

**DISASTER PREPAREDNESS AND SAFETY STANDARDS IN PUBLIC
SECONDARY SCHOOLS OF NAIROBI COUNTY, KENYA**

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A Research thesis submitted in partial fulfillment of the requirement for the degree of
Master of Science in Disaster Management and Humanitarian Assistance of Masinde
Muliro University of Science and Technology (MMUST).

November, 2024

DECLARATION AND CERTIFICATION

DECLARATION BY THE CANDIDATE

This thesis is my own work and has not been presented for a degree in any other university or institution for a degree or any other award.

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CERTIFICATION

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DEDICATION

This thesis is dedicated to my late father Joseph Saleri Fundi, for being my source of inspiration. My mother Agripina Saleri, for her kind words, love, and prayers during my educational journey. I'm hoping that this accomplishment will fulfill the dream they had for me. My loving husband, Joshua Wasigala, who encouraged and supported me financially and emotionally.

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ABSTRACT

Increase in disaster incidences have been witnessed in secondary schools in recent years, its frequency and impact hampering education process. For instance, besides loss of lives, and injuries, school properties have been damaged and closing and often with children having to leave school for long periods in recovery period. Continued occurrence and magnitude of disaster have prompted international organizations especially the United Nations agencies and other countries to come up with best practice models of institutions including training on disaster and disaster risk management. Despite the concerted efforts by the government of Kenya and other stakeholders in emphasizing preparedness, Kenya still experiences various disasters in schools. Majority of students in secondary schools are exposed to mishaps and accidents daily in schools. School authorities, parents and even students are jolted into actions only when a fatality or injury has occurred and this affects the response and mitigation level of these disasters and thus the need of the study. The general objective of the study is to assess disaster preparedness and safety standards in public secondary schools of Nairobi County, Kenya. Specific objectives of the study were to: Establish the level of disaster preparedness in public secondary schools in Nairobi County; Determine the causes of vulnerability to disasters in public secondary schools in Nairobi County; Assess safety of physical infrastructure in public secondary schools in Nairobi County. The study adopted a descriptive research design. Target population of the study was 73 from which 13 schools were selected using random sampling. A sample size of 458 respondents was selected to participate in the study; 6 sub county quality assurance and standards officer, 3 officials from the Kenya Red Cross, 3 from St. Johns Ambulance, 3 fire department officials, 1 official from department of disaster management, 13 teachers in charge of quality assurance and standards from sampled schools, 13 head teachers, 13 board of management members, 13 parent association members, 6 officers commanding station and 384 students. Data was collected using questionnaires, interview schedules, focus group discussions and observation checklist. The data was analyzed using descriptive statistics such as frequency distributions and percentages. The findings were presented in tables and figures. The findings revealed a lack of training and inadequate community awareness on disaster preparedness and safety standards. Inadequate funds and lack of clear policies were some of the factors causing the schools vulnerability to disasters. The physical infrastructures in schools were poorly maintained. Dormitories and classes were overcrowded. The study concluded that the schools were insufficiently prepared for disasters and most of the physical infrastructures were considered unsafe. The study recommended regular inspection of school infrastructure, safety training by qualified by qualified personnel and taking into consideration the ability and capacity of different schools when settings standards for disaster preparedness and safety.

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ABBREVIATION AND ACRONYMS

DRR: Disaster Risk Reduction

FEMA:	Federal Emergency Management Agency
KRCS:	Kenya Red Cross Society
UNDP:	United Nations Development Program
UNISDR:	United Nations International Strategy for Disaster Reduction
GAR:	Global Assessment Report
ISDR:	International Strategy for Disaster Reduction
MOE:	Ministry of Education
U.S.D.E:	The United States Department of Education
KESI:	Kenya Education Staff Institute

OPERATIONALIZATION OF KEY CONCEPTS

Catastrophes: The phrase has been employed within scholarly research to designate an occurrence that engenders significant and typically abrupt harm or distress to a certain culture.

Disaster preparedness: Predicting and, where feasible, preventing disasters, mitigating their impact on vulnerable populations, and responding to and effectively coping with the consequences of disasters are all part of disaster preparedness.

Disaster: A state of severe societal disruption characterized by extensive human casualties, injuries, material damages, or environmental harm that surpasses the affected society's capacity to effectively manage the issue using its own available resources.

