DETERMINANTS OF HOSPITAL EMERGENCY PREPAREDNESS IN MACHAKOS LEVEL 5 AND KANGUNDO LEVEL 4 HOSPITALS

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DECLARATION

This research thesis is my original work and has not been presented for a degree in any University

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We confirm that the work reported in this thesis was carried out by the student under our supervision and has been submitted with our approval as the university Supervisors.

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DEDICATION

I dedicate this thesis to my husband Harrison and children Diana, Doreen, Daniella and Gift for their wonderful support up to this time. I cannot forget my late sister Janet for your support. May God bless you all.

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ABSTRACT

Emergency preparedness is a key security priority globally. Plans are needed, not only to maintain services continuity but also to guide in emergencies in hospitals. Kangundo level 4 and Machakos Level 5 Hospital have recorded 27% and 39% increase of emergency cases in 2018 respectively. In the face of these emergencies, the ability of Kangundo level 4 and Machakos Level 5 Hospital to provide emergency service quite literally make the difference between life and death. This study assessed the determinants of Hospital Emergency Preparedness in Kagundo level 4 and Machakos Level 5 Hospitals in Machakos County. The study adopted cross-sectional design and stratified random sampling method. Whereby a sample size of 128 respondents was obtained using the Yamane 2008 formula; 49 respondents from Kangundo level 4 and 79 from Machakos level 5 hospital. Self-administered questionnaire was applied. The findings reveal high understanding of the meaning of emergency preparedness with mean of 4.29±0.67. Ninety-four (74%) of the respondents considering themselves prepared for emergency. While 80 (64%) considered themselves key leadership figure in emergency preparedness with a mean of 3.67±1.06. One hundred and eleven (88%) of the respondents agreed with the statement that training on emergency preparedness should be conducted quarterly with mean of 4.27±0.95. Respondents agreed that emergency tray is well equipped with various equipment for management of emergency with a mean of 3.51± 1.101 and that hospital has a drug supply system with drug suppliers with mean of 3.51±1.108. Majority of the respondents agreed with the statements that financial allocation for emergencies preparedness should be increased (*4.07*±1.195), and that the facility has transport and logistics support in case of any emergency (*3.4*±1.231). There results showed strong and positive relationship between commodity availability, financial resources, policies and emergency preparedness with coefficient of correlation of $r=0.619$, $p<0.001$, $r=0.626$, $p<0.001$, and $r=0.702$, $p<0.001$ respectively. In a combined relationship Commodities ($p<0.05$), Finance ($P<0.05$) and Policies ($P<0.05$), all had a significant influence on hospital emergency preparedness. The study found that policy formulation and implementation, commodities and finances significantly influenced emergency preparedness. The study variables under this study are important in determining emergency preparedness, and that emergency preparedness will work well if the variables are taken into account. Therefore, hospital management need to build stable drug supply system with adequate drug suppliers. Resources should be allocated to purchase ultra-modern equipment. Additionally, clear mechanism of access of emergency commodities should be developed by hospital management and staff be made aware of it. There is need for staff participation in emergency policy formulation, guidelines, emergency plans, and lobbying for emergency preparedness. In addition, the facilities need to make emergency drills, and safety inspections regular.

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ABBREVIATIONS AND ACRONYMS

CS	**:**	Command System
DRM	**:**	Disaster Risk Management
EOC	**:**	Emergency operations center
GHSA	**:**	Global Health Security Agenda
HCW	**:**	Health care worker
KEMU	**:**	Kenya Methodist University
MOH	**:**	Ministry of Health
NACOSTI	**:**	National Commission of Science, Technology and Innovation
PPE	**:**	Personal Protective Equipment
PHEMSs	**:**	Public Health Emergency Management Systems
SDG	**:**	Sustainable Development Goals
SPSS	**:**	Statistical Package for Social Sciences
UHC	**:**	Universal Health Coverage
UN	**:**	United Nations
UNESCO	**:**	United Nations Educational, Scientific and Cultural Organization
WHO	**:**	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Service delivery as one of the World Health Organization's (WHO's)building blocks for health systems is the area of focus in this thesis. Risks management is a global public health security (Khan, 2018). Planning for and responding to emergencies is an important element for global health system preparedness, response and risk management (World Health Organization [WHO], 2018). Emergencies preparedness a vital phenomenon in planning, preparing and responding to crises (Khan, 2018). The term emergency refers to any extraordinary event or situation that requires an intense, rapid response and that can be addressed with existing community resources (Qureshi & Gebbie, 2001). Preparedness on the other hand is defined as arrangements to ensure that, should an emergency occur, all those resources and services, which may be needed to cope with the effects, can be rapidly mobilized and deployed (Peter, 2015).

Emergency preparedness is conceptualized therefore as the comprehensive knowledge, skills, abilities and actions needed to prepare for, and respond to, threatened, actual or suspected chemical, biological, radiological, nuclear or explosive incidents, man- made incidents, natural disasters or other related events (Slepski, 2008). Public emergency is defined as an event that happens unexpectedly and has huge negative impacts on human health, the economy and social stability (Qiu et al, 2018). Meanwhile, hospital preparedness encompasses those actions, programs, and systems developed and

implemented before a major incident to improve the capability and capacity of the hospital to respond to disasters and emergencies (Djalali et al., 2014; Wachira & Martin, 2011). Emergency preparedness and response resources are designed to assist organization in planning for, and reacting to, all hazards. In health care, emergency preparedness establishes facility readiness before an emergency, and provide a proven response, resiliency and recovery framework. The major components of maintaining a high preparedness are planning, infrastructure, knowledge and capabilities, and training (Adini et al., 2006).

Historically, the concept of healthcare preparedness began in 1996 (Jaye, et. al., 2016). This was prompted by increased terrorism, such as the 1993 bombing of the World Trade Center in New York City, the 1995 bombing of the Oklhoma City Alfred P. Murrah Federal Building, and the 1995 biological and chemical terror attacks by Aum Shinrikyo in Japan (Toner, 2017). In Africa, droughts, fire, floods, terrorism, technological accidents, diseases dominate disaster profile and epidemics that disrupt people's livelihoods, destroy the infrastructure, divert planned use of resources, interrupt economic activities and retard development. For example, Kenya has experienced major epidemics, floods, drought, social unrest and mass casualty incidents in the last decade (Ministry of State for Special Programmes & Office of the President, 2009).

The idea of emergency preparedness has been domesticated in countries, counties, cities, and hospitals policies and operational framework. For example, National Policy on Disaster Management to institutionalize mechanisms for addressing disasters in Kenya was developed and operationalized in 2009 (Ministry of State for Special Programmes & Office of The President, 2009). The policy emphasizes on preparedness on the part of the

Government, communities and other stakeholders in managing emergencies activities. Furthermore, the Ministry of Health developed the Kenya Health Sector Disaster Risk Management Strategic Plan 2014-2018 (Ministry of Health [MOH], 2014).

According to World Disasters Report (2016), inadequate emergency preparedness affected majority of health institutions in Guinea whereby more than 30, 544 lives were affected directly with 2,845 deaths from Ebola disease than hit the country in March 2014 (Stephenson, 2014). Emergency preparedness should focus on community preparedness, a personnel augmentation plan, and communications and public policies for funding the emergency preparedness. The capability to cope with a MCI serves as a basis for preparedness for non-conventional events. Coping with chemical casualties necessitates decontamination of casualties, treating victims with acute stress reactions, expanding surge capacities of hospitals, and integrating knowledge through drills. Risk communication also is important (Raisbeck, 2014).

One of the goals of the plan is to build the emergency management of hospitals and professions to effectively prepare for, mitigate against, respond to, and recover from any hazard by planning, training, and exercising. Whereas the focus is to save lives, the scope of organizational and individual health worker preparedness in response to emergencies remains unaccounted (Qureshi & Gebbie, 2001). Additionally, there is little research that provides a comprehensive overview of the facilities preparedness particularly for key outlets Jaye et al., (2016) like the present study site Therefore, establishment of the determinants of emergency preparedness in Kangundo level 4 and Machakos Level 5 Hospital in the context of devolution is necessary.

1.2 Statement of the Problem

Globally, Health facilities are contemplated to be the pillar of emergency response plans with capacity of health care workers and policy formulation being identified as vital in emergency response plans (Balicer, 2006). In Kenya, level 4 and 5 hospitals are the heart of referral and emergencies (MoH, 2018). Kangundo Level 4 and Machakos level 5 hospitals are arguably the most advanced in Machakos County. Yet, data published by the Ministry of Health Kenya demonstrate an increase of emergencies and referral in Machakos environments (MOH, 2014). From 2014 to date tens of thousands of accidents victims from Nairobi-Mombasa highway and from fire outbreaks and gas cylinder have rushed or referred to hospitals.

For example, Kangundo level 4 hospital records showed 27% increase of emergency patients in 2017 (18,705 cases) compared to 14, 728 cases in 2016, and 39% increase in 2018 (25,991 cases) compared to 2017 while Machakos level 5 hospital's records showed an increased casualty patient flow by 35% from 43,542 (2017) to 66987 in 2018. During this period, the deaths in the two hospitals also were reported to have increased compared to previous years. Kangundo level 4 reported 375 deaths in 2018 compared to 209 in 2017 while Machakos level 5 mortality records showed 497 deaths in 2018 compared to 362 in 2017 and 191 in 2016 (District Health Information System [DHIS], 2019). Referrals from Kangundo level 4 and Machakos level 5 hospitals were on the increase by 23% and 35 % respectively (DHIS, 2018).

In the face of these emergencies, hospital's vulnerability assessment to identify the state of emergencies preparedness plans of the two hospitals to anticipate, prepare for, and

manage client flow trends and their effects is crucial (MOH, 2014). This may contribute to enhance hospital efficiency. Therefore, establishing the determinants of emergency preparedness in Kangundo level 4 and Machakos level 5 hospitals will inform policy formulation as well as adjustments of resource allocation and commodities for better emergencies preparedness.

1.3 Research Objectives

1.3.1 Broad Objective

The main objective was to establish the determinants of hospital emergency preparedness in Machakos Level 5 and Kangundo Level 4 Hospitals.

1.3.2 Specific Objectives

i. To determine the influence of the capacity of Health workers on hospital emergency preparedness in Kangundo level 4 and Machakos Level 5 Hospitals.
ii. To establish influence of commodities availability on hospital emergency preparedness in Kangundo level 4 and Machakos Level 5 Hospitals.
iii. To determine the influence that finance has on hospital emergency preparedness in Kangundo level 4 and Machakos Level 5 Hospitals.
iv. To establish the influence that institutional policy has on hospital emergency preparedness in Kangundo level 4 and Machakos Level 5 Hospitals.

1.4 Research Questions

i. What is the influence of Health worker's capacity on hospital emergency preparedness in Kangundo Level 4 and Machakos Level 5 Hospitals?
ii. How does availability of commodity availability influence hospital emergency preparedness in Kangundo Level 4 and Machakos Level 5 Hospitals?
iii. What is the Influence of finance on hospital emergency preparedness in Kangundo Level 4 and Machakos Level 5 Hospitals?
iv. Does institutional policy influence hospital emergency preparedness in Kangundo Level 4 and Machakos Level 5 Hospitals

1.5 Justification of the Study

In Kenya, Pneumonia, HIV / AIDS, heart disease, malaria, anemia, tuberculosis and eventually cancer in that order are the top leading causes of death, with contribution levels of 11%, 8%, 8%, 5%, 4% and 3% collectively. However, mortality rates from cancer, anemia and heart disease and human induced accident have been on the increase. In regards to Machakos and Nairobi the number of emergencies and casualty are bound to increase with expansion of Nairobi-Mombasa highway, industries and residential area in Kitengala, Emali and Athi River (MOH, 2014). There are few known studies on preparedness and with the lack of clear policy on emergency preparedness in major hospitals like Kangundo level 4 and Machakos level 5 hospitals, a study to examine the determinant may be a revelation. Secondly, since the Machakos facility is helpful to accidents victims along Mombasa- Nairobi highways one of the major reasons as to why Machakos was selected among the pilot counties for universal Health Care and industries

around Machakos town, the data will show the ability of the hospital and the technical knowhow of staff in emergencies. Furthermore, pre-hospital care including ambulance service and its coordination is not well defined. The data is also beneficial in providing brief on development of operational framework on routine simulation and coordination of emergencies services in the context of devolution. The finding will also enrich knowledge management for Emergence and Disaster Risk Management (DRM) in the health sector which is inadequate (MOH, 2014). Scholars and academic world will also benefit. Lack of adequate emergencies preparedness in strategy hospitals such as Machakos level five is set to compound the number of mortality and morbidity in Kenya.

1.6 Limitations of the Study

The dynamic nature of health workers schedule was a challenge. The study being cross-sectional, researcher was not in control of the information because it was collected at a particular point in time. What happened before or after the study was not captured. Delay was also experienced due to travelling restrictions. The interviews were undertaken in hours friendly to the health workers.

1.7 Delimitations of the Study

This study was to assess the determinants of emergency preparedness among health workers. The specific areas of study included influence of health worker's capacity, influence of commodities availability, influence that finance has on emergency preparedness and the influence that institutional policy has on emergency preparedness. The study was conducted in Kangundo level 4 and Machakos level 5 Hospitals in Machakos County. These are the referral centres and strategically located in emergency

prone areas. The study involved outpatient health care workers because statistics recorded emergencies only in outpatient in the health facilities whereby questionnaires were administered. There was absolute confidentiality on all information collected, hence anonymity in completing the questionnaire was offered as an option in order to gain respondent's trust.

