

Determinants of Hospital Emergency Preparedness in Machakos County Kenya: A Case of Machakos Level 5 and Kangundo Level 4 Hospitals

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Abstract

Emergency preparedness is emerging as a key security priority globally. Plans are needed, not only for responding to the impacts of events, but also to maintain business continuing while managing the crisis, and to guide recovery and reconstruction effectively. Machakos being along Nairobi-Mombasa highway recorded 27% increase of emergency cases in 2017, 39% 2018 in Machakos level 5. During these period deaths increased from 191 to 497 from 2016. 35% increase of referrals to other hospitals was recorded. In the face of these emergencies, the ability of affected facilities like Kangundo level 4 and Machakos Level 5 Hospital Kenya to provide care to the injured can quite literally make the difference between life and death. This study assessed the determinants of Hospital Emergency Preparedness in Kangundo level 4 and Machakos Level 5 Hospitals in Machakos County. The study adopted cross-sectional design and simple 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. Simple random sampling was applied to select respondents. Self-administered questionnaire as a data collection tool was applied. The questionnaire was developed based on the objectives and identified gaps from literature review. The finding reveals high understanding of the meaning of emergency preparedness ($M = 4.29$; $SD = 0.67$), with 94 (74%) of the respondent considering themselves prepared for emergency. The mean was 3.67 ; $SD = 1.06$. While 80 (64%) considered themselves key leadership figure in emergency preparedness. One hundred and eleven (88%) of the respondents agreed with the statement that training on emergency preparedness should be conducted quarterly with mean of $M = 4.27$; $SD = 0.95$. Respondent 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 respondent 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). The respondent further agreed with proposition that the hospital has policy in place for emergency preparedness 91 (72%) and the hospital has a clear chain of command system in case of any emergencies 83 (65%). 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. 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 in this study 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 on it. There is need for staff participation in emergency policy formulation, guidelines, emergency plans, and lobbying for emergency preparedness. Addition institution needs to make emergency drills, safety inspections regular.

Keywords: *Capacity of Health workers, Commodities availability, Finance, Institutional policy and Emergency preparedness*

1.1 INTRODUCTION

The World Health Organization defined the Health Systems Management pillars which include Health workforce, service delivery, leadership and governance, health information systems, access to essential medicines and financing. The main pillar of focus is service delivery in emergency preparedness that aims at providing quality and effective health care services to all. The service offered does not vary in terms of quality irrespective of characteristics such as gender, ethnicity and socioeconomic status. Furthermore, the pillar has other aims, which include safety to patient and caregiver, patient centered, timely and efficient (Carroll, 2006). Emergency preparedness is a critical component in healthcare and disaster medicine (Rådestad, 2013). 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 Kristine and 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 Aitken, 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, 2016). 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) and (Djalali et al., 2014).

Historically, the concept of healthcare preparedness began in 1996 (Jaye, Reedy, Riley, Amlôt, & Skryabina, 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 Oklahoma 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 (Government of Kenya; Ministry of State for Special Programmes & Office of the President, 2009).

MHA's emergency preparedness and response resources are designed to assist health care facilities a collaboration among government, public health, long-term care, clinics and hospitals in planning for, and reacting to, all hazards. Health care planning establishes hospital and community readiness before an emergency, and a proven response and recovery framework during and after an emergency. Health care readiness also increases overall community resiliency. MHA's staff and resources are available to support hospitals with information and tangible resources in the event of an emergency. MHA is committed to providing leadership, expertise and guidance to support health care preparedness and response. Emergency preparedness can be defined by the preparedness pyramid, which identifies planning, infrastructure, knowledge and capabilities, and training as the major components of maintaining a high level of preparedness. The aim of this article is to review the characteristics of contingency plans for mass-casualty incidents (MCIs) and models for assessing the emergency preparedness of hospitals

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 (Government of Kenya; 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 (Government of Kenya; Ministry of Health, 2014).