Preparedness planning: actions done to ensure a quick and effective response in the event of a disaster, while taking into account the local disaster management system and adapting it to the local situation.

Safety standards: Are standards intended to guarantee the security of goods, operations, processes, etc. The guidelines can be categorized as either advisory or compulsory, and are typically established by an advisory or regulatory entity, which can be either voluntary or mandated by law.

Public Secondary school: This establishment typically offers secondary education and include the physical infrastructure where educational activities are conducted. Secondary education is a phase that succeeds primary school and serves as a preparatory stage for tertiary education.

Community: A collective of individuals cohabiting inside a shared geographic location. In this instance, the community will encompass the student body, comprising both instructional and non-instructional personnel, as well as individuals residing in close proximity to the educational institution.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The occurrence of disasters has had a detrimental impact on the education process, leading to many consequences such as loss of human life and injuries, social disruptions, damage to school infrastructure, and temporary closures. As a result, students often find themselves unable to attend school for extended periods of time during the recovery phase (Clerveaux, 2010). There has been a global increase in the incidence of fatalities and injuries among school students due to incidents of violence, disasters, and emergencies. These unfortunate occurrences may have been prevented if there was rigorous adherence to safety standards (Omolo & Simatwa, 2010). Nevertheless, there is considerable variation in both the impact and scale of these disasters across different countries. The disparity in disaster preparedness between nations is a result of varying levels of development, with industrialized countries successfully mitigating the impact of disasters, while underdeveloped countries suffer the consequences owing to inadequate preparedness (Ozmen, 2006).

Based on a survey done by the Arson Control Forum in 2006 (Adams, 2009), it was found that around 50% of the secondary schools included in the study had encountered a notable fire incident that necessitated the involvement of fire and rescue services. Fortunately, the government's implementation of fire safety education, fire prevention advice, risk assessment, evaluation, and anti-arson actions has effectively limited the severity of the situation.

According to Fennis and Johnston (2010), several countries, including Bangladesh, China, Cambodia, the Philippines, Honduras, India, and Indonesia, have incorporated disaster risk reduction (DRR) into their educational curricula. In Sri Lanka, the incorporation of disaster risk reduction (DRR) elements is observed within the curriculum of geography for secondary schools. Conversely, in India, the educational system has implemented disaster management as an independent topic in select classes within secondary school (Pinar, 2017). DRR was integrated into the second grade subjects of the national curriculum in the Philippines, China, and Cambodia, with teachers receiving training in curricular modules (UNDP, 2010). These factors have had a significant impact on the implementation of disaster management strategies in the respective countries.

In the African context, occurrences of disasters within secondary schools are both prevalent and recurrent. In the year 2001, a devastating fire engulfed a secondary school for girls located in Gadhiri village, situated in Northern Nigeria. Tragically, this incident resulted in the loss of twenty-three students' lives and caused injuries to fourteen others (Ndetu & Kaluyu, 2016). The large number of casualties can be attributed to the confinement of students within the dormitory, which was secured by the presence of iron bars and a chain. In March 2009, a fire incident occurred at Alliance Secondary School in Ibanda district, Uganda, resulting in the destruction of a dormitory and significant loss of property valued at millions of shillings. Despite the diligent endeavors undertaken by the Police Fire Unit to gain entry to the site of the fire incident, the truck was unable to approach the dormitory due to limited accessibility (Wanjala & Onyango, 2016).

In the context of Kenya, secondary schools have been subjected to various calamities, such as lightning strikes, floods, and powerful winds, resulting in extensive damage to school infrastructure and unfortunate loss of life (Gichuru, 2013). Additionally, documented instances of school fires and arson assaults have been recorded, such as the Bombolulu fire catastrophe in 1998 and the Kyanguli fire disaster in 2001 (Republic of Kenya, 2001). Numerous educational institutions, as well as water and sanitary infrastructure, have suffered significant destruction due to flooding in various regions, including Budalangi, Nyando area, Baringo, and Tana River. Consequently, there exists a heightened susceptibility to diarrheal ailments, including cholera (Omukuti, 2008). According to UNICEF (2007), the rain was accompanied by severe gusts which resulted in the displacement of roofing in several schools within the Emuhaya district, hence posing a potential threat to the safety of the pupils.