1.8 Significance of the Study

The study findings will be useful to Kangundo level 4 and Machakos level 5 hospital's management for planning, policy revision or development. Other level 4 and 5 hospitals may also benefit from the recommendations. The results from the study will enable Kangundo level 4 and Machakos level 5 hospitals management and Ministry of Health (MoH) policy makers to be decisive when acting on the gaps identified. Study participants were informed on emergency preparedness and their core competencies. The depth of literature in the emerging field of emergencies preparedness was enhanced for scholars and researchers. Opportunities for further research and interventions were recommended. The researcher has benefited from practical research, report writing and results facilitate MSc award.

1.9 Assumptions of the Study

The researcher assumed that data collection instruments were adequately valid and reliable. It was also assumed that the respondents were honest and provided factual and unbiased information. In addition, the study assumed that Machakos County will use this information in decision making. Articulation of the knowledge (facts and figures), skills

(psychomotor or mental operations) and attitudes (values) ensures adequate preparedness for disasters and public health emergencies (Walsh et al., 2012).

1.10. Operational Definition of Terms

Commodity:	A material or product that is invested, allocated, distributed and anticipated to be useful/ used during emergencies.
Emergency:	Unprecedented occasion or circumstance that requires an extraordinary, fast reaction and that can be tended to with everyday assets.
Finance:	The process of prioritizing, investing, budgeting, saving, and forecasting monetary resources for emergencies.
Health worker:	Human resource for health expected to prepare and response, to emergencies.
Information:	Facts or data provided or learned about emergencies preparedness to be used for decision making or action by organization during emergencies.
Policy:	A set of principles, rules, and guidelines formulated or adopted by an organization to address emergencies.
Preparedness:	Courses of action to guarantee that, should a crisis happen, each one of those assets and administrations, which might be expected to adapt with the impacts, can be quickly assembled and sent.
Emergency preparedness:	Course of actions which flexible and resilient are efficient and responsive.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents reviewed literature with regard to study objectives; health care workers, commodity, finance and policy in order to familiarize with the study context and identify any gaps based on which the study was conducted.

2.2 Capacity of Health Workers and Hospital Emergency Preparedness

Individual and organizational capacity is critical element in emergency preparedness (Jaye et al., 2016). Capacity is defined as a combination of observable and measurable skill, knowledge, performance behavior, and personal attributes that contribute to enhanced employee performance and success in emergencies (Gebbie & Merrill, 2002). The competencies overall goal is to have public human resource for health prepared to perform proficiently their assigned prevention, preparedness, response, and recovery role(s) in accordance with established local health security and public health policies, laws, and systems (Gebbie et al., 2013). Wide and diverse range of health professionals are being brought into the realm of emergency preparedness, response, and management due to heightened awareness and the reality that natural disasters, human system failures, and conflict-based disasters are occurring with increased magnitude and frequency worldwide (Walsh et al., 2012).

2.2.1 Influence of Health Workers Skills on Hospital Emergency Preparedness

The ability of any one worker to meet the emergency preparedness performance goal for his or her position is closely tied to scribed and acquired skills (Shabanikiya, et al., 2016). For this reason, articulation of the knowledge (facts and figures), skills (psychomotor or mental operations) and attitudes (values) ensures adequate preparedness for disasters and public health emergencies (Walsh et al., 2012). The clarification of exactly what knowledge, skills, and attitudes a public health professional must demonstrate during upsurge is therefore a priority (Gebbie et al., 2013). Although training and education have long been accepted as integral to disaster preparedness, the application of these practices are neither evidence-based (Bass et al., 2006).

Hospital personnel must possess particular characteristics for the effective emergency preparedness particularly in difficult and unpredictable conditions (Shabanikiya et al., 2016). However, there is currently little information available regarding the characteristics that allow hospital staff to perform well in an adversity (Shabanikiya et al., 2016). Since health emergencies, require a major response; happen quite infrequently, organizations and staff need to exercise the procedures and skills for these events in order to be prepared to respond. The only way to actually test a plan is through organized drills. There are several mechanism of drills (Kiongo, 2015) which drill mechanism is adopted in current study context.

There are no universally accepted set of skills for public health preparedness (K. M. Gebbie, et. al., 2013). However, according to Bass and others, in reviewed titled Healthcare worker competencies for disaster training there are seven core cross cutting

competencies (Bass et al., 2006). These include the ability to recognize a potential critical event and implement initial actions. The term, critical event, denotes any situation that threatens to disrupt the ability of an organization to maintain continuity of operations. The documentation of the ability of Human resource for Health to provide early event recognition and early response mobilization is vital for any emergencies plan. It reported that any health personnel should be able to assume a leadership role in emergencies (Shabanikiya et al., 2016). In addition, their level of competencies to recognize triggers and report appropriately is paramount (Bass et al., 2006). Evaluation of the ability Human resource for Health to identify correctly all potential critical events among a list of scenarios is warranted.

The need for effective evidence-based disaster training of healthcare staff at all levels, including the development of standards and guidelines for training in the multi-disciplinary health response to major events, has been designated by the disaster response community as a research priority (Bass et al., 2006).

Providing the estimated twelve million healthcare workers in the United States with effective disaster preparedness training poses several major challenges. First, best practices to be taught must be identified and recognized. Second, specific target audiences and the content they should be taught must be defined. Instructional content should be tailored to meet the training requirements for different job categories. Effective multidisciplinary disaster response demands acquisition and application not only of factual knowledge but also complex concepts, multi-level decision making, and specific technical skills. The evaluation of whether these skill sets have been efficiently conveyed and effectively acquired presents its own inherent challenges (Stephenson, 2014). Finally,

differences among healthcare workers such as prior training, work experience, baseline abilities and cultural background directly impact training effectiveness and must be taken into consideration for the training of large groups.

The use of a methodical, competency-based approach may provide the solid foundation to build a comprehensive program of training and evaluation required to meet these challenges. Research on practices, standards and educational programs based on both the evidence and sound actions remains an important gap to be filled. Disaster preparedness and response are two of the four core areas for focus in Strategy 2010, the strategy document of the International Federation. This strategy guides the National Societies in their work and the Secretariat and delegations who support them and underlines the need for improving the Red Cross Red Crescent Movement's response to emergencies. The aim of disaster management training is to build the capacity of National Societies' staff and volunteers, and that of International Federation delegates, to improve preparedness and response at all levels before during and after disasters and to give all components of the Movement the means to work together in a coordinated manner (WHO, 2010).

The focus of disaster management training is generally on improving the technical skills of the participants, but also on personnel and team management. It aims to encourage an exchange of experience and knowledge and the creation of networks amongst the disaster managers. It also aims to improve coordination of disaster response and the quality and availability of disaster management tools. The role of the International Federation is to standardize training curricula, train trainers in National Societies, facilitate and support training in disaster management at national, regional and international level. Training at national level is the responsibility of individual National Red Cross and Red Crescent

Societies, supported as needed by technical delegates of the International Federation (Strategic Plan, 2014-2018).

2.2.2. Professional Training and Experience in Hospital Emergency Preparedness

Health worker's capacity is organized into domains, or categories of learning outcomes, as defined by Bloom's Taxonomy of Learning Domains (Walsh et al., 2012). Published research on emergency preparedness education has identified a lack of solid evidence on the core competencies an individual requires in a substantial response strategy (Gebbie et al., 2013). However, most studies have focused on organizational and system testing with few on individuals' input (Jaye et al., 2016). Majority of the documented efforts have been limited primarily to individual specialties or targeted professionals, which has resulted in a lack of definitional uniformity across professions with respect to education, training, and best practices within the discipline of public health (Walsh et al., 2012). It is important therefore to document and develop a combination of new employee orientation, continuous on the job learning, and regular exercises and drills with interwoven quality improvement loops. The WHO advocates that proper preparedness requires improvement and protection of the baseline capacities including health care facilities, services and skills (Haltigan & Vaillancourt, 2018). Henceforth, emergency preparedness requires a health work force which is adequately staffed and which has an appropriate, equitably distributed mix of skills and competencies (Waldman, 2017). What are the skills and competencies in the current study setting?

The application of the principles of critical event management is next core competencies. In order for a facility to successfully manage all critical events, healthcare workers should

understand the essential elements of an effective preparation and response including the appropriate actions to be performed (Bass et al., 2006). Are the study participants able to identify key information to be reported and recognize the appropriate notification steps like the appropriate authorities to be notified? To be successful, the participant must correctly identify standard safety precautions as well as additional precautions that may be needed for potential event (Bass et al., 2006). What is the ability of the Human resource for Health in the proposed study to enlist the immediate actions needed to protect personal, environmental and public safety in a specific potential critical event?

2.2.3. Knowledge and Awareness on Hospital Emergency Preparedness

Understanding the institutional emergency operations plan is important for disaster plan activation (mobilization) (Bass et al., 2006). In this context, awareness on the identification of the specialized personnel and equipment necessary for the upsurge and the preparation steps required for mobilization is key competency (Bass et al., 2006). The ability to control emotions is another important personal attribute (Shabanikiya et al., 2016). Understanding the incident command system and individual role is next (Bass et al., 2006). Are Health care workers in the current study able to identify the phases of critical event management and match the activities to the appropriate phase? Application of the knowledge of preparedness to identify the key components of preparedness and recognize appropriate preparedness activities in a given a critical event scenario is critical (Bass et al., 2006). What is the ability of the respondents to correctly identify the components of preparedness, and select the appropriate preparedness activities for each preparedness component?

The frequency of emergency and its severity resulting to damages and loses has gradually increased. This therefore calls for high competency skills among the health care personnel to reduce and manage the harm caused to either individual or whole organization. Additional educational skills have been highly recommended by developed and third world countries in order to manage emergency health care risks which are posed to cause harm to human beings. Good education skills instilled to health care workers improve their skills in managing these emergency cases. The abrupt deadly coronavirus disease has helped countries to identify the gap needed in handling of emergencies in various countries. With million cases identified in wild wide, for instance the United States of America recorded the highest number compared to any other country as at July 2020, with (141 000) deaths from 3.68 million infected people with a recovery of 1.08 million people (Nukpezah & Soujaa, 2020).

The emergency preparedness among Kenyan institutions in fight against Covid-19 has also identified the gap in our health facilities. With a total of 12, 062 confirmed cases, 222 deaths and 3983 recoveries as at 18th of July 2020, the country is still struggling to lower the spread of infections among its citizens. The HCW are also still continuing to manage the scores of corona virus patients, few days after paying final respect to the country's first doctor, a gynecologist who succumbed to the virus and also another a prominent comedian which has caused relaxation among media industry. The increased infections raising from less than 300 cases a day to more than 450 cases have been identified and related to lack of proper preparedness among counties in the country despite the cessation of inter county movement that was previously imposed by the Kenyans president. Lack of proper knowledge and skilled health care personnel has majorly affected the country in

fight against these virus as most counties have less health care personnel. The introduction of covid-19 prevention measures such as social distancing, wearing of face mask still does not provide proper solution to the diseases as the country still registers high infection numbers. This has still posed a challenge to our medical and educational institutions as it suggests that there is low educational level on emergency preparedness (MoH, 2020).

Several articles have suggested the proper measures to curb the high numbers of infections such as introduction of more treatment facilities in all the 47 counties and employment of more frontline health care workers who will help in fight against these pandemics. Despite of these prevention measures, the country declared lack of insufficient finances to equip health facilities and hiring of the skilled personnel. These has highly contributed to increased infections and deaths (MoH, 2020). Safety and protection are key in the ability to effectively and respond to emergencies (Shabanikiya et al., 2016). A critical response component for healthcare workers is the ability to protect themselves and others during a disaster event whilst also protecting the facility and its resources. Management of risk, imminent threats and scene safety to self is central (Bass et al., 2006). Familiarity of the emergency preparedness operations plan EOP (Shabanikiya et al., 2016). Correctly identification the purposes of the EOP and its components is paramount (Bass et al., 2006). This is essential for competences worth exploring in any study.

Disaster preparedness includes activities designed to improve the ability to start emergency measures to protect property and contain the damage and disruption, as well as the capacity to engage in post-disaster restoration and early recovery activities (ÖztekİN et al. 2014). Preparedness is serving as a time-based connector between the pre- and post-impact stages of a disaster incident. It consists of measures that allow individuals,

institutions, and communities to react efficiently and recover quickly when disasters attack (Sadeka, 2015). Preparedness aims to ensure that the resources necessary for responding effectively in the event of a disaster are in place. Also, the responding personnel must know how to use those resources (United Nations International Strategy for Disaster Reduction (UNISDR) and United Nations Office for Coordination of Humanitarian Affairs [UNOCHA], 2008).