According to World Disaster 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 Kristine & 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.

The ability of any one worker to meet the emergency preparedness performance goal for his or her position is closely tied to skills scribed and acquired. 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 (K. M. 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, Gorgi, Seyedin, & Jafari, 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 mechanisms of drills (Rios, 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.

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 the major determinants of emergency response plans (Balicer, *et al.*, 2006). Study results from a survey conducted in New York City to determine the ability and willingness of health care workers to report to work during various catastrophic events revealed that about 84.75 percent were more likely to report and attend to emergencies. More than half (77.45%) of the respondents reported that capacity building through trainings improved health care worker's knowledge, skills and competencies in emergency response plans (Qureshi, 2005). According to Kenya Health Strategic Plan (KHSP 2018) level 4 and 5 can refer or receive emergencies. Kangundo Level 4 and Machakos level 5 hospitals are arguably the most advanced in Machakos County. Unfortunately, there is no hospital's vulnerability assessment to identify the state of emergencies preparedness plans of the hospitals to anticipate, prepare for, and manage client flow trends and their effects. 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 (DHIS, 2019).

Referrals from Kangundo level 4 and Machakos level 5 were on the increase by 23% and 35 % respectively (DHIS 2018). At the same time, data published by the Ministry of Health Kenya demonstrate an increase of emergencies situation in Machakos environments (Government of Kenya; Ministry of Health, 2014). For example, in January 2019, more than 35 people were rushed to Machakos level five hospital for emergency treatment after series of accidents along the Nairobi-Mombasa highway. In August- December 2018, tens of thousands were also rushed after several accidents. Accident victims from fire outbreaks and gas cylinder in industries around Machakos are also taken there (Government of Kenya; Ministry of Health, 2014). In the face of these emergencies, the ability of Kangundo level 4 and Machakos level 5 hospitals can quite literally make the difference between life and death (Government of Kenya; Ministry of Health, 2014). 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. The main objective was to establish the determinants of hospital emergency preparedness in Machakos Level 5 and Kangundo Level 4 Hospitals.

1.3.1 Specific Objectives

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

2.0 LITERATURE REVIEW

2.1 Capacity of Health Workers on Emergency Preparedness

Emergency preparedness is an individual responsibility as well as organizational (Gebbie & Merrill, 2002). Capacities 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 (K. 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 (K. M. 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 Health Workers Skills and Influence on Emergency Preparedness

The ability of any one worker to meet the emergency preparedness performance goal for his or her position is closely tied to skills scribed and acquired. 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 (K. M. 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, Gorgi, Seyedin, & Jafari, 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 (Rios, 2015) which drill mechanism is adopted in current study context.

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 (K. M. 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.

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).

2.3 Commodities for 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 (Rios, 2015) and (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. 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 Aitken A. 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).

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? (Rios, 2015). Assessing the influence of these parameters in the current context may inform structural adjustments.

2.4 Financing in 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).

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, Peters, Wojtecki, & Hyde, 2001). As part of this, identifying what resources different groups wish to receive remains an important task in any future preparedness (Qiu, 2016). 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. 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 Kangundo level 4 hospitals to determine how it is prepared in emergency.

2.5 Institutional Policies in Emergency Preparedness

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

2.5.1 Policies and Legislation in 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, Seneviratne, Amaratunga, & Haigh, 2014). Policies, systems, networks, lines of authorities and decision making processes are paramount to any master plan (Pathirage et al., 2014). According to Shabanikiya, et al 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?

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 Payne (2016) revealed that 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. He further indicated that majority of the emergency preparation units provide in information through print and visual media which puts some health care workers disadvantaged. The government and other investors do not erect boosters to provide emergency preparedness skills to its consumers which make it hard for them to get the information. This affects their response skills negatively.