According to the Kenya Red Cross Society (KRCS, 2001), the susceptibility of secondary schools to disasters can be attributed to various factors, including the absence of specialized training in fire drills, inadequate firefighting equipment, insufficient resources, and the absence of systematic disaster mitigation and response mechanisms (Government of Kenya, 2008). Akali and colleagues (2011) observed a lack of preparedness in secondary schools in Kenya for catastrophes, despite the government's initiatives to improve disaster risk management and ensure the safety of schools. The researchers hypothesized that a limited number of secondary schools had taken measures to ensure preparedness for disasters by appropriately installing fire extinguishers in their laboratories, storage areas, and kitchens, as outlined in the safety standards manual. According to Nderitu's (2009) findings, a significant number of secondary schools in Kenya were found to lack sufficient

firefighting apparatus and a dependable alert system. The aforementioned observations serve as unequivocal indications of a deficiency in catastrophe preparedness within secondary schools in Kenya.

According to Kimathi (2011), Nairobi is considered one of the prominent counties in terms of secondary school disasters. According to Aluanga (2008), a tragic incident occurred in 2008 at Upper Hill School in Nairobi, resulting in the unfortunate demise of a form three student. It is thought that this incident was triggered by a period of dissatisfaction among the students within the institution. The learning process in Nairobi, particularly in informal settlements such as Mathare and Kibera, was significantly disrupted by the post-election violence in 2007/2008. This disruption resulted in the complete destruction of several educational facilities and the displacement of both pupils and teachers (Ministry of Education, 2008). The Moi Girls Nairobi dormitory fire in September 2017 resulted in the tragic deaths of ten girls. The accident was attributed to the inadequate architectural layout of the dormitories, which lacked sufficient means of egress for emergency situations.

A fire incident occurred at one of the dorms located in Nairobi's South B area, namely at the Highway Secondary School. A total of twelve individuals were expeditiously transported to the Kenyatta National Hospital in the aftermath of the aforementioned occurrence. The parents expressed their belief that it is necessary for schools nationwide to use surveillance camera systems in order to address the increasing prevalence of arson events. They argued that the rise in such occurrences serves as a compelling evidence that kids exhibiting disciplinary issues are actively seeking to disrupt the educational environment.

On Sunday night, a dormitory located at Kangemi High School in Nairobi was subjected to a fire incident, resulting in the hospitalization of several students. A collective of 12 pupils were documented as having incurred injuries during the nocturnal occurrence, while other individuals were afterwards brought to medical facilities due to inhalation of dense smoke. The dormitory in question is purported to have incurred significant damage, resulting in the destruction of both the physical structure and the personal belongings of the students. In July 2015, Dagoretti High School experienced a comparable event of a fire outbreak, which was subsequently attributed to electrical wiring issues (Gagawala, 2016).

According to the Federal Emergency Management Agency (FEMA) (2009), it has been observed that in order to enhance the efficacy of disaster preparedness in schools, it is imperative to have guide maps that clearly indicate planned evacuation routes, assembly areas, locations of fire extinguishers, first aid stations, and well-communicated evacuation alarm information. However, it has been noted that a significant number of schools in Nairobi lack these essential components (Mwangi, 2008).

1.2 Statement of the Problem

The occurrence of disasters in public secondary schools within Nairobi County continues to be a matter of worry for both the government and stakeholders in the education sector, owing to the significant extent of damage and the loss of lives and school property. Government authorities and school management often find themselves unprepared and

reactive in the face of disasters. According to Newport and Jawahar (2003), the effectiveness of disaster preparedness is contingent upon the active involvement of vulnerable populations and the relevant formal or informal organizations. According to the authors, community engagement should prioritize several measures such as contingency planning, community readiness, task force establishment, reaction mechanisms, and similar strategies, which are often lacking in many educational institutions.

According to Harper (1989), schools were first perceived as "islands of safety". The proclivity to respond rather than take proactive measures is a prevalent characteristic observed among individuals in Kenya. The prevalence of double standards is particularly deeply rooted within the education system in Kenya. In Kenya, the absence of a comprehensive, robust, and sustained national data repository hinders the availability of reliable information pertaining to school crimes, violence, and the corresponding measures for prevention, intervention, enforcement, and crisis preparedness. The issue of school fires and incidents of arson is a prevalent concern within the education system in Kenya. In addition to the threat of fire, educational institutions are susceptible to various other emergencies, including but not limited to flooding, building collapse, and terror attacks. This vulnerability arises from the insufficient provision of amenities and inadequate structural measures in place to effectively mitigate the risks associated with such catastrophes.