Actions that are usually related to disaster preparedness comprise of the development of planning procedures for preparation, formulation of disaster strategies, storing essential resources for effective response, and evolving skills to guarantee the adequate performance of disaster-related duties. Disaster management plan is a continuous, integrated, multidisciplinary process of planning and application of procedures to accomplish the disaster prevention, mitigation, preparedness, response, recovery, and rehabilitation (Joseph, 2015). In 2014, Montán et al., developed a new simulation model for interactive training of the response to major disasters and then in (2015) the same author enhanced a new simulation model for education, research, and quality assurance in disaster medicine. The models provided the base for the start and development of training program in disaster management (Montán et al., 2015).

Simulation of Montán et al., (2015) is a method for testing capacity and preparedness to identify critical limiting factors for surge capacity during disaster response and also illustrate how these factors interacted with each other. It also provided a base for evaluation and enhancement of preparedness, response, and performance in a major disaster. Efficient and ideal methods of teaching the disaster preparedness in faculties of nursing are still under debate. Efforts are needed to determine the types of educational

strategies and the best class scheduling options for training the staff personals and employees (Gillani, et al., 2020).

2.3 Commodities for Hospital Emergency Preparedness

Commodities are central in emergency medical situations and influence scope of service offered as well as the behavior of the provider, facility, and entire countries (Kiongo, 2015;Shabanikiya et al., 2016). From the Kenyan perspective, there is little research interrogating the influence of commodities understanding that Kenya Health Policy 2014 – 2030 defines emergency preparedness to include provision of medicines, ambulance, and information.

2.3.1 Procurement and Supplies for Hospital Emergency Preparedness

This refers to how the hospital equipment are sourced and delivered in day-to-day use and for any emergency preparedness. In healthcare like any other institutions, procurement undergoes several processes before it is completed. Hospital equipment, products and other hospital services usually go through several steps before approval of purchase. Such processes include application of tenders to provide the equipment needed, review of the application of tenders by the hospital management team and other stakeholders (Peter, 2015). Slow procurement processes have influenced majority of hospitals in emergency preparedness as the process undergoes several steps before completion. Health care workers have been unable to plan for emergency preparedness as they lack proper equipment to aid in planning of the activities. This has seen the delay in provision of quality health care services leading to loss of life in hospitals. For effective planning and proper provision of health services, procurement processes in health care should be

revised to take a shorter period of time for delivery of required equipment and other hospital services (Javaid & Siddiqui, 2018).

Public procurement units across the country will also feel this pressure. They will be deciding over the purchase of goods and services with taxpayer money. On the one hand, the purchases are urgently needed. On the other, there is a risk that taxpayer money can be wasted if decisions are taken too hastily (Soucat, 2019). Further highlighted that one instrument that can be helpful in this kind of situation is a framework agreement. This should be part of any country's Disaster Risk Management plan. Its aim is to have a procurement system ready that responds quickly to an emergency. But this quick response should not increase risks beyond what policymakers have defined as acceptable. Special procurement procedures for emergencies should be part of disaster management systems and should especially include tailored framework agreements. The emergency framework agreements can encompass basic goods and services that are likely to be used in response to a serious emergency. For example, it can include goods such as drugs and medical supplies, emergency housing, fuel, mattresses, blankets, food and water (Stephenson, 2014).

The primary role and responsibility of the procurement unit is to procure the right product in the right quantity and quality, at the right time for delivery to the right place. All relief activities depend upon procurement for relief materials. Emergencies are life-saving situations, so time is of the essence and we need to procure the required goods and materials, and deliver these to the intended beneficiary in a timely manner (Toner, 1017). The importance of communication/collaboration/coordination in the procurement process to the entire relief operation cannot be stressed strongly enough. Slow or ineffective

procurement can delay or stop the entire operation if relief items are not available and prevent CARE from achieving its mission of providing urgently needed assistance to disaster-affected people (Stephenson, 2014).

2.3.2 Products and Medicine for Hospital Emergency Preparedness

The role of any hospital is to provide necessary products for management of any emergencies experienced. These products include a well-equipped emergency kitty that provides needed products to deal with in any emergency response. Assessment of hospital products and medicines is paramount. This informs the integrity and availability of alternative sources of essential utilities, safety of elevators, functionality water and safety of water, safe of the ceilings, status of communication systems. Are the fire suppression and alarm systems working? Is there a water-rationing plan in the event of water outage or other water problems? Is there a camera with adequate amount of film available to record damages to the building and equipment for insurance purpose? (Kiongo, 2015). Assessing the influence of these parameters in the current context may inform structural adjustments.

2.4 Financing in Hospital Emergency Preparedness

Health care financing is a key component as World Health Organization highlights it among the Health Systems Management pillars. Proper health care financing tends to move closer in fulfillment of achieving the aspect of universal health coverage. This includes allocation of funds in a more efficient and equitable way that contributes to achievement of the UHC (Soucat, 2019). Finance as a unit plays a key role in emergency preparedness. Timely allocation of finance in an emergency enables effective

management which allows smooth implementation of programs. It also ensures accountability, timely and accurate management of emergencies. Therefore, following proper procedures in finance allocation and procurement of resources needed in emergency preparedness plays a greater role in promoting transparency (United Nations Educational, Scientific and Cultural Organization, 2007).

Containment of financial loss, regardless of its cause, is a key goal of virtually every organization's risk strategy, providing a compass for many of the actions taken to avoid, mitigate, transfer and retain risks enterprise-wide. Yet catastrophic events too often result in losses that exceed the expectations of management. Such losses highlight the need for organizations to more fully address their exposure to financial losses through the process of financial disaster preparedness. Financial preparedness is a crucial component of disaster planning that addresses the actions necessary for an organization to mitigate financial losses following a catastrophic event. Long before a catastrophic disaster occurs, these actions need to be identified, understood and addressed. It is clearly not the optimal time to initiate the process while the fire is burning, the ground shaking or the water rising (WHO, 2009). According to Qui recovery from a disaster can present many unexpected challenges that directly affect financial recovery, such as delays in restoration, issues continuing operations and generating revenue, unexpected costs and challenging insurance claims. These and other issues can make it difficult to project the outcome of a catastrophe and manage expectations within the organization (Qiu et al., 2018).

2.4.1 Budgeting for Hospital Emergency Preparedness

Effective preparedness requires that emergency plans be developed, resource put on stand by and that these measures be monitored and evaluated regularly. Resource allocation is a vital element to a successful critical event response (Qiu et al., 2018). Standby resources to facilitate implementation of process in facilities in accordance with accepted guidelines and standards are warranted in a plan (World Health Organization [WHO], 2009). Adequate Resource allocation helps to facilitate purchasing of core items needed, stimulate knowledge needed for informed decision making about risks; engaging stakeholders in dialogue aimed at resolving disputes and reaching consensus (Covello, 2001). As part of this, identifying what resources different groups wish to receive remains an important task in any future preparedness (Qiu et al., 2018). Therefore, a profiling resource for emergency preparedness in any setting is important. It is important to describe the influence of perceived influence of resource allocation on emergency preparedness.

Different studies have shown gaps related to emergency preparedness plans due to insufficient allocation of financial resources. For instance, (Covello, 2001) study results revealed that insufficient financial allocations in health facilities has contributed to failure in performance. Among the respondents involved in the study, more than half 63% reported that poor budgeting and poor financial allocations contributed to low procurement of quality products needed in planning for emergency preparedness. Less than 15% of the respondents supported the finances allocated to the departed of emergency preparedness while the remaining 22 percent of the respondents had no proper support to either of the opinions. Another study results also reported that allocating inadequate finance to the department of emergency preparedness makes it difficult to acquire required

equipment necessary to use during any emergencies. The insufficient finances do not enable the designation of proper plans i.e. hiring the expertise to equip more knowledge to other staffs for dealing with emergencies (Kiongo, 2015).

Health care facilities in Kenya have experienced different emergency situations that need quick responses. For instances, accidents have occurred along Nairobi – Nakuru highway leaving several deaths. This lead to increased number of patients and other accident casualties in Nakuru Provincial General Hospital. Due to lack of proper financial allocations and poor planning, the hospital could not handle the situation since it has no equipment necessary in managing emergencies. Few health care workers and fewer infrastructures were also among the identified weaknesses. Same cases have been reported by Thika level 4 hospitals which experiences such challenges due to its location in Nairobi – Garissa highway. These shows how unprepared in emergency response on Kenyan health facilities. Therefore, this study will be carried out in Machakos level 5 and Kagundo level 4 hospitals to determine how it is prepared in emergency.

Based on the national study survey 2013 and 2016, the report revealed that financial resource allocation by United nations and World Health Organizations to third world countries increased the general emergency preparedness in health care facilities through proper planning. Naderpajouh revealed that proper and adequate finance allocation to hospital management team minimizes the risk of this hospital being caught unware due to lack of preparation. A study in China “the public health emergency management system trend” proved that financial resources are the key component for any stable health care facility in developing. According to the results, respondents from the outpatient departments of the three hospitals where the study was conducted revealed that inadequate

financial allocation affected the smooth functioning of the emergency departments. Delayed payments, lack of ultra-modern equipment which would aid in fighting emergency had greatly harmed the hospitals ability in providing proper guidelines in fight against emergency (Hastak, 2019).

In Kenya, the recent financial crises by the ministry of health has affected the running of devolutions as majority of the health care facilities operate on unequipped infrastructures. Few hospitals with equipment were overwhelmed and always filled with emergency cases such as road traffic accidents, fire and other explosive substances. For instance, the St. Mary's high school fire that led to lose of life for both students and non-teaching staffs exposed the lack of preparedness in our health facilities. According to the statement from Mbagathi level 5 and Kenyatta National Hospital, the biggest referral health facility in the region revealed that inadequate staffing, lack of infrastructure and inadequate supply of modern equipment hindered their response to the emergency as no health care worker would attend to patients without proper self-protection (Kaguthi et al., 2020). Health care staffs in these hospitals have on several occasion threatened to boycott working due to poor work conditions. Health care workers during the press briefing with one of the top media house revealed that hospital management had not allocated adequate finances to cater for emergency preparedness planning and budgeting. In Machakos County, frequently emergencies such accidents on Nairobi-Mombasa highway have threatened the public health. This has critically challenged the Public Emergency Management Systems (PHEMSs). Therefore, the purpose of this study aims to assess the determinants of hospital emergency preparedness in Machakos County Kenya, a case in Machakos level 5 and Kagundo level 4 hospitals. The findings from this study will help the County government

to improve on financial allocation in order to ensure emergency preparedness response team has been set and well organized to minimize the risk to human life and socio-economic activities.

2.5 Institutional Policies on Hospital Emergency Preparedness

The common elements for strengthening preparedness in institutions include rules and governance.

2.5.1 Policies and Legislation on Hospital Emergency Preparedness

Governance entails both policies and legislation that integrate emergency preparedness, plans for emergency preparedness, response and recovery and coordination mechanisms. WHO say institutions should prioritize the development of joint health sector emergency preparedness plans within the existing health sector coordination mechanism as well as health sector contingency planning, with regular updating of methodologies and planning for exercises and simulations (Haltigan & Vaillancourt, 2018) An effective institutional arrangement is essential for managing disasters successfully (Pathirage et al., 2014). Policies, systems, networks, lines of authorities and decision making processes are paramount to any master plan (Pathirage et al., 2014). According to Shabanikiya, in a study titled assessment of hospital management and surge capacity in disasters, achievement of optimal hospital disaster capacity depends on effective institutional arrangement (Shabanikiya et al., 2016). How then is the institutional arrangement in the current study?

Based on the view of improvement on the emergency preparedness policy and legislation, Kim, (2014) stated that hospital emergencies should observe all stages of preparedness to ensure quick adoption to the techniques involved by both management, health care workers and other hospital based personnel. He further noted revealed that inadequate policies in emergency preparedness contributed to poor emergency response. Emergency preparedness policy involves several approaches in order to ensure its effectiveness for proper functioning. These approaches include emergency response and adaptability, building block approaches, stakeholder's participation and action based (Kim, 2014) which worth exploring in research.

2.5.2 Communication in Hospital Emergency Preparedness

Communication is the most important determinants of emergency preparedness as communication skills enable health care providers give appropriate information relating to the emergency response (Pickton & Broderick, 2011). In addition, when the routine and appropriate communications are observed in any institution, it can alleviate their sense of vulnerability and so improve their response (Friedman & Kelman, 2006). A study results by Jennings et al. (2016) revealed that unaddressed communication challenges have negative impact on response of any emergency preparedness, participation in preventive measures, ability to obtain permission, ability for health care workers to meet their ethical obligations in terms of quality and patient safety. Limited scope of communication such as print and visual media which puts some health care workers disadvantaged and affects their literacy and response skills. Schillinger et al., (2004) writes that ineffective communication with healthcare workers has a relationship with poor response to emergency preparedness. As Health workers get access to Health Information on

emergency preparedness, it influences the decisions they make hence informed actions that leads to better lives (WHO, 2014).

Stewart, (2001) noted that when communication between a health worker and an emergency preparedness unit is effective, it increases satisfaction and more so when it leans towards necessary needs, values and liking. Communication also improves adherence and proper outcomes. All healthcare encounters depend on effective communication e.g. organizing of seminars to educate on benefits and internalizing proper preventive measure instructions in any emergency situations. Interactive technology has created new opportunities for health communication that can overcome barriers such as low literacy and expand opportunities to tailor and personalize information. Social support is another communication behavior that has profound consequences for mental and physical well-being of health workers (Martinez et al., 2019). How then does this communication dynamic play out in the current study?