Health literacy enables communication and participation in any emergency situation (Hill 2011), this concurs with Schillinger, Bindman, Wang, Stewart and Piette (2004) 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, there environments, resources and supports, it influences the decisions they make hence informed actions that leads to better lives (WHO, 2014). During and after occasions hospitals expect the critical improvement of giving health services to individuals, on schedule and with no impedance (Barbara I. Braun, et al. 2006). Besides, hospitals are in like way head for the individuals who are condemned for sifting through how to obstruct and treat gigantic flare-ups of infectious disease and gathered mass disaster occasions (Niska, & Shimizu, 2011). Considering this worry, China, the inspiration driving social event of the current evaluation, has put unequivocally in the state and neighborhood public health structure, and has offered central focuses for review hospitals about their status of reaction to public health crises (Qi-Zhao, 2009; LQ-Liuet al., 2006).

2.6 Emergencies Preparedness

Researchers and authorities to evaluate preparedness level or response performance by a hospital (Djalali et al., 2014) have created various indicators and methods. 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 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, 2016). 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-pajooch & 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 Kristine and 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 Aitken, 2015). This Primer provides key information on the public health emergency response to the COVID-19. The primer provides information & objective guidance (not legal advice) on emerging issues of law and policy and serve as a quick briefing on core legal preparedness and response issues. Pandemic events present multiple challenges to the health care environment and the ability of the respiratory therapist to provide mechanical ventilation to all persons in need. The Center for Disease Control and Prevention's (CDC) Strategic National Stockpile (SNS) is a repository of ventilators that would be used to supplement the supply currently in use by the nation's acute care facilities. These ventilators can be requested and allocated to areas of need in the event of a pandemic.

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, Ardalani, Akbarisari, Noorbala, & Elmi, 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 (K. M. 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.