A number of instances of lamentable school violence transpired in Kenya from the 1990s, extending till the beginning of 2019. The occurrence of these occurrences prompted

Kenyans to go on a quest for understanding the underlying reasons, strategies for prevention, and methods for enhancing preparedness in order to effectively handle such incidents in the future. According to Trump (2000), it is evident that a significant proportion of the unfortunate occurrences that take place within educational institutions can be avoided. According to Nichols (1997), contemporary educational institutions have similar vulnerabilities as those experienced by societies at large. In the present-day society, including its educational establishments, it is evident that there are limited locations where individuals can reasonably expect to have a sense of security. Crisis circumstances manifest with greater frequency within educational institutions, and a significant number of these institutions lack adequate preparedness to properly manage such crises.

The primary objective of the Safety and Standards Manual developed by governments is to equip schools with the necessary tools and guidelines for effective catastrophe risk management. Nevertheless, despite being introduced in 2008, educational institutions continue to struggle with the implementation of disaster risk management, since a significant number of casualties and property damage have been incurred (Decker, 2007). Every educational institution possesses distinct characteristics that are shaped by factors such as student population, available resources, and organizational structures. This assessment evaluates their level of readiness and ability to effectively react to catastrophic events. Drawing upon the contextual framework of the research, the present study aims to investigate the topic of disaster preparedness and safety protocols inside public secondary schools located in Nairobi County, Kenya.

1.3 Objective of the Study

The general objective of the study is to assess disaster preparedness and safety standards in public secondary schools of Nairobi County, Kenya.

Specific objectives of the study are to:

- i. Establish the level of disaster preparedness in public secondary schools in Nairobi County.
- ii. Determine the causes of vulnerability to disasters in public secondary schools in Nairobi County.
- iii. Assess safety of physical infrastructure in public secondary schools in Nairobi County.

1.4 Research Questions

The following research questions will guide the study:

- i. What level of disaster preparedness are public secondary schools in line with school safety standards in Nairobi County?
- ii. What are the causes of vulnerability to disasters in public secondary schools in Nairobi County?
- iii. How safe is the physical infrastructure in public secondary schools in Nairobi County?

1.5 Justification of the Study

1.5.1 Academic justification

This study aims to provide a valuable contribution to the current body of knowledge on disaster preparedness and safety standards in public secondary schools in Kenya. The researcher intentionally chose to conduct this study in Nairobi County due to the presence of numerous public secondary schools with a substantial student population. Furthermore, numerous secondary schools have experienced the impact of disasters, despite adhering to established safety protocols.

1.5.2 Policy Justification

The study is deemed valuable by secondary school management for its contribution to the planning, policy modification, and growth of disaster preparedness in secondary schools. This study examines the efficacy of disaster management policies implemented in public secondary schools in Kenya. The formulation of well-informed policies by government officials, particularly those in the education sector, holds the potential to effectively address and prevent the occurrence of disasters within secondary schools in Kenya.

1.6 Scope of the Study

The research was conducted inside the public secondary schools located in Nairobi County. The target population encompassed several stakeholders, including head-teachers, teachers, pupils from the selected schools, officials from the ministry of education, representatives from the disaster management department, the fire department, as well as members of the Kenya Red-Cross and St John's ambulance. Schools can be subject to a variety of disasters, such as floods, terrorist attacks, fire incidents, sports injuries, and motor vehicle accidents, among other potential occurrences. The primary emphasis of the study was on fire incidents, as they represent the most widespread disaster occurrence in public secondary schools within Nairobi County. The assessment of safety standards in

educational institutions is based on the frequency and effectiveness of emergency response measures implemented by the schools. The temporal scope of the study encompassed the period spanning from 1998 to 2023. Nevertheless, the research did not categorize public secondary schools based on their composition, such as mixed-gender (boys and girls) or their operational structure, such as day schools or boarding schools. Furthermore, the school's size was not considered as a criterion for segregating it from the study.