2.5.3 Planning for Hospital Emergency Preparedness

Planning ensures an organization identifies appropriate measures to curb any arising emergencies. This is done by providing a well-equipped emergency supplies kit readily available for use at any needful times. A good planning system should provide adequate resources such as equipment, personnel, food and procedures that would act as a protective measure in handling and protecting against emergencies (Slepski, 2008). Waldman, (2017) reported that an effective emergency plan should involve all stakeholders of the system or organization. It should be an easy to remember plan for it to be important and function appropriately in an organization. The plan also should be kept at a very familiar

place which can be easily accessed by all organizational members. During planning for an emergency, the personnel's involved should ask themselves if the plan meets the required standards. This helps to identify and prioritize the basic needs to acquire during emergency preparedness. Properly designed plan are a key to success of any institutions. The designed emergency plan should answer questions such as how to help you and others access more places, how to reach each other in terms of communication and what you will do in different situations. During planning for emergency preparedness, duties and responsibilities should be assigned according to capability and specialty (WHO, 2009).

Albattat & Mat (2019) states that emergency planning includes identifying organizational resources through duties, roles, responsibilities that inform response. The actual primarily planning process requires all stakeholders to identify and highlight proper methods that shall work effectively to prevent or reduce the future re-occurrence of the emergency. Proper planning also determines how readily a health care facility is and how it will respond in case of the emergency. Planning encompasses instilling appropriate educational and other training skills that would be widely used by the trainees while responding. Therefore, the health care management and researcher needs to identify and mobilize resources from government and non-governmental organizations to achieve the aspect of emergency preparedness. The information shared during emergency planning process should therefore serves as guidelines, rather than blueprint to these organizations. Emergency preparedness planning priorities are different and depends on specific developed structures in each organization (Carmeli & Schaubroeck, 2008). The concept of emergency preparedness planning is key and very important and should therefore involve the emergency management teams and other stakeholders such as doctors, nurses,

laboratory officers, pharmaceutical officers, health information officers among other cadres that give preventive health services to individuals and communities. Timely and accurate responses are required during any emergency response but this action often depends on which plans were put in place before such emergencies strike an organization (Carmeli & Schaubroeck, 2008).

2.5.4 Command System on Hospital Emergency Preparedness

This refers to a set of standardized approaches that are used in command, control and coordination in case of any emergency response. Command System (CS) provides effective communication in an organization whereby various agencies and other stakeholders (Federal Highway Administration, 2018) should follow certain hierarchical. Mistovich et al., (2018) stated that command system comprises of standardize hierarchy of procedures which aids in management of emergencies in organizations of any size. It helps in management of several resources such as funds, human resource and equipment. Human resources are allocated and assigned duties according to established set of standardized set of procedures formed. Command System it provides an organization with a unified and centrally authorities. The system also provides effective communication that prevents duplication of roles as assigned by the management. A well-functioning hospital incident command system is essential for the effective management of emergency operations (WHO, 2009). Designation of Hospital Command Centre, i.e. a specific location prepared to convene and coordinate hospital-wide emergency response activities and equipped with well-functioning means of communication (WHO, 2009). Lack of a systematic search and rescue system and equipment, and poor empowerment and

participation shows lack of readiness and emergency preparedness (Kiongo, 2015). How does command system influence emergencies response in Machakos County?

2.6 Hospital Emergencies Preparedness

Researchers and authorities to evaluate preparedness level or response performance by a hospital have created various indicators and methods (Djalali et al., 2014). The Hospital Safety Index (HSI), an all-hazards checklist developed by the World Health Organization (WHO), is a standardized, internationally-accepted method. It evaluates the functional capacity, which is defined as the level of preparedness of hospital staff for disasters, as well as the level of the implementation of a hospital disaster plan (Djalali et al., 2014). However, Djalali et al. (2014) writes that whether the evaluation tools can reliably predict the effectiveness of a hospital function during an actual disaster remains unclear (Djalali et al., 2014). The lack of internationally-accepted standards for preparedness and response performance measures is a global concern (Djalali et al., 2014). Nonetheless there are five core components of a response to emergencies. These flexible, efficient, responsible and resilient courses of action include surveillance, healthcare response, public health intervention, communication and command (Qiu et al., 2018). Parameters with indicators for these core components inform preparedness and the summations of answers to all the questions make up the criteria for level of preparedness (Mohammad-pajooh & Ab. Aziz, 2014)**.** For this study awareness of these five core components of a response to emergencies will equate preparedness. The inverse will be true.

The term emergency refers to any extraordinary event or situation that requires an intense, rapid response and that can be addressed with existing community resources (Qureshi &

Gebbie, 2001). Preparedness on the other hand is defined as arrangements to ensure that, should an emergency occur, all those resources and services, which may be needed to cope with the effects, can be rapidly mobilized and deployed (Peter, 2015).

The key role of the facility during emergency has to expand from increasing the awareness of its members to the aspect of development of the proper ability to respond and provide adequate knowledge based on the skills gained in emergency preparedness events (Song & Park, 2019). Despite the emergencies being unexpected and sudden events, which cause significant disturbance of a health institution or community functioning regarding widespread human, material, environmental and economic impairments which at times exceeds the ability of affected to properly manage using appropriate skills and resources, this event requires immediate solution to stabilize and harmonize the situation.

There are no universally accepted set of skills for public health preparedness. However, according to Bass and others, in reviewed titled Healthcare worker competencies for disaster training there are seven core cross cutting competencies. These include the ability to recognize a potential critical event and implement initial actions. The term, critical event, denotes any situation that threatens to disrupt the ability of an organization to maintain continuity of operations (Toner, 2017). The documentation of the ability of Human resource for Health to provide early event recognition and early response mobilization is vital for any emergencies plan. It reported that any health personnel should be able to assume a leadership role in emergencies. In addition, their level of competencies to recognize triggers and report appropriately is paramount. Evaluation of the ability Human resource for Health to identify correctly all potential critical events among a list of scenarios is warranted (Song & Park, 2019).

Inadequate supply of commodities contributes much in proper preparedness in management of any emergency in an institution. For instance, a case study in Guinea revealed that weak surveillance medical systems and inadequate supply of medical commodities contributed to difficulty surrounding the containment of the Ebola outbreak in 2014 and it quickly spread and affected the neighboring countries (WHO, 2018). Recently, the Coronavirus outbreak worldwide has also exposed the degree of lack of emergency preparedness as most countries have been hit hard by the virus. United states of America, a leading causality with a total confirmed case of 3.78M who also registered the highest number of deaths (142,000) with 1.11M recoveries, Brazil (2.08M) confirmed cases, (78,735 deaths), Spain and Italy were also affected due to inadequate preparedness. This was revealed by lack of inadequate supply of hospital commodities as health care workers in these countries threatened to boycott their daily duties due to lack of personal protective equipment (PPE's) (Najafi et al., 2017.

In Africa, a report from world health organization (2020) revealed that the continent registered 14, 443,127 confirmed covid-19 cases with 605, 202 deaths and 8,627, 753 recoveries as at 19th July 2020. The report further states that the continent would still register the high numbers if the countries do not lay down proper emergency preparedness mechanisms. Among the highlighted protective measures include procurement of proper and certified medical equipment both for health care workers and patients (Najafi, et al., 2017).

2.7 Theoretical Framework

This study utilized the theory of planned behavior (TPB). It is theorized that a significant amount of variance in intentions and behavior would assist in helping develop interventions to preparedness (Najafi, et al., 2017). It is hypothesized that intentions to establish emergencies preparedness ways is predicted by, subjective norms such skills, knowledge, legislation, policies. Skills and knowledge refer to the degree to which the individual has a favorable or an unfavorable power in the issue. The second predictor is a governance factor that is the subjective policies, legislation and command system to guide towards the subject. The third predictor of intention is the degree of perceived behavioral control which refers commodities necessary to do the activity (Najafi et al., 2017). Therefore, the theory of planned behavior will be used to predict the determinant associated with emergence among health worker in Machakos.

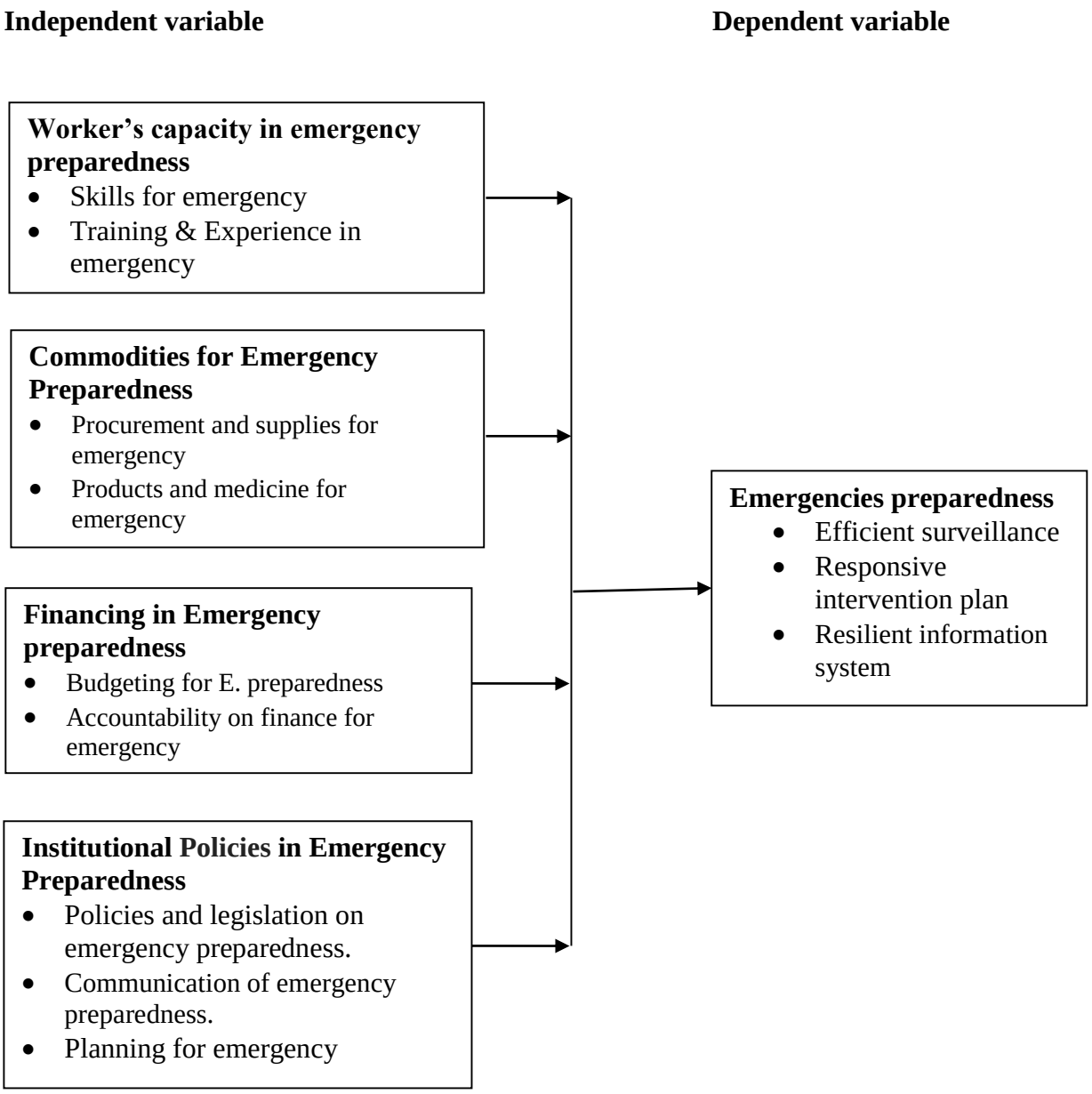
2.8 Conceptual Framework

The study utilized a modification of competency model as used by Gebbie and company (Gebbie et al., 2013). The model was founded on the theory of planned behavior. It is postulated that Health worker's capacity policies blended by finance and commodities inform level of preparedness. Use of services can be influenced and improved through training, support, involvement and conducive environment (WHO, 2007). Below is a diagrammatic representation of a modified model. Figure 1.2 below shows the conceptual framework that conceived that emergencies preparedness (dependent variable) was influenced by a multiplicity of contextual factors. Health worker capacity (skills, training and knowledge), commodities (supplies products and medicine), finance (budget,

accountability and allocations) and institutional policies (legislations, guidelines and communitarian pathways).

Figure 2. 1

Conceptual Framework



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter represents the study methodology. This include research design, study site, study variables, study population, sample size determination and sampling procedure are described. This chapter also describes the used, research instruments, data collection procedures, ethical consideration and data analysis.

3.2 Research Design

This was a cross-sectional study design. The design depicts variables as they exist in the study area. It encompassed quantitative approaches; self-administered questionnaires were used. The approach was considered most appropriate for the study because of its ability to elicit a wide range of information.

3.3 Location of the Study

The study was conducted in Kangundo level 4 and Machakos Level 5 Hospitals which are public health facilities located in Machakos County. Machakos (Masaku) is a town 63 kilometers Southeast of Nairobi see map, (Appendix 5). Machakos is a satellite town due to its proximity to Nairobi and Mombasa-Nairobi highway.