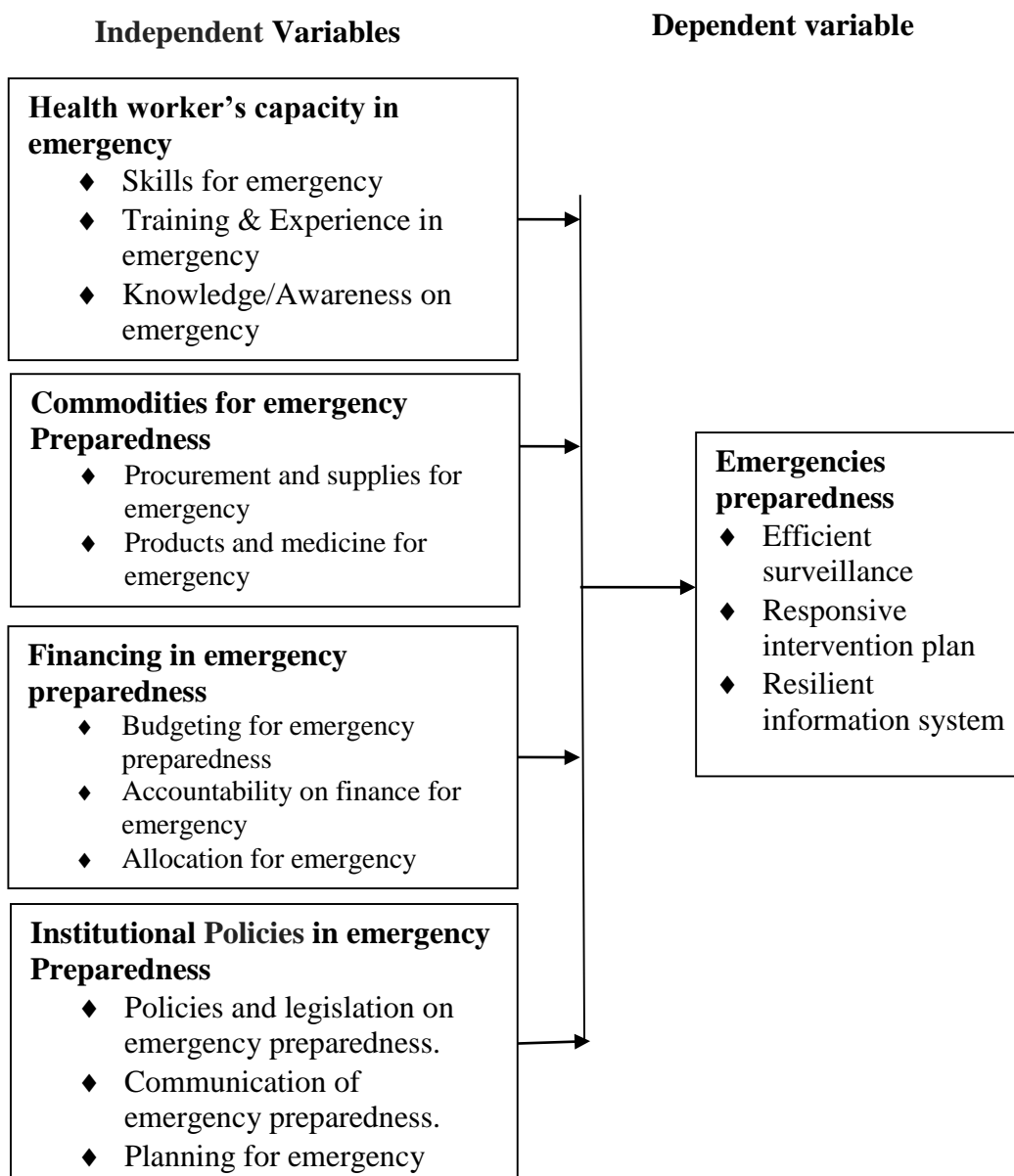


Figure 2. 1: Conceptual Framework
Source: Author, 2020

3.0 RESEARCH METHODOLOGY

The study adopted cross-sectional study design. The study was conducted in Kangundo level 4 and Machakos Level 5 Hospitals which are public health facilities located in Machakos County. Target population comprised of 55 outpatient health workers in Kangundo level 4 and 98 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. Target population comprised of 55 outpatient health workers in Kangundo level 4 and 98 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 all outpatient Health workers in both Kangundo level 4 and Machokos level 5 hospitals.

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 Kangundo and Machakos hospitals.

$N=n/(1+N(e)^2)$ (Yamane's 2008)

Where;

n = is the total sample size

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

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

Kangundo: Machakos

= $55 / (1 + 55(0.05)^2)$

= $98 / (1 + 98(0.05)^2)$

= 48.288

= 78.723

n = 49 Respondents

n = 79 Respondents

Hence a sample size of 128 respondents

The researcher obtained the list of all 128 health workers from list provided by the management of both hospitals. The study used a simple random probability sampling method where the target population had an 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 Kangundo 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.

The entered data was cleaned and exported to Statistical Package of Social Science (SPSS) version 25 for analysis. Descriptive statistics including frequency, percentages and mean was employed during data analysis. Chi square was used to assess for associations between each independent variable and the dependent or outcome variable (quality of life). The 95% confidence interval of the odds ratios and the *P-value* of <0.05 was used to assess for statistical significance. Key informant interview data collected from pediatric specialists was transcribed and analyzed using latent content analysis.

4.0 RESULTS

4.1 Response Rate

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 on Emergency Preparedness

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 respondents 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
Kangundo 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 write female were more health workers profession and significantly associated with Healthcare workers' willingness to respond following a disaster (Shapira *et al.*, 2019).

57(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 an execution plan (Sadler, 2013).

4.3 Descriptive Statistics

4.3.1 Health Worker's Capacity on Emergency Preparedness

Objective one of the study was to determine the influence of the capacity of Health workers in emergency preparedness. Majority of the respondents 121(96%) agreed ($M = 4.29 \pm 0.67$) 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 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 $M = 3.39 \pm 1.19$ 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 $M = 4.27 \pm 0.95$. 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 on Emergency Preparedness

Description	D	A	M	SD	X ²	P-Value
	n (%)	n (%)				
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 $M = 4.66 \pm 0.65$. 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 $M = 2.66 \pm 1.18$. 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 $M = 2.23 \pm 1.20$. 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 workers development and strengthening of managerial systems (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 are 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 (Rios, 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 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).