1.7 Chapter Summary

This chapter provides a comprehensive overview of disaster preparedness and safety requirements in public secondary schools located in Nairobi County, Kenya. The analysis encompasses viewpoints at the global, regional, national, and county levels. The problem statement emphasizes significant deficiencies that the study aimed to address. The study was directed by its aims and research questions. The rationale and extent of the investigation offer a comprehensive understanding of the necessity for further research. The subsequent chapter presents an in-depth examination of the literature pertaining to the subject of inquiry.

CHAPTER TWO

LITERATURE REVIEW

This chapter deals with review of related literature of this study. Specifically, review focused on the overview of disaster, disaster preparedness in secondary schools, the empirical reviews of the various variables and the conceptual framework.

2.1 Disaster safety standards in institutions

According to the definition provided by the United Nations International Strategy for Disaster Reduction (UNISDR) in 2009, a disaster is characterized as a significant disruption to the functioning of a community or society. This disruption results in extensive losses and impacts, encompassing human, material, economic, and environmental aspects. Furthermore, these losses and impacts surpass the capacity of the affected community or society to effectively manage and recover using their own available resources. According to Wisner et al. (2004), disasters provide a hindrance to both economic and human growth at both the household and national levels due to the damage incurred to essential infrastructure such as roads, bridges, hospitals, schools, and other services.

According to the Global Assessment Report (GAR) of 2011, it has been observed that catastrophes tend to have a disproportionate effect on individuals living in poverty within developing nations. This impact is particularly pronounced among segments of the population who are considered more vulnerable. Children, particularly those in the early stages of development, possess physical, social, and psychological attributes that render them less capable of effectively managing deprivation and stress. According to Hassanain (2006), it is said that children attending schools may experience heightened levels of anxiety and become challenging to control during emergency situations. The potential consequences of a disaster occurring within a school setting are deemed significant.

Katie et al. (2012) assert that safety standards encompass a range of actions implemented by governmental bodies and educational institutions to effectively realize the aims and

objectives outlined in safety policy declarations. Additionally, it involves implementing the required prerequisites to establish a secure educational setting for all students, educators, and administrative personnel. These potential strategies encompass the procurement of equipment and technology, modifications in various contexts and systems, and the enhancement of practitioners' competencies (Kemunto et al., 2015).

According to Chemeli (2015), schools are required to adhere to safety standards policies and guidelines in order to ensure preparedness for potential disasters and to create a secure learning environment for students. Muthiani (2016) posits that the New Jersey Department of Education in the United States implemented proactive measures aimed at safeguarding the well-being and protection of both children and staff personnel. According to Ng'ang'a (2013), it is imperative for every educational institution to develop a comprehensive safety and security strategy in collaboration with law enforcement authorities, emergency service providers, public health officials, and other relevant stakeholders.

Multiple methodologies are employed to augment the level of safety within educational institutions in the United States of America (Berry, 2002). School-wide policies and practices are implemented in a methodical manner to effectively address the requirements of students, school workers, the community, and the physical infrastructure of the school. The enforcement of safety regulations in schools is mandated by the United States Department of Education (U.S.D.E) in response to several threats, including terrorism, drug-related violence, the proliferation of firearms, and natural catastrophes such as typhoons, floods, and hurricanes (DeVoe, 2004).

According to Cavanagh's (2004) research on the response of schools to the threat of terrorism, the adoption of safety and security policies in European countries has been significantly shaped by past incidents of school tragedies and close calls. The author observes that the September 2004 school hostage crisis in Beslan, Russia, resulting in the tragic loss of 320 lives including students, teachers, and parents at School Number One, prompted the implementation of armed military troops as a protective measure to deter similar acts of terrorism targeting educational institutions.

According to Soomeren (2002), the topic of schools' involvement in crime prevention has been examined. In the Netherlands, efforts have been directed at ensuring the safety of school premises, enhancing the capacity of schools, addressing issues of bullying, and improving incident response. The Amsterdam School Safety Project is a five-year initiative encompassing a total of forty secondary schools. The implementation of school safety plans, physical enhancements to school facilities, and the integration of curriculum and social supports are employed to foster an integrated and proactive approach towards ensuring school safety in the schools involved.

The occurrence of disasters in India has been attributed to the inadequate or non-existent execution of school safety measures. According to Reuters (2004), the tragic incident of the Indian school fire in July 2004, resulting in the unfortunate loss of 90 children's lives, was attributed to the inadequate implementation of safety regulations. As per the author's

account, the school facility exhibited overcrowding, with just a single exit without any emergency doors or fire-fighting apparatus.