3.4 Target Population

Target population comprised of all outpatient health workers in Kangundo level 4 and Machakos level 5 hospitals. The study targeted all cadres of health workers working in outpatient department which included and not limited to Doctors, Clinical officers, Pharmacists, Laboratory technicians, Public health and management. The study population was 55 outpatient Health workers in Kangundo level 4 and 98 Machokos level 5 hospitals.

3.5 Sample Size Determination

To determine the sample size, Yamane's 2008 sample size was applied with population size of 55 Kangundo level 4 and 98 Machakos level 5 respectively. This data was derived from existing human resource records at Kagundo level 4 and Machakos level 5 hospitals

$$n = \frac{N}{1 + Ne^2}$$

Where;

n=is the total sample size

N=The size of population (55 Kagundo and 98Machakos)

E=Level of precision i.e 0.05 with 95% confidence interval

Kagundo:

$$= \frac{55}{1 + 55(0.05)^2}$$

$$= 48.288$$

$$= 49\ Respondents$$

Machakos;

$$= \frac{98}{1 + 98(0.05)^2}$$

$$= 78.723$$

$$= 79\ Respondents$$

Total of 128 respondents was interviewed.

3.6 Sampling Technique

The researcher obtained the list of all 128 health workers from list provided by the management of both hospitals. Stratified method was used to select participants from several cadres of workforce. Simple random probability sampling method was used in each department for equal opportunity to participate in the study. The sample was picked using a table of random numbers. The researcher assigned numbers to 49 and 79 health workers in the outpatient department Kagundo and Machakos respectfully ranging from 1 to 49 and 1 to 79. The respondents were chosen at random selecting one number at a time until the desired number was reached. Due to COVID 19 Pandemic only health workers on duty were sampled at that time.

3.7 Pretesting

After designing the questionnaire, the researcher carried out a pre-test at Thika level 5 hospital to ascertain the feasibility of the tool. Any ambiguity and non-clarity in the questionnaire were revised to fit the exact purpose of the study.

3.7.1 Validity

Validity is defined as the extent to which a concept is accurately measured in a quantitative study. To ensure the validity of the questionnaire, the researcher made changes on the questionnaire as instructed by the research supervisor. This was to ensure that the questions in the questionnaire answer the research questions of the study. To enhance the validity of the questionnaire, the necessary modification and revision were done.

3.7.2 Reliability

A pre-test was conducted at Thika level 5 hospital so as to obtain issues as relevant as possible to the study population. The pre-test assessed the reliability of the data collection instruments. After issuing 40 pretest questionnaires, Cronbach's alpha was used to test reliability. An alpha of 0.7 or higher was considered acceptable reliability for the tools as shown in Table 3.1.

Table 3. 1

Reliability Results

Variable	Cronbach Alpha	No. of items tested
Health Worker Capacity (X_1)	0.712	8
Commodities Availability (X_2)	0.762	6
Financial Resources (X_3)	0.728	7
Policy in emergency (X_4)	0.842	7
Emergency Preparedness (Y)	0.798	5

3.8 Data Analysis

Data was coded and entered into SPSS version 23. Data cleaning was done and analysis was undertaken. Descriptive analysis was undertaken for the demographic data and the study variables. Mean and standard deviation were obtained from the 5 point Likert Scale (1-5); strongly Disagree = 1: disagree= 2: Undecided = 3: agree =4: strongly agree = 5, for each indicator of the independent and dependent variable, a mean cut off of above 3.4 indicated Agree while below 3.4 was Disagree. The descriptive statistics were further combined from a five-point Likert scale (Strongly agree, Agree, Undecided, Disagree and Strongly Disagree) to a two-point Likert scale of (Agree and Disagree) to allow for a comprehensive understanding of the study variables. The strongly agree and Agree were combined into Agree and the Undecided, Disagree and Strongly Disagree were combined into Disagree. Bivariate analysis was undertaken using Pearson's product method based on 0.05 (5%) level of significance, to compare the independent variables and the dependent variable individually.

The coefficient of correlation (r), determined the degree of the relationship. Further multiple regression was undertaken to estimate a model to explain the effect of the independent variables on the dependent variable in a combined relationship. The regression analysis was based on 5% level of significance (*P-value* = 0.05). A Goodness of fit test for the proposed model, using Analysis of Variance (ANOVA) was also obtained to establish if the model was fit for estimation. The multiple regression analysis was carried out to establish the nature of the relationship based on the model in equation.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mathrm{e} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots Equation\ (i)$$

Where;

Y=Emergency Preparedness

X_1=Health Worker Capacity

X_2= Commodities Availability

X_3=Financial Resources

X_4=institutional Policy on emergency preparedness

β_0 is a constant (which is the value of dependent variable when all the independent variables; X_1, X_2, X_3, and X_4 are held constant).

$\beta_{1-4}$are the regression coefficients or change induced by X_1, X_2, X_3, and X_4

3.9 Inclusion and Exclusion Criteria3.9.1 Inclusion Criteria

Only outpatient Health workers who had worked and on duty at Kagundo Level 4 and Machakos level 5 hospitals for more than three months, and who agree to participate in the study were included.

3.9.2 Exclusion Criteria

Health workers who had worked at Kagundo Level 4 and Machakos level 5 hospitals for less than three months, those on leave or night offs, or anyone who did not consent to take part in the study were excluded.

3.10 Research Instruments

A structured self-administered questionnaire was used for data collection in the two hospitals see appendix II, page…80. A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents

(Nukpezah & Souja, 2018). Questions in the tool were divided into sections as per the study objectives.

3.11 Data Collection

Self-administered questionnaires were administered through drop and pick later from an identified point in each hospital from the respondents. This tended to be at a pre-arranged time that was convenient to the respondents, which was a mostly early morning when the respondents had enough time and free to focus on the questions before the patients started arriving to be served. After data collection, the completed questionnaires were manually checked for completeness, accuracy and consistency.

3.12 Ethical Considerations

The researcher observed the code of ethics in the process of reviewing the relevant literature, data collection and thesis writing. The researcher obtained a written permission to conduct the study from the Scientific, Ethics Review Committee (SREC) of Kenya Methodist University (see Appendix III, page 83…), and NACOSTI (see appendix IV, page…85.). Consent to collect data in the respective study areas was sought from Machakos County, (See Appendix V, page…87.) department of County Health Management Team (CHMT). There was an introductory letter to all respondents seeking their consent to participate in the study (see appendix I, page…78.). The letter contained instructions on the confidentiality of the collected data. Respondents were assured of their confidentiality by not writing their name and any other demographic data on the provided questionnaires. Furthermore, all respondents were assured of their privacy through keeping the collected data under key and lock.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter covers presentation and interpretation of findings based on the data collected and analyzed. Results are arranged beginning with socio-demographic features of respondents and findings based on specific objectives. The chapter thus entails opinions regarding results of the study and explanations on implications of results. This chapter begins by restating and answering the research questions asked in the introduction, followed by explanations of results in relation to expectations and consistency with previously published work, discuss limitations and weaknesses of the study, and finally provide inferences of the results. The results are presented in tables with appropriate explanations and description. The results are from 126 participants against targeted sample of 128. Hence a response rate of 98.43%.

4.2 Demographic Characteristics of the Respondents

The characteristics of the respondents are tabulated in Table 4.1. Majority of the respondents 77 (61%) were from Machakos Level 5 Hospital. This was based on proportionate distribution of sample size relative to staff numbers per facility. Majority 108 (86%) of the respondent's s were aged 20-40 years with a mean age of 32.8 ± 5.4 years, above 51 years were the least being the retirement age which begins at 50 in Kenya this is expected. 70% of the respondents had trained up to college level this is in line with their age group. While almost two-thirds of the respondents were females 81 (64%).

Table 4. 1

Respondents characteristics

Facility Level	Frequency (n)	Percent (n)
Machakos Level 5 Hospital	77	61
Kagundo Level 4 Hospital	49	39
Total	**126**	**100**
Age		
20-30	59	47
31-40	49	39
41-50	13	10
51 and above	5	4
Total	**126**	**100**
Education Level		
College	88	70
University	38	30
Total	**126**	**100**
Sex		
Male	45	36
Female	81	64
Total	**126**	**100**
Years of Work experience		
Less than 5 years	57	45
5-10	49	39
11-15	6	4
16-20	7	6
21-31	7	6
Total	**126**	**100**

The finding on gender is similar to Shapira, et al., (2019) who writes that female health workers profession are majority in health facilities and not significantly associated with willingness to respond following a disaster (Shapira et al., 2019). Fifty seven (45%) had

worked for five years or less while 49 (39%) had worked for less than ten years. Age and period of services may be explained by devolution phenomena. It is possible that upon devolution of health services, the county of Machakos advertised position for health workers and employed young people. In response to the level of education, 88 (70%) of the respondents had college education and 38 (30%) university degrees. Ordinarily, majority of health workers in Kenya except medical doctors are graduates from medical training colleges, which offer diploma courses.

Similar demographic parameters have been reported by (Paci-Green, et al, 2020). Sadler writes that such demographic represents a critical factor in innovation and emergency development and plays a central role in the success and sustainability of the execution plan (Sadler, 2013).

4.3 Descriptive Statistics

4.3.1 Health Worker's Capacity and Hospital Emergency Preparedness

Objective one of the study was to determine the influence of the capacity of Health workers on emergency preparedness. Eight constructs were used to answer this objective as summarized in Table 4.2. A mean cut of 3.4 was maintained with scores above mean 3.4 meant agree while below was disagree. Majority of the respondents 121(96%), (M = 4.29±0.67) agreed to understand the meaning of emergency preparedness. The high awareness is attributed to the medical background of the respondents' majority having undergone basic medical training in medical colleges. Understanding the meaning of emergency preparedness had a mean of 3.4. However, understanding and practicing are two different things all together. this is supported by Bass et al. (2006) who argues that

although training and education have long been accepted as integral to emergency preparedness, the application of these practices are neither evidence-based (Bass et al., 2006).

Ninety-four (74%) of the respondent considered themselves prepared for emergency. With a mean of 3.67 ±1.06. While 80 (64%) considered themselves key leadership figure in emergency preparedness this is in line with Shabanikila who reported that any health personnel should be able to assume a leadership role in emergencies (Shabanikiya et al., 2016). The mean for consideration as key leadership figure in emergency preparedness was M = 3.39±1.19 this below the expected mean probably due to lack of further and continuous professional continuous training. One hundred and eleven (88%) of the respondents agreed with the statement that training on emergency preparedness should be conducted quarterly with mean of M = 4.27±0.95. The finding alludes that individual are aware that preparedness is not just institutional order but also personal development. This finding is similar to Tang who reported that preparedness entails leadership, training, individual readiness and exercise support, and technical know-how to respond and launch effective recovery efforts (Tang, 2015).

Table 4. 2

Descriptive on Health Worker's Capacity and Hospital Emergency Preparedness

Description Variable	**Disagree n (%)**	**Agree n (%)**	**Mean**	**Std. Dev**	**Chi-Square**	***P-Value***
Understand meaning of emergency preparedness	5(4)	121(96)	4.29	0.67	58.91	0.001
I consider myself prepared for emergency	33(26)	94(74)	3.67	1.07	81.37	0.001
I would be considered a key leadership figure in emergency preparedness	46 (36)	80 (64)	3.39	1.19	60.1	0.001
All hospital staff are well equipped with knowledge on emergency preparedness	77(62)	48 (38)	2.66	1.18	63.27	0.001
The hospital management organizes training in emergency preparedness among its staff	60 (47)	66 (53)	3.02	1.15	80.79	0.001
I am trained to train other staff and stakeholders on emergency preparedness	94 (75)	32(25)	2.23	1.20	43.71	0.001
Training on emergency preparedness should be conducted quarterly	15 (13)	111(88)	4.27	0.95	128.84	0.001
Emergency preparedness training should be included in all medical training curricula	4 (3)	122 (97)	4.66	0.65	94.43	0.001

There was a consensus 122 (97%) that, emergency preparedness training should be included in all medical training curricula. This is supported by Tang who wrote that the value of continuous training is well documented (Tang, 2015). The natures of work and emerging conditions such as COVID may explain this high score. Linkage of nature

and training of Health workers on disaster preparedness and planning is well documented (Perry, 2013). This is in line with jay that capacity is critical element in emergency preparedness (Jaye et al., 2016). The mean was M = 4.66± 0.65. Majority 77 (62%) of the respondent disagreed with the statement that all hospital staff are well equipped with knowledge on emergency preparedness. The mean was M = 2.66± 1.18. This is not in agreement with Walsh et al who argued that majority of the documented efforts have been limited primarily to individual specialties or targeted professionals, which has resulted in a lack of definitional uniformity across professions with respect to education, training, and best practices within the discipline of public health (Walsh et al., 2012). It is important therefore to document and develop a combination of new employee orientation, continuous on the job learning, and regular exercises and drills with interwoven quality improvement loops.

Similarly, 60(47%) disagreed with proposition that the hospital management organizes training in emergency preparedness among its staff. The mean was M = 2.23±1.20. The lack of continuous training contrast the principle of capacity building of creating an enabling environment with appropriate policy and legal frameworks, personnel continuous development, Health worker's development and strengthening of managerial systems (National Institute of Disaster Management [NIDM], 2013). The Chi-Square results indicate that there was a significance difference ($P<0.001$) in the responses by individuals under each category of Agree and Disagree for influence of health worker capacity for emergency preparedness.