Table 4. 3: Descriptive on Commodity Availability for Emergency Preparedness

Descriptive Statistics	D	A	M	SD	X ²	P-Value
	n (%)	n (%)				
The hospital has adequate supply of commodities in case of an emergency	67 (53)	59 (47)	2.87	1.22	99.079 ^a	0.001
The hospital has acquired ultra-modern commodities to help deal with emergencies	79 (62)	47 (38)	2.69	1.169	72.159 ^b	0.001
The hospital has a drug supply system with drug suppliers	39 (30)	87 (70)	3.51	1.108	121.540 ^a	0.001
Food rations for hospital staff during emergency are available	70 (56)	56 (44)	2.86	1.257	86.619 ^a	0.001
The emergency tray is well equipped with various equipment for management of emergency	39 (32)	87 (68)	3.52	1.101	127.413 ^a	0.001
The emergency tray is accessible by all staff	56 (44)	70 (56)	3.09	1.265	50.571 ^b	0.001

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 Rios 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 (Rios, 2015).

4.3.3 Financial Resources and 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 mechanisms 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 Emergency Preparedness

Description	D	A	M	SD	Chi-Square	P-Value
	n (%)	n (%)				
Financial resources for emergencies are adequately allocated	83 (66)	43 (34)	2.67	1.109	125.825 ^a	0.001
The hospital receives funding from NGOs and well-wishers to cater for emergencies.	87 (69)	39 (31)	2.52	1.157	108.206 ^a	0.001
the financial allocation for emergencies preparedness should be increased	26 (21)	100 (79)	4.07	1.195	105.429 ^a	0.001
The hospital caters for training logistics for staff/training fees	73 (58)	53 (42)	2.81	1.225	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	1.231	94.714 ^a	0.001

4.3.4 Institutional Policies on 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 agrees with Balicer et al., 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, *et al.*, 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 authority 83 (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%).

In cooperation 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).

Table 4. 5: Descriptive on Emergency Preparedness

Description	D	A	M	SD	X ²	P-Value
	n (%)	n (%)				
The hospital has policy in place for emergency preparedness	35 (28)	91 (72)	3.6	1.089	120.825 ^a	0.001
I participated in emergency policy formulation	108 (85)	18 (15)	2.064	0.961	142.413 ^a	0.001
The hospital has an emergency operations committee	38 (30)	88 (70)	3.492	1.094	136.143 ^a	0.001
There are procedures for expanding usable space, including the availability of extra beds during emergencies	36 (28)	90 (82)	3.452	1.114	160.111 ^a	0.001
Regular safety inspections are conducted by appropriate authority	43 (34)	83 (66)	3.428 6	1.1691 3	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	1.189	83.206 ^a	0.001

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. The results are presented in Table 4.6.

Table 4. 6: Descriptive on Emergency Preparedness

Description	D	A	M	SD	X ²	P-Value
	n (%)	n (%)				
The facility has effective communication in case of an emergency	40 (32)	86 (68)	3.56	1.217	78.524 ^a	0.001
HIS provides sufficient data for decision making	17 (14)	109 (86)	3.98	0.959	152.016 ^a	0.001
The hospital conducts emergency drills frequently	77 (61)	49 (39)	2.67	1.219	87.889 ^a	0.001
Emergency operational plan are regularly updated	64 (51)	62 (49)	2.98	1.229	87.175 ^a	0.001
Hospital has information center specifically for emergency	54 (43)	72 (57)	3.11	1.254	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 making 109 (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 Rios 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 (Rios, 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 Health workers, 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 (Carter2008).