2.2. Disaster Preparedness

According to the International Strategy for Disaster Reduction (ISDR) (2002), disaster preparedness encompasses a range of proactive actions and strategies implemented beforehand to facilitate a prompt and efficient response to the consequences of disasters. These measures include the timely dissemination of accurate and actionable early warnings, as well as the temporary relocation of individuals and assets from areas at risk.

According to the United Nations Development Program (UNDP) (1994), the concept of disaster preparedness encompasses the act of predicting and implementing preventive measures in anticipation of an impending hazard, particularly when there exists the potential for advance notifications. The implementation of preparedness planning enhances the ability to effectively respond to the consequences of a disaster through the systematic coordination of timely and efficient delivery of rescue, relief, and assistance.

The concept of disaster preparedness encompasses the establishment and frequent evaluation of alert systems (connected to predictive systems) as well as strategies for evacuation or other necessary actions to be implemented during a period of disaster alert in order to mitigate the possible loss of life and bodily harm (Kakuli & Kabuka, 2009). The process encompasses the instruction and development of individuals in positions of authority and the populace susceptible to harm, the instruction of teams responsible for

intervening, and the creation of guidelines, benchmarks, structural frameworks, and strategic blueprints to be implemented subsequent to a catastrophic event (Mathbor, 2007).

According to GADRRRES (2014) and the United Nations International Strategy for Disaster Reduction (UNISDR, 2006), children are considered to be one of the most susceptible groups during a disaster, especially if they are present at school during such an event. Consequently, the prioritization of children's welfare in educational settings has been a central objective of worldwide initiatives aimed at mitigating the impact of disasters.

The Sendai Framework for Disaster Risk Reduction 2015-2030 builds upon the accomplishments and components created in its antecedent, the Hyogo Framework for Action: Building the Resilience of Nations and Communities 2005-2015. The agreement incorporates several significant advancements, notably a heightened focus on catastrophe risk management, as opposed to the conventional approach of disaster management. The importance of disaster risk reduction in achieving sustainable development is emphasized by the Sendai Framework (Gadrrres, 2014).

The Sendai Framework for Disaster Risk Reduction delineates seven distinct targets and four prioritized areas of action aimed at mitigating future and mitigating current disaster risks. The comprehension of disaster risk, the reinforcement of disaster risk governance for the purpose of managing disaster risk, the allocation of resources towards disaster reduction to foster resilience, the enhancement of disaster readiness to facilitate effective response, and the allocation of resources towards recovery, rehabilitation, and reconstruction. The primary objective is to effectively decrease the risk and minimize the negative impact of

disasters on human lives, economic activities, physical infrastructure, social structures, cultural heritage, and natural resources of individuals, enterprises, communities, and nations (Kihila, 2017).

Since 2005, many frameworks and international disaster risk reduction (DRR) initiatives have been implemented to strengthen the use of this framework in the context of schools and education. One illustrative instance of the initiation of Disaster Risk Reduction can be observed at The School Campaign, initiated by the United Nations International Strategy for Disaster Reduction (UNISDR, 2006), aims to foster the incorporation of Disaster Risk Reduction (DRR) principles into educational curricula. Additionally, it seeks to facilitate the establishment of disaster-resilient schools, which may involve retrofitting buildings as deemed necessary. The successful implementation of the campaign relied heavily on the active involvement of various important parties at different levels, including local, regional, national, and international stakeholders. This collaborative approach was crucial in attaining the targeted results, as stated by the United Nations International Strategy for Disaster Reduction (UNISDR, 2005).

According to Ozmen (2006), there is a prevailing viewpoint that following substantial financial investments in school repairs subsequent to a disaster, numerous governments have implemented mandatory disaster preparedness measures within their educational institutions. The author additionally highlights the necessity for school administrators to engage in proactive catastrophe planning, risk reduction, safeguarding the well-being of students and educators, and expediting the recovery process for educational institutions.

In their scholarly article titled "Rethinking Disasters by Design," Afedzie and McEntire (2010) conducted an analysis of preparedness within many domains, including households, organizations, communities, states, and the nation. The authors emphasized the importance of integrating the current understanding of preparedness, response, and recovery issues. They also defined preparedness as encompassing the development, testing, and implementation of disaster plans, as well as effective communication with the public and other stakeholders to mitigate the impact of disasters.