4.3.2 Influence of Commodities Availability on Emergency Preparedness

Table 4.3 presents the results for descriptive analysis for objective two. This was to establish influence of commodities availability on emergency preparedness. From the finding in Table 4.3, the statement that emergency tray is well equipped with various equipment for management of emergency had highest mean of mean of 3.51±1.101, followed closely by the statement that the hospital has a drug supply system with drug suppliers with mean of 3.51±1.108. The data reveal that facilities have in place preparedness dimensions such as classifying needed resources, storage and distributing channels. This finding resonates with Tang (2015) that preparedness is of little use unless resources are available to support response activities (Tang, 2015). Seventy (56%) of the respondents agreed with the statement that the emergency tray is accessible by all staff with a mean of mean of 3.09± 1.265. Accessibility of equipment for emergency appears to a key concern and this may put emergency staff in meaningless position in what to do in case of emergencies. This a practice worth reviewing. Importance of accessibility of emergency document is well documented (Perry, 2013). The statement that the hospital has adequate supply of commodities in case of an emergency had mean of 2.87±1.22 however 67 (53%) disagreed with this proposition Commodities are central in emergency medical situations and influence scope of service offered as well as the behavior of the provider, facility, and entire countries (Kiongo, 2015).

This is also supported by Javaz and Siddiqui who advises that for effective planning and proper provision of health services, procurement processes in health care should be revised to take a shorter period of time for delivery of required equipment and other hospital services (Javaid & Siddiqui, 2018). The trend was replicated in the statement that

the hospital has acquired ultra-modern commodities to help deal with emergencies with 79 (62%) disagreed. The mean was 2.69±1.169. The finding infers that personnel perceive the hospitals are partially armed with emergency tools. The study disagrees with Perry who reported that workplaces are prepared, but with some crucial exceptions of important equipment's important for emergency (Perry, 2013). The absence of adequate equipment makes facilities and individual vulnerable (Tang, 2015). Perry adds that types of workplaces inform contingency plan in place (Perry, 2013). The Chi-Square results indicate that there was a significance difference ($P<0.001$) in the responses by individuals under each category of Agree and Disagree for influence of commodities availability on emergency preparedness. See Table 4.3. The importance of commodities is well elaborated by (Özdamar, 2004). Özdamar, writes that logistics planning in emergency situations involves putting commodities such as medical materials and personnel and equipment in open and strategy places (Özdamar, 2004) a statement backed by Kiongo that Commodities are central in emergency medical situations and influence scope of service offered as well as the behavior of the provider, facility, and entire countries (Kiongo, 2015)

Table 4. 3

Descriptive on Commodity Availability for Emergency Preparedness

Descriptive Statistics	Disagree n (%)	Agree n (%)	Mean	Std Div	Chi-Square	*P-Value*
The hospital has adequate supply of commodities in case of an emergency	67 (53)	59 (47)	2.87	1.22	99.08	0.001
The hospital has acquired ultra-modern commodities to help deal with emergencies	79 (62)	47 (38)	2.69	1.17	72.159[b]	0.001
The hospital has a drug supply system with drug suppliers	39 (30)	87 (70)	3.51	1.11	121.540[a]	0.001
Food rations for hospital staff during emergency are available	70 (56)	56 (44)	2.86	1.26	86.619[a]	0.001
The emergency tray is well equipped with various equipment for management of emergency	39 (32)	87 (68)	3.52	1.10	127.413[a]	0.001
The emergency tray is accessible by all staff	56 (44)	70 (56)	3.09	1.27	50.571[b]	0.001

4.3.3 Financial Resources and Hospital Emergency Preparedness

Objective three was to establish the influence that finance has on emergency preparedness. The descriptive results are presented in Table 4.4. Majority of the respondent agreed with the statements that financial allocation for emergencies preparedness should be increased (*4.07*±1.195), there is a mechanism to prepare a census of admitted patients/those referred to other hospitals (*3.47*±1.115) and the facility has transport and logistics support in case

of any emergency (*3.4* ±1.231). The proportion were 100 (79%), 90 (72%) and 80 (64%) respectively. Nevertheless, the respondent disagreed with the statement that financial resources for emergencies are adequately allocated 83 (66%) and, the hospital receives funding from NGOs and well-wishers to cater for emergencies 87 (69%). Additionally, that the hospital caters for training logistics for staff/training fees 73(58%), and there no delays to emergency response due to financial allocation 87 (69%), as illustrated in Table 4.4.

Finding suggest that health workers are aware of the critical role financing play as key health system building blocks more so in the context of preparedness. Similar results is reported (Olu et al., 2018), who writes that a resilient health system should well be financed and enabled to effectively prepare for and respond to disasters (Olu et al., 2018). For this reason, it is important for institutions to pursue support for sustainable financing for preparedness and response activities as advanced by WHO (Board, World, & Assembly, 2020). The proportionate Chi-Square results indicate that there was a significance difference ($P<0.001$) in the responses by individuals under each category of Agree and Disagree for influence of finance has on emergency preparedness.

Table 4.4

Descriptive on Availability of Financial Resources for Hospital Emergency Preparedness

Description	Disagree n (%)	Agree n (%)	Mean	Std Div	Chi-Square	*P-Value*
Financial resources for emergencies are adequately allocated	83 (66)	43 (34)	2.67	1.11	125.825[a]	0.001
The hospital receives funding from NGOs and well-wishers to cater for emergencies	87 (69)	39 (31)	2.52	1.16	108.206[a]	0.001
The financial allocation for emergencies preparedness should be increased	26 (21)	100 (79)	4.07	1.20	105.429[a]	0.001
The hospital caters for training logistics for staff/training fees	73 (58)	53 (42)	2.81	1.23	86.222[a]	0.001
The facility has Transport and logistics support in case of any emergency	46 (36)	80 (64)	3.4	1.29	35.905[b]	0.001
There no delays to emergency response due to financial allocation	87 (69)	39 (31)	2.52	1.23	94.714[a]	0.001
Mechanisms to prepare a census	36 (28)	90 (72)	3.47	1.12	152.889	0.001

4.3.4 Institutional Policies on Hospital Emergency Preparedness

The influence of policy on emergency preparedness was assessed using seven parameters as presented in Table 4.5. The respondent agreed with proposition that the hospital has policy in place for emergency preparedness 91 (72%) with mean of 3.6±1.089 This finding agree with Balicer that globally, Health facilities are contemplated to be the pillar of emergency response plans with capacity of health care workers and policy formulation being identified as the major determinants of emergency response plans (Balicer, 2006). and the hospital has a clear chain of command system in case of any emergencies 83

(65%). Additionally, the hospital has an emergency operations committee 88 (70%), there are procedures for expanding usable space including the availability of extra beds during emergencies 90 (82%) and regular safety inspections are conducted by appropriate authority83 (66%). While the respondent disagreed with statement that they participated in emergency policy formulation 108 (85%) and they have participated in creating new guidelines, emergency plans, and lobbying for emergency preparedness 96 (77%).

Table 4. 5

Descriptive on Institutional Policies on Hospital Emergency Preparedness

Description	**Disagree** n (%)	**Agree** n (%)	**Mean**	**Std. Div.**	**Chi-Square**	***P-Value***
The hospital has policy in place for emergency preparedness	35 (28)	91 (72)	3.6	1.09	120.825[a]	0.001
I participated in emergency policy formulation	108 (85)	18 (15)	2.06	0.96	142.413[a]	0.001
The hospital has a clear chain of command system in case of any emergencies	43 (35)	83 (65)	3.40	1.16	119.317[a]	0.001
The hospital has an emergency operations committee	38 (30)	88 (70)	3.50	1.09	136.143[a]	0.001
There are procedures for expanding usable space, including the availability of extra beds during emergencies	36 (28)	90 (82)	3.45	1.11	160.111[a]	0.001
Regular safety inspections are conducted by appropriate authority	43 (34)	83 (66)	3.43	1.17	101.540[a]	0.001
I have participated in creating new guidelines, emergency plans, and lobbying for emergency preparedness	96 (77)	30 (23)	2.24	1.19	83.206[a]	0.001

Incorporation of the employees in policy formulation is important for effective and efficient documents. This is supported by Kim who highlighted that emergency preparedness policy involves several approaches in order to ensure its effectiveness for proper functioning. These approaches include emergency response and adaptability, building block approaches, stakeholder's participation and action based (Kim, 2014). It is possible user-friendly formulation minimizes confusion and even more loss, in case of a disaster. Similar finding is well documented (Perry, 2013). Perry writes that employers and employees need work in partnership to prepare for worst-case scenarios and minimize confusion (Perry, 2013). In cooperating people who work in different department departments on policy formulation bring on board different knowledge, skill sets, and interests about hospital preparedness capacity (Tang, 2015). The proportionate Chi-Square was significant at $P<0.001$. Participation in formulation of plans facilitates ownership important in execution of the plan in the likelihood occurrence of emergency and transmission of memory in the context of developing a new strategy.

4.3.5 Hospital Emergency Preparedness

The dependent variable (emergency preparedness) was measured using five considerations strongly agree, disagree, not decided, agree and strongly disagree. The results are presented in Table 4.6.

Table 4. 6

Descriptive on Emergency Preparedness

Description	Disagree n (%)	Agree n (%)	Mean	Std. Dev.	Chi-Square	*P-Value*
The facility has effective communication in case of an emergency	40 (32)	86 (68)	3.56	1.22	78.524[a]	0.001
HIS provides sufficient data for decision making	17 (14)	109 (86)	3.98	0.96	152.016[a]	0.001
The hospital conducts emergency drills frequently	77 (61)	49 (39)	2.67	1.22	8.889[a]	0.001
Emergency operational plan are regularly updated	64 (51)	62 (49)	2.98	1.23	87.175[a]	0.001
Hospital has information center specifically for emergency	54 (43)	72 (57)	3.11	1.25	93.841[a]	0.001

Against the five factors, the respondent agreed with the facility has effective communication in case of an emergency 86 (68%), this agrees with Pickton that communication is the most important determinants of emergency preparedness as communication skills enable health care providers give appropriate information relating to the emergency response (Pickton & Broderick, 2011). Friedman and Kelman added that, when the routine and appropriate communications are observed in any institution, it can alleviate their sense of vulnerability and so improve their response (Friedman & Kelman, 2006). HIS provides sufficient data for decision making109 (86%) and that Hospital has information center specifically for emergency 72 (57%). But disagreed with the statements that the hospital conducts emergency drills frequently this is against Kiongo who argued that since health emergencies, require a major response; happen quite infrequently, organizations and staff need to exercise the procedures and skills for these

events in order to be prepared to respond. The only way to actually test a plan is through organized drills. There are several mechanism of drills (Kiongo, 2015) which drill mechanism is adopted in current study context.77 (61% and that emergency operational plan are regularly updated 64 (51%). Provision of sufficient data and drills are key components of continuous improvement in preparedness. The finding is similar to Tang, (2015) who writes that mocks exercise through drills and exercises, are good ways of testing of plans and the formulation and execution of corrective action plans (Tang, 2015). The lack of internationally-accepted standards for preparedness and response performance measures is a global concern (Djalali et al., 2014)

4.4 Inferential Statistics

4.4.1 Bivariate Analysis

The study sought to carry out correlation analysis in a bid to determine the relationship between the independent variables and dependent variable as shown in Table 4.7. Results shows that there is a strong and positive relationship between the independent variables that is, commodity availability, financial resources, policies and the dependent variable Emergency preparedness. This is in line with Carter who highlighted that there is value in commodity availability, financial resources, policies in preparedness, response, and recovery is well documented (Carter, 2008).

The coefficient of correlation of health worker's capacity and hospital emergency preparedness indicated a weak relationship, ($r=0.169$, $P>0.05$) this could be as a result of health workers not being involved in policy formulation and implementation on hospital emergency preparedness. This also have been occasioned by the staff not being trained by

the hospital. This can result to feeling of not being part of the process. The coefficient of correlation of commodity availability (r=0.619, p<0.001), financial resources (r=0.626, p<0.001), and policy (r=0.702, p<0.001) showed a strong and positive relationship with emergency preparedness at Machakos County Level 4 and 5 health facilities. See Table 4.7. The finding concurs with (Gillani, et al., 2020), who stated that knowledge, commodities, finance, and attitude predicted readiness to emergency practice (Gillani et al., 2020).