Table 4. 7: Bivariate Analysis

		Emergency Preparedness	HW Capacity	Commodities	Finance	Policies
Emergency Preparedness	r	1				
	P-value					
Health workers Capacity	r	.169	1			
	P-value	.058				
Commodities	r	.619**	.225*	1		
	P-value	.000	.011			
Finance	r	.626**	.227*	.572**	1	
	P-value	.000	.011	.000		
Policies	r	.702**	.055	.573**	.631**	1
	P-value	.000	.538	.000	.000	
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

N = 126

The coefficient of correlation of health worker's capacity ($r=0.169$, $P>0.01$) indicated a weak significant in 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. The coefficient of correlation of commodity availability ($r=0.619$, $p<0.001$), financial

resources ($r=0.626$, $p<0.001$), and policy ($r=0.702$, $p<0.001$) which 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). Gilani writes that knowledge, commodities, finance, and attitude predicted readiness to emergency practice (Gillani *et al.*, 2020).

4.4.2 Multiple Regression

4.4.2.1 Model summary

The regression model in Table 4.8.1 specifies coefficient of determination R^2 as 0.576. This means that variables in this study explained about 57.6% of variations in emergency preparedness. The finding resonates with (Song & Park, 2019) whose 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 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 4.8.2 shows that the overall P -value is less than 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) Health workers Capacity, Commodities, Finance, Policy					
b. Dependent Variable: Emergency 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: Emergency Preparedness						
b. Predictors: (Constant), Health workers, Capacity, Commodities, Finance, Policy						

The results in Table 4.9. indicate that the prediction model of emergency preparedness being influence by the four study variables (Health worker's capacity, Commodities, Financial resources and policies) was valid and significant as indicated by a $P<0.05$.

Table 4. 10: Regression Weights

Model		Coefficients ^a						
		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-	.358		-.025	.980		
		.009						
	Health workers 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: Emergency Preparedness

The VIF index is below 10 for all the variables indicating that there was no multicollinearity. From Table 4.9, 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;

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

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, and this need to further be studied to establish the cause.

5.0 CONCLUSION

Understanding of emergency preparedness, self-preparedness, leadership role, periodic training hinged on health workers medical training curricula were key health worker's capacity building attributes 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.

Therefore, Results shows that there is a strong and positive relationship between the independent variables (Commodity availability, financial resources, policies) and the dependent variable (Emergency preparedness). The value of commodity availability, financial resources, policies in preparedness, response, and recovery is well documented. The coefficient of correlation of commodity availability ($r=0.619$, $p<0.001$), financial resources ($r=0.626$, $p<0.001$), and policy ($r=0.702$, $p<0.001$) which showed a strong and positive relationship with emergency preparedness at Machakos County Level 4 and 5 health facilities. See Table 4.7.

Communication is the most important determinants of emergency preparedness as communication skills enable health care providers give appropriate information relating to the emergency response. 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. The 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.

Health literacy enables communication and participation in any emergency situation 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, there environments, resources and supports, it influences the decisions they make hence informed actions that leads to better lives.

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.

In bivariate value $r=0.169$ and $P>0.05$ however, health worker's capacity was not correlated with emergency preparedness therefore the research question is answered in affirmative that capacity, influence preparedness. Stable drug supply system with adequate drug suppliers; adequate supply of ultra-modern equipment as well as accessibility of drugs/utilities are key commodities for emergency. The study concludes that commodities influence emergency preparedness. There is inadequate funding by facility, NGOs and well-wishers for emergencies. Similarly, resources for training logistics for staff/training from the hospital is inadequate. Hospitals have policy, clear chain of command system and operations committee for emergency preparedness. Nevertheless, emergency drills, safety inspections are not undertaken regularly.

Additionally, there is lack of staff participation in emergency policy formulation, guidelines, emergency plans, and lobbying for emergency preparedness. The study found that policy formulation and implementation, commodities and finances significantly influenced emergency preparedness.

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

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