The implementation of disaster preparedness measures within the education sector encompasses a systematic approach, encompassing many stages such as policy formation, ongoing monitoring and assessment. This process is characterized by its dynamic nature, necessitating continual enhancements and adjustments (UNDP Team-Nepa, 2001). It is imperative to establish policies pertaining to emergency preparedness in order to facilitate the alignment of objectives across the various departments engaged in disaster preparedness (Allen, 2006).

Planning is a significant element of the school disaster preparedness approach. The planning process facilitates the development of reaction measures and protocols, which can be effectively recorded in a written plan. It is vital to acknowledge that the written plan does not provide a guarantee of preparedness (Morrow, 2007). Instead, it should be regarded as a component of preparedness initiatives that seek to enhance disaster response (Ansal, 2009). The safeguarding of personnel is a fundamental principle within the framework of hospital disaster preparedness. This principle encompasses the provision of essential components,

including personal protective equipment (PPE), firefighting equipment, training and education, as well as the establishment of policies to guarantee the appropriateness and sufficiency of protective measures (UN, 2003).

2.3.1 Causes of vulnerability to disasters in public secondary schools

The dissemination of knowledge on hazard risks and appropriate response strategies, particularly among those in the younger age group, has the potential to significantly mitigate loss of life (UNICEF, 2011). The integration of hazards education into the formal educational system is often seen as a potent means of disseminating information about hazards to the wider society, hence enhancing resilience. This is because schools serve as a crucial nexus connecting children, families, and communities (Ronan & Johnston, 2005).

Two recent international reviews have presented an up-to-date comprehension of hazards education programs and their efficacy. The study conducted by Johnson et al. (2014) presents a comprehensive analysis of 35 evaluations pertaining to school-based risks education programs, focusing on the methodologies employed in these assessments. The research identified substantial deficiencies in the body of evidence employed for assessing the efficacy of educational interventions, mostly attributable to notable methodological constraints such as inadequate sample sizes, absence of baseline data, and absence of control groups.

As per the United Nations International Strategy for Disaster Reduction (UNISDR) (2006), the mitigation of disasters can be significantly enhanced through the acquisition and

dissemination of pertinent knowledge and information regarding hazards, vulnerabilities, and capacities. This process is essential in fostering a culture of disaster prevention and resilience, as it empowers individuals with the necessary awareness and motivation to effectively respond to and mitigate potential disasters. According to Priority 3 of the Hyogo Framework for Action 2005-2015, which focuses on the topic of "Utilizing knowledge, innovation, and education to foster a culture of safety and resilience across all levels,"

According to the findings of a survey conducted by Pala and Vankar (1997), which aimed to evaluate the knowledge and attitude of primary school teachers towards disasters, it was observed that only 20% of the 113 teachers surveyed expressed confidence in their ability to effectively handle mishaps. The findings indicated a lack of understanding, particularly in relation to the frequency of incidents. Misconceptions pertaining to first aid were prevalent as well. The level of communication on accidents among the teachers, parents, and doctor was significantly lacking.

2.3.1 Level of public secondary school vulnerability to disasters

According to Burling and Hyle (1997), it is imperative for plans to be dynamic documents that encompass pre-, during, and post-emergency actions. Additionally, RiskRED (2009) emphasizes the importance of regularly reviewing these plans to ensure they remain up-to-date and responsive to evolving social, economic, and psychological factors within the school and broader community (Stuart, Patterson, Johnston, and Peace, 2013). Furthermore, it is imperative that emergency plans maintain their functionality even in

situations where substitute people are assuming critical positions (MacNeil & Topping, 2007).

Although there is no universally applicable plan type for schools, it is essential to incorporate certain fundamental features into every plan, while also taking into account the specific needs of each individual school (American Academy of Pediatrics, 2008). School preparations must primarily adhere to the demands of several emergency scenarios, rather than solely focusing on those that appear to be the most probable. Nevertheless, it is not imperative to create distinct strategies for every type of emergency. Chung et al. (2009) assert that the school preparedness literature recommends schools to prioritize their emergency preparedness endeavors by concentrating on the formulation of plans for four fundamental response procedures, including shelter-in-place, lockdown, building evacuation, and relocation.