Table 4. 7

Bivariate Analysis

		Disaster Preparedness	HR Capacity	Commodities	Finance	Policies
Disaster Preparedness	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	126				
HR Capacity	Pearson Correlation	.169	1			
	Sig. (2-tailed)	.058				
	N	126	126			
Commodities	Pearson Correlation	.619**	.225*	1		
	Sig. (2-tailed)	.000	.011			
	N	126	126	126		
Finance	Pearson Correlation	.626**	.227*	.572**	1	
	Sig. (2-tailed)	.000	.011	.000		
	N	126	126	126	126	
Policies	Pearson Correlation	.702**	.055	.573**	.631**	1
	Sig. (2-tailed)	.000	.538	.000	.000	
	N	126	126	126	126	126

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

4.4.2 Multiple Regression

4.4.2.1 Model summary

The regression model in Table 4.8. specifies coefficient of determination R^2 as 0.576. This means that variables in this study explained about 57.6% of variations in hospital emergency preparedness. The finding resonates with Song & Park (2019) who's the level of significance on the regression formula constant numbers was over 20 %(Song & Park, 2019). This study further sought to establish the extent to which the independent variables (Health worker's capacity, commodity availability, financial resources adequacy and existence of emergency policy) influence emergency preparedness at level 4 and 5 in Machakos County, Kenya. The model resonates well with Tang (2015) who concluded that hospital service is the most important factor for hospital preparedness capacity, followed by Health workers, stockpiles and facilities (Tang, 2015). The summary model results in Table 4.9 shows that the overall *P*-value is less that 0.05 (5%). This shows that the overall regression model is significant at the calculated 95% level of significant. It further inferred that the studied independent variables have significant influence on emergency preparedness in Machakos County.

Table 4. 8

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.768[a]	.589	.576	.57185	1.660

a. Predictors: (Constant), Policies, HR Capacity, Commodities, Finance

b. Dependent Variable: Disaster Preparedness

Table 4. 9

Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.773	4	14.193	43.403	.000[b]
	Residual	39.568	121	.327		
	Total	96.342	125			

a. Dependent Variable: Disaster Preparedness

b. Predictors: (Constant), Policies, HR Capacity, Commodities, Finance

Table 4. 10

Regression Weights

Coefficients[a]								
		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-.009	.358		-.025	.980		
	HR Capacity	.008	.011	.044	.717	.475	.909	1.100
	Commodities	.045	.014	.246	3.221	.002	.581	1.721
	Finance	.035	.014	.204	2.516	.013	.517	1.935
	Policies	.068	.013	.430	5.321	.000	.520	1.923

a. Dependent Variable: Disaster Preparedness

The VIF index is below 10 for all the variables indicating that there was no multicollinearity. From Table 4.10, the constant was not significant with P>0.05. This infers that the study variables under this study are important in determining emergency preparedness, and that emergency preparedness will work well if the variables in this study are taken into consideration in addition to other variables not in this study. This may also be supported by results in Table 4.8, which show that the study variables contribute to

57.6% of emergency preparedness. In a combined relationship Commodities ($p<0.05$), Finance ($P<0.05$) and Policies ($P<0.05$), all had a significant influence on Emergency preparedness of the health facilities in this study. The study model can thus be presented as shown below;

$$Y = 0.00 + 0.044X_1 + 0.246X_2 + 0.204X_3 + 0.430X_4 +$$

From the finding, Y-Intercept ($B_0=0.000$) depicts that holding all independent variables constant, the emergency preparedness will not be functional at the health facilities in Machakos County.

Further, from the findings on health worker capacity (X_1, B_1= 0.044, P=0.475) implies that a unit change in health workforce capacity will improve the emergency preparedness by 4.4%, however the improvement is not statistically significant at 5%level of significance. In addition, the findings on commodity availability, (X_2, B_2= 0.246, P=0.002) implies that a unit change of X_2, will improve emergency preparedness by 24.6%, and the improvement is statistically significant at $P<0.05$. Further, Financial resources model, (X_3, B_3=0.204, P=0.013) implies that a unit change of X_3(Financial Resource) will improve emergency preparedness by 20.4%, and the improvement is statistically significant at $P<0.05$. Finally, from the findings, policy on emergency preparedness, (X_4, B_4=0.430, P=0.000) shows that a unit change of Policy on emergency X_4, will improve emergency preparedness by 43.0 %, and the improvement is statistically significant at $P<0.05$. The prediction mirrors (Gillani et al., 2020) whose total variation in the dependent variable of readiness to practice was explained by the independent variables of knowledge and resources at 73.2% (Gillani et al., 2020). It therefore implies that if the results of this study

are to apply policy analysis, formulation, implementation, and evaluation on emergency preparedness would be the point to start, followed by availing commodities and finances. This study also reveals that the health workers in this study never fully felt their role in emergency preparedness of the health facilities.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter presents the study summary, conclusion and recommendations. This section relates the quantitative findings and interprets them according to the literature review and according to researchers' observation. The findings are analyzed according to research questions and objectives.

5.2 Summary of Findings

The purpose of the study was to determine hospital emergency preparedness in Machakos County. The specific objectives include to determine the influence of the capacity of health workers in emergency preparedness, to establish the influence of commodity availability on emergency preparedness, to determine the influence that finance has on emergency preparedness and to establish the influence of institutional policy on emergency preparedness. The above objectives, the summary of the findings is discussed.

5.2.1 Demographic Characteristics of Respondents

Machakos level 5 respondents were 77 (61 %) while Kagundo had 49(39%) due to population distribution in both hospitals. Majority of the study respondents were aged 20-30 years 59 (47%) followed by age 31-40 49(39%), 41-50 years 13(10%) while 51 years and above had the least respondents 5 (4%). The mean average age was 25 years. More than half of the respondents had attained up to college level of education 88(70%) more

than the university graduates holding bachelors 38(30%) and above. This revealed that the employees in the two health facilities have at least attained diploma as their lowest level of education based on the study findings. The study comprised more female respondents 81(64%) compared to male 45(36%). Majority of the respondents had less than 5 years of work experience 57(45%) more than all other employees, respondents with 5-10 years 49(39%) of work experience were the second highest respondents while 11-25 years 6(4%) being the third 16-20 years and 21-31 years of work experience had the least number of respondents with each comprising of 7(6%) respondents.

Based on the study results, the population was largely comprised of youthful health care workers with an average age of 25 years. The result further shows that there is relationship between the age in years of employees and the work experience as majority of them have less than 5 years of work experience. In my opinion this demographic results represents a critical factor in innovation and emergency development and plays a central role in the success and sustainability of an execution plan. The researcher further revealed that the success of any health institutions in handling and managing emergency depends more on the readiness and willingness of health care workers in managing this situation. Young employees tend to protect any institution during emergency situations compared to majority of employees who urged that such situations need experienced personnel. Current education curriculum encompasses a wider and detailed curriculum which involves practical experiences which prepare learners in handling emergency situation during their actual working days. Such early emergency preparedness has revealed the positive impact to most institutions as much has been seen from the young employees in these organizations.

Increasingly frequent worldwide emergencies are posing high threats to human life due to lack of proper management from health care facilities. The world health organization has emphasized to all countries to provide and prepare detailed plans at all levels in order to curb the rising cases of emergencies both in health care facilities and other institutions. Doctors, nurses and other health care personnel are frontline workers under stable conditions but there is more needed more so in emergency situations and other crises when working in any health care setting. In order to play a major role in saving any life and promoting proper health care under difficult conditions, all HCW need to have right competency skills.

5.2.2 Health Worker's Capacity and Hospital Emergency Preparedness

The first objective was to determine the influence of the capacity of health workers in emergency preparedness. Majority of the respondent 121(96%) understood the meaning of emergency preparedness, 94(74%) of the respondents indicated that they believed to be self-prepared for emergency. While 80(64%) considered themselves key leadership figures in emergency preparedness 77(62%) disagree that all staff are well equipped with knowledge in emergency preparedness. 111(88) also agreed with the proposition that emergency preparedness should be conducted quarterly. 122(97) Training on emergency preparedness need to be included in all medical training curricula this will enhance their emergency preparedness skills.

The respondents 62% perceive that not all hospital staff are well equipped with knowledge on emergency preparedness. The Chi-Square results indicate that there was a significance difference ($P<0.001$) in the responses by individuals under each category of Agree and

Disagree for influence of health worker capacity for emergency preparedness. Bivariate value indicated that health workers' capacity had weak relationship with hospital emergency preparedness, ($r=0.169$, $p>0.05$) In a combined relationship (multivariate analysis health workers' capacity did not have significance influence on hospital emergency preparedness, this could be as a result of not being involved in policy formulation and not being trained by the hospital. This can result to feeling of not being part of the process.

5.2.3 Commodity Availability and Hospital Emergency Preparedness

The second specific objective was to establish the influence of commodities availability in emergency preparedness. It is generally agreed 67 (53%) that hospitals have inadequate supply of commodities in case of an emergency. 79(62%) agree that hospitals have not acquired ultra-modern commodities to help deal with emergencies. In my opinion patient safety is very important lack of commodities is a risk to patient assessing the influence of these parameters in the current context may inform structural adjustments. However, 87(68%) agree that the emergency tray is well equipped with various equipment for management of emergency and 70(56%) the tray is accessible to all. Similarly, 87(70%) of the respondents perceived that hospital has a drug supply system with adequate drug suppliers.

The statement that the hospital has adequate supply of commodities in case of an emergency had mean of 2.87 ± 1.22 however 67 (53%) disagreed with this proposition. The trend was replicated in the statement that the hospital has acquired ultra-modern commodities to help deal with emergencies with 79 (62%) disagreed. The mean was 2.69

± 1.169. Bivariate analysis (r=619, P<0.001) indicated that the availability of commodity for hospital emergency preparedness had strong relationship, in a combined relationship or multivariate analysis, commodity availability had a significance influence on hospital emergency. In my opinion availability of the emergency tray and supply of drugs contributed to this result.

5.2.4 Availability of Financial resources and Emergency Preparedness

The third specific objective was to determine the influence of financial in emergency preparedness. The respondents 83(66%) agreed that financial allocation for emergencies preparedness is inadequately and should be increased. Health care financing is a key component as it among the Health Systems Management pillars. This includes allocation of funds in a more efficient and equitable way that contributes to achievement of the UHC. Emergency response is delayed by financial issues. The 87(69%) of respondents disagreed that there is inadequate support by NGOs and well-wishers funding for emergencies. While 100(79%) where for increase of financial allocation for emergency preparedness. 73(58%) disagreed that the hospitals cater for staff training fee thus justification for not being prepared for emergency. Eighty (64%) agreed that the facility has transport and logistics support in case of any emergency. 90(72%) agreed that there was a mechanism to prepare a census of admitted patients/those referred to other hospitals a clear indication that referrals are given high priority. Financial support for training logistics for staff/training from the hospital is wanting. The proportionate Chi-Square results indicate that there was a significance difference (P<0.001) in the responses by individuals under each category of Agree and Disagree for influence of finance has on emergency preparedness. Bivariate analysis indicated a strong positive relationship (r=0.626,

P<0.001) between availability of finance and hospital emergency preparedness, in a combined relationship or multivariate analysis, financial resource availability strongly influenced hospital emergency preparedness, (P<0.001).

5.2.5 Institutional Policies on Emergency Preparedness

The fourth specific objective was to establish the influence that institutional policy has in emergency preparedness. 91(72%) of the respondents agreed that the hospitals have policy and operations committee in place for emergency preparedness. However, 108(85%) disagreed that have been involved in policy formulation. Safety inspections are undertaken regularly. In my opinion involvement in policy formulation makes implementation easy this has contributed to health workers feel not part of the emergency preparedness. Additionally, 83(65%) agree that there is clear chain of command system in case of any emergencies. In workplaces need to have clear procedures for expanding usable space including contingency plan, clear communication with workers, before, during and after a disaster. However, there was no staff participation in emergency policy formulation, guidelines, emergency plans, and lobbying for emergency preparedness. There is sufficient and effective communication in case of an emergency. HIS provides sufficient data for decision-making and that hospital has information center specifically for emergency. However emergency drills are insufficient and emergency operational plan are irregularly updated. Commodity availability, financial resources and policies were strongly and positively correlated with emergency preparedness. A unit change of commodity availability improved emergency preparedness by 24.6% while a unit changes in financial resources and policy, improved emergency preparedness by 20.4% and 43.0 % respectively. Health worker's capacity was not significantly correlated with emergency

preparedness. Nevertheless, a unit change in health workforce capacity improved the emergency preparedness by 4.4%. The regression coefficient model R^2 was 0.576 indicating that variables in this study explained about 57.6% of variations in Emergency preparedness. There was no multicollinearity reported meaning that study variables under this study are important in determining emergency preparedness, and that emergency preparedness will work well if the variables in this study are taken into consideration in addition to other variables not in this study. Bivariate analysis indicated a strong positive relationship ($r=0.702$, $P<0.001$) between institutional policy and hospital emergency preparedness, in a combined relationship or multivariate analysis, institutional policy availability strongly influenced hospital emergency preparedness, ($P<0.001$). This could have been as a result of policy availability though there was no involvement in policy formulation.

5.3 Conclusion

Following the research findings, the conclusions are made based on the objectives that were set by the researcher to be achieved at the end of the study. Thus, concludes as follows: On Health worker's capacity the study indicates that health worker capacity did not influence hospital emergency preparedness. Whereby majority disagreed that all staff are well equipped with knowledge in emergency preparedness, also agreed with the proposition that emergency preparedness should be conducted quarterly and that training on emergency preparedness need to be included in all medical training curricula this will enhance their emergency preparedness skills. In my opinion health workers should be fully equipped with knowledge especially including hospital emergency preparedness in curriculum as suggested by respondents.

