staff be prepared for emergency cases in their environment.

Moreover, study results revealed that effective and efficient strategy or plan execution improves hospital emergency preparedness (mean= 4.85, SD= 1.819). This result supports Veenema's (2018) <sup>[40]</sup> observation effective and efficient strategy or plan execution by the healthcare system will make them prepare for an emergency.

Furthermore, study results revealed that crucial healthcare facilities and equipment availability improves hospital emergency preparedness (mean= 4.85, SD= 1.819). This result supports Rose *et al.*'s (2017) <sup>[32]</sup> findings, which revealed that increasing the capability of a healthcare institute in terms of beds and equipment, among other resources, is another means to be prepared for an emergency as a hospital. The Health system's ability to expand capabilities is critical; it gives them the ability to respond quickly to take care of emergencies.

Similarly, study results revealed that adequate finance improves hospital emergency preparedness (mean= 4.85, SD= 1.819). This result is similar to Turer *et al.* (2020) <sup>[39]</sup> study, which revealed that a hospital with strong finance can acquire vital materials for its operational activity like personal protective equipment (PPE) and ventilators, among other machinery and tools. This equipment aids in the day-to-day activities of the Hospital and during crucial times or times of emergency.

Moreover, study results revealed that adequate resource capability improves hospital emergency preparedness (mean= 4.81, SD= 1.803). This result supports Rose *et al.*'s (2017) <sup>[32]</sup> findings, which revealed that resource generation capability is another area seen as a possibility to promote rapid responses to an emergency. This is a key component of hospitals to prepare and respond to catastrophes. The result is also in line with Kwon *et al.*'s (2016) <sup>[21]</sup> observation that an increase in resources is crucial for hospital emergency preparedness to properly control and manage disaster or disease, or pandemic outbreaks that may occur.

Again, study results revealed that proper management improves hospital emergency preparedness (mean= 4.81, SD= 1.803). This result supports Mulyasari *et al.* (2013) <sup>[27]</sup> assertion that hospitals and their managerial department must constantly develop and adopt different strategic preparation planning to keep them at bay from emergency chaos. Managers who understand the nature and implications of external change can develop effective change strategies over time to manage the Hospital's momentum during crisis

seasons actively.

Finally, study results revealed that effective surveillance systems improve hospital emergency preparedness (mean= 4.64, SD= 1.745). The result is cognate to Whitelaw *et al.* (2020) <sup>[43]</sup>, whose findings indicated that the surveillance system has proved vital in controlling biological hazards. Hence, a healthcare system or institute without these systems will likely have challenges in emergency readiness.

## 5. Conclusion

Although hospital emergency preparedness is at the core of public health, research on the subject is still rare. Given the intricacy of the subject, this is not unexpected. Hospital emergency preparedness has been hardly understood, and tackling hospital emergency preparedness by incorporating determinant factors brings up a wider argument on definitions and scope. The study found a significant positive relationship between financial capacity or funding, infrastructure availability, plan strategy or tool for hospital emergency preparedness, hospital resource management, hospital communication and triage system, and top management decision on emergency preparedness. Government emphasis and supervision, national policies and regulations, and community standards determine hospital disaster readiness and response skills, not affiliation; nonetheless, financing and emergency experience are determinants that increase hospital disaster preparedness and response capabilities. Because it is difficult to anticipate which hospitals will be engaged in the emergency health response to disasters, all hospitals must be prepared to cope with disaster casualties.

## 6. References

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