On commodity availability, the study results indicated that commodity availability influenced hospital emergency preparedness, this could be attributed to aspects on that the hospitals have a drug supply system with drug suppliers and that the emergency tray is well equipped with various equipment for management of emergency the study indicates that hospitals had inadequate supply of commodities in case of an emergency, that hospitals have not acquired ultra-modern commodities to help deal with emergencies, that the emergency tray is well equipped with various equipment for management of emergency tray is accessible to all, the respondents perceived that hospital has a drug supply system with adequate drug suppliers, the hospital has inadequate supply of commodities in case of an emergency. However, the hospitals had no acquired ultra-modern commodities to help deal with emergencies. Availability of commodities influence hospital emergency preparedness. For hospital to function well drugs need to be in supply and accessible. The study indicates that finance has influence on emergency preparedness. The respondents agreed that financial allocation for emergencies preparedness is inadequately and should be increased, respondents disagreed that there is inadequate support by NGOs and well-wishers funding for emergencies, supporting for increase of financial allocation for emergency preparedness, that the hospitals do not cater for staff training , agreeing that the facility has transport and logistics support in case of any emergency, there was mechanism to prepare a census of admitted patients/those referred to other hospitals a clear indication that referrals are given high priority. Respondents also indicated that there was no financial support for training logistics for staff/training from the hospital. Health care financing is a key component as it is one of the Health Systems Management pillars.

Institutional policies influenced emergency preparedness as per the study which reviewed that the hospitals have policy and operations committee in place for emergency preparedness. However, respondents did not agree that they had been involved in policy formulation. Additionally, respondents agreed that there was clear chain of command system in case of any emergencies. However, there was no staff participation in emergency policy formulation, guidelines, emergency plans, and lobbying for emergency preparedness. The respondents also agreed that there was sufficient and effective communication in case of an emergency, also emergency drills are insufficient and emergency operational plan are irregularly updated. Involvement in policy formulation is very key in implementation, there is a gap in no conducting drills as it identifies gaps.

5.4 Recommendation

- On Health workers this study recommends that regular continuous professional training be conducted regularly, seminars, provide finance for specialized training this will equip health workers with necessary skills to handle emergency thus reducing deaths and referrals to other facilities thus saving life, time, and resources.
- This study recommends Machakos County management need to build stable drug supply system with adequate drug suppliers.
- Allocate resources to purchase ultra-modern equipment in line with advancing technology, for example alert systems and diagnostic systems. Additionally, clear mechanism of access of emergency commodities should be developed by hospital management and staff be made aware on it.

- Further recommendation that future priorities should also include developing proper recovery mechanisms, establish a well feedback mechanism and ensure accountability during emergency action.
- On policy there is need for staff participation in emergency policy formulation for easy implementation, guidelines, emergency plans, and lobbying for emergency preparedness. Addition institution needs to make emergency drills, safety inspections quarterly

5.5 Recommendation for Further Research

- This study reveals that the health workers in this study never fully felt their role in emergency preparedness of the health facilities, and this need to further be studied to establish the cause.
- This study was based in level 5 and 4 hence a similar study in lower levels is recommended.
- A comparative study on determinants of hospital emergency preparedness among health workers between public and private hospitals is recommended.

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APPENDICES

Appendix I: Consent form

Kenya Methodist University

P.O. BOX 267-60200

Meru, Kenya

SUBJECT: INFORMED CONSENT

Dear Respondent,

My name is Mercy Munanie Kahare. 0722621398 MSc student from Kenya Methodist University. I am conducting a study titled: ***"Determinants of hospital emergency preparedness in Kagundo level 4 and Machakos level 5 hospitals, Machakos County, Kenya"***. The findings will be utilized to strengthen the health systems in Kenya and other low-income countries in Africa. As a result, countries, communities and individuals will benefit from improved quality of health care services. This research proposal is critical to strengthening health systems as it will generate new knowledge in this area that will inform decision makers to make decisions that are research based Procedure to be followed

Participation in this study will require that I ask you some questions and also access all the hospital's department to address the six pillars of the health system. I will record the information from you in a questionnaire.

You have the right to refuse participation in this study. You will not be penalized nor victimized for not joining the study and your decision will not be used against you nor affect you at your place of employment.

Please remember that participation in the study is voluntary. You may ask questions related to the study at any time. You may refuse to respond to any questions and you may stop an interview at any time. You may also stop being in the study at any time without any consequences to the services you are rendering.

Discomfort risks

During the time you will be answering the questions, some questions might be uncomfortable for you to answer. In case of such incidence, you are allowed to skip them. You have the right to refuse the interview or any questions asked during the interview.

Benefits

If you participate in this study you will help us strengthen the health systems in Kenya and other Low-in-come countries in Africa. As a result, countries, communities and individuals will benefit from improved quality of health care services. This field

attachment is critical to strengthening health systems as it will generate new knowledge in this area that will inform decision makers to make decisions that are research based.

Rewards

There is no reward for anyone who choose to participate in the study.

Confidentiality

The interviews will be conducted in a private setting within the hospital. Your name will not be recorded on the questionnaire and the questionnaires will be kept in a safer place at the University.

Contact Information

If you have any further questions or concerns about participating in the study, please contact the following supervisors;

Ms. Eunice Mwangi- eunicelucki@. co.uk

Ms. Susan Njuguna – njugunarsm@gmail.com

Participants Statement

The above statement regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will not be victimized at my place of work whether I decide to leave the study or not and my decision will not affect the way I am treated at my work place.

Name of participant…… Date …… Signature ……

Investigator's statement

I, the under designed, have explained to the volunteer in the language s/he understands the procedures to be followed in the study and the risks and the benefits involved. Name of

Interviewer…… Date……
Signature…….

Appendix II: Questionnaire

QUESTIONNAIRE **No_____**			
Date			
Respondent Biodata			
Department		Unit	
Age		Sex	
Education level		Specialty	
Occupation		Year of services	

Capacity of human resources in emergency preparedness					
Respond to what extend do you agree or disagree with the following statements: Use the score of 1= Strongly Disagree, 2=Disagree, 3= Agree, and 4= Strongly Agree.					
No.	**QUESTION**	**SD**	**D**	**A**	**SA**
1.	I understand the meaning of emergency preparedness				
2.	I consider myself prepared for the management of emergency				
3.	I would be considered a key leadership figure in my facility in emergency preparedness				
4.	All hospital staff are well equipped with knowledge on emergency preparedness				
5.	The hospital management organizes training in emergency preparedness among its staff				
6.	I am trained to train other staff and stakeholders on emergency preparedness				
7.	Training on emergency preparedness should be conducted quarterly according to hospital calendar				
8.	Emergency preparedness trainings should be included in all medical training curricula				
Commodities					
Provide your level of agreement with the below statements. Use the score of 1=Strongly Disagree, 2=Disagree, 3= Agree, and 4= Strongly Agree;					
No.	**QUESTION**	**SD**	**D**	**A**	**SA**
9.	The hospital has adequate supply of commodities in case of an emergency				
10.	The hospital has acquired ultra-modern commodities to help deal with emergencies				
11.	The hospital has a drug supply systems with drug suppliers				
12.	Food rations for hospital staff during the emergency are available				

13.	The emergency tray is well equipped with various equipment for management of emergencies				
14.	The emergency tray is easily accessible by all staff				
Finance					
Using the score of 1= Strongly Disagree, 2=Disagree, 3= Agree, and 4= Strongly Agree; Indicate your level of agreement with the following statements					
No.	**QUESTION**	**SD**	**D**	**A**	**SA**
15.	Financial resources for emergencies are adequately allocated				
16.	The hospital receives funding from non-governmental organizations and other well-wishers to cater for emergencies				
17.	The financial allocation for emergency preparedness should be increased				
18.	The hospital caters for training logistics for its staff i.e. training fees				
19.	The facility has transport and logistics support in case of any emergency				
20.	That there are no delays because of financial allocation				
21.	Mechanism to prepare a census of admitted patients and those referred to other hospitals				

Policies					
Tick appropriately according to the extend on how you agree with the statements below. Using the score of 1= Strongly Disagree, 2=Disagree, 3= Agree, and 4= Strongly Agree;					
No.	**QUESTION**	**SD**	**D**	**A**	**SA**
22.	The hospital has policy in place for emergency preparedness				
23.	I participated in emergency policy formulation				
24.	The hospital has a clear chain of command system in case of any emergencies				
25.	Hospital has emergency operation's committee				
26.	There are procedures for expanding usable space, including the availability of extra beds during emergencies				
27.	Regular safety inspections are conducted by appropriate authority				
28.	I have participated in creating new guidelines, emergency plans, and lobbying for emergency preparedness				
Emergency preparedness					

29.	The facility has effective communication in case of any emergency				
30.	Health Information system provides sufficient data for decision making				
31. .	The hospital conducts drills frequently				
32.	Emergency operational plan are regularly updated				
33.	Hospital has information centre specific for emergency				

Appendix III: KEMU Ethical Clearance

KENYA METHODIST UNIVERSITY
P. O. BOX 267 MERU - 60200, KENYA FAX: 254-64-30162
TEL: 254-064-30301/31229/30367/31171 EMAIL: INFO@KEMU.AC.KE

28th February 2020 KeMU/SERC/HSM/5/2020

Kahare Munanie Mercy
HSM-3-4448-3/2012
Kenya Methodist University

Dear Mercy,

SUBJECT: ***DETERMINANTS OF HOSPITAL EMERGENCY PREPAREDNESS IN MACHAKOS COUNTY KENYA: A CASE OF MACHAKOS LEVEL 5 AND KANGUNDO LEVEL 4 HOSPITALS***

This is to inform you that Kenya Methodist University Scientific Ethics and Review Committee has reviewed and approved your above research proposal. Your application approval number is KeMU/SERC/HSM/5/2020. The approval period is 28th February 2020 – 28th February 2021.

This approval is subject to compliance with the following requirements

I. Only approved documents including (informed consents, study instruments, MTA) will be used.

II. All changes including (amendments, deviations, and violations) are submitted for review and approval by Kenya Methodist University Scientific Ethics and Review committee.

III. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KeMU SERC within 72 hours of notification.

V. Clearance for export of biological specimens must be obtained from relevant institutions.

VI. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal

VI:. Submission of an executive summary report within 90 days upon completion of the study to KeMU SERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely

KENYA MOORLAND UNIVERSITY
KEMU SERC
21 FEB 2020
P.O. BOX 267 - 60200, MERU

Dr. A. WAMACHI
Chair, SERC

Appendix IV: NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **364140**

Date of Issue: **30/March/2020**

RESEARCH LICENSE

This is to Certify that Ms.. MERCY MUNANIE KAHARE of Kenya Methodist University, has been licensed to conduct research in Machakos on the topic: DETERMINANTS OF HOSPITAL EMERGENCY PREPAREDNESS IN MACHAKOS COUNTY KENYA: A CASE OF MACHAKOS LEVEL 5 AND KANGUNDO LEVEL 4 HOSPITALS for the period ending : 30/March/2021.

License No: **NACOSTI/P/20/4459**

364140

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is Guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014

CONDITIONS

1. The License is valid for the proposed research, location and specified period
2. The License any rights thereunder are non-transferable
3. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research
4. Excavation, filming and collection of specimens are subject to further necessary clearence from relevant Government Agencies
5. The License does not give authority to tranfer research materials
6. NACOSTI may monitor and evaluate the licensed research project
7. The Licensee shall submit one hard copy and upload a soft copy of their final report (thesis) within one of completion of the research
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice

National Commission for Science, Technology and Innovation
off Waiyaki Way, Upper Kabete,
P. O. Box 30623, 00100 Nairobi, KENYA
Land line: 020 4007000, 020 2241349, 020 3310571, 020 8001077
Mobile: 0713 788 787 / 0735 404 245
E-mail: dg@nacosti.go.ke / registry@nacosti.go.ke
Website: www.nacosti.go.ke

Appendix V: Machakos Approval

REPUBLIC OF KENYA

GOVERNMENT OF MACHAKOS COUNTY
DEPARTMENT OF HEALTH AND EMERGENCY SERVICES
Office of the County Director of Medical Services

Machakos Highway
P.O. Box 2574-90100
Machakos, Kenya
REF: DHES/DMS/RESEARCH/2020/21

Telephone: +254 -44-20575
Fax: 254-44-20655
15th May 2020

Principal Investigator - ATTN: Mercy Munanie Kahare
Kenya Methodist University
HSM-3-4448-3/2012

Dear Mercy,

RE: LETTER OF AUTHORIZATION FOR CONDUCTING PROPOSED RESEARCH

The Department of Health and Emergency Services, Machakos County is keen to collaborate in your study: **'Determinants of Hospital Emergency Preparedness in Machakos County, Kenya: A Case of Machakos Level 5 and Kangundo Level 4 Hospitals.'**

Note is taken of the letter of Ethical clearance from Kenya Methodist University Scientific Ethics and Review Committee REF KeMU/SERC/HSM/5/2020 dated 28th February 2020 as well as the Research License from the National Commission for Science, Technology & Innovation number NACOSTI/P/20/4459 dated 30th March 2020.

You are hereby authorized to proceed with the research and urged to share the findings with the Department of Health and Emergency Services; Machakos County, through this office.

Sincerely,

Dr. Jonathan Nthusi
County Director – Medical Services

cc: County Executive Committee Member – Health
Chief Officer – Medical Services
Medical Superitendant – Machakos Level 5 Hospital

Appendix VI: Map of the study Area