In addition to the implementation of the four fundamental response procedures, it is acknowledged that schools should also have plans and procedures in place for the purpose of reuniting families (International Finance Corporation, 2010; Ronan & Johnston, 2005). The issue of family reunion during emergency responses is widely recognized as a challenging aspect, emphasizing the crucial need for schools to have comprehensive and well-defined strategies for reuniting families in the aftermath of such events (Takao, et al., 2004). In addition, it has been suggested that parents who possess knowledge about the school's reunification protocols may effectively mitigate the levels of anxiety and confusion experienced by both kids and parents. Consequently, this may result in a

decreased likelihood of impeding the response efforts undertaken by school staff (Johnson, Johnston, Ronan & Peace, 2014).

In general, research conducted in the United States and Australia suggests that the majority of school districts and individual schools have formulated emergency plans. Nevertheless, it is important to note that the rates of reaction to these plans have exhibited variability (Smith et al., 2001). In the context of the United States, Graham et al. (2006) conducted a study which revealed that a significant majority of schools, specifically 96%, had implemented strategies for transferring kids to other locations during emergency situations. Additionally, 92% of schools had established protocols for lockdown procedures, while 86% had devised plans to address mass casualty events. Moreover, almost 75% of schools had implemented procedures to facilitate the reuniting of families under such circumstances.

According to Clarke et al. (2014), there is a recognized need to address the response requirements of children and staff with disabilities or special needs in school-based emergency planning. This pertains specifically to the availability of evacuation routes and any supplementary assistance required in the designated assembly place. In a survey conducted by Petal et al. (2011) examining schools in the Central Southern US states, it was found that the majority of schools (89%) have implemented strategies specifically designed to accommodate disabled or special needs pupils. According to a study conducted in Australia, it was found that out of 80 schools examined, less than one-third of them had plans specifically catering to the requirements of students with disabilities in relation to

different types of hazards. The study also revealed that the percentage dropped to as low as ten percent for certain hazards (Boon, et al., 2014).

Another component of school-based planning involves creating strategies for maintaining school operations in the event of a disaster or emergency. This includes establishing alternative learning environments and instructional methods to ensure that children may continue to receive education (United States Department of Education, 2013). The maintenance of educational access is advantageous for the long-term well-being of students following a crisis, as well as for aiding in the healing of families and communities (Peek, 2008). The discontinuation of education following a crisis or catastrophe can have detrimental effects on students' academic achievements and future educational prospects. This can manifest in prolonged absences or the decision to withdraw from school, ultimately leading to negative consequences for students, their families, and the broader community, particularly in situations where there are existing difficulties such as displacement or family instability (International Finance Corporation, 2010).

According to Awofisayo, Ibbotson, Smith, Janmohamed, Mohamed, and Olowokure (2013), educational institutions might also be compelled to implement temporary closures as a response to emergency situations. Hence, it is imperative to establish comprehensive protocols for the abrupt closure of schools, encompassing strategies for notifying parents, as well as ensuring the provision of appropriate care for pupils until their retrieval. According to a report by the US Government Accountability Office in 2007, an examination of preparedness initiatives in American schools indicated that some institutions may have already incorporated strategies for temporary school closures and the

maintenance of educational services in their existing pandemic response plans. These plans could serve as a foundational framework for schools to initiate their preparedness efforts.

Njoroge (2008) conducted research on the relationship between school inspectors, school characteristics, and school emergency preparedness. The researcher conducted interviews and surveys with school inspectors to gain a deeper understanding of their implementation of the supervision act, as well as their methods for assessing schools and promoting improvements in school safety. The findings of the study indicate that there was a noticeable improvement in school safety across all educational institutions subsequent to a school visit. Additionally, it was observed that the school's ability to innovate in terms of disaster readiness does not appear to have a significant impact on school progress following inspections. There were no observed effects on the processes of school safety improvement in relation to the amount of scores assigned to schools by inspectors, as well as the extent of comments and suggestions provided for improvement following school inspections.

2.4 Assessment of disaster preparedness in public secondary schools

The responsibility for implementing rules, standards, and laws related to basic education institutions is with the school management and administration. As stated by Crooks (2008), it is the duty of school boards to prioritize the establishment of school safety programs by allocating funds, coordinating staffing, facilitating training and professional development, and ensuring the availability of necessary resources for program execution.

According to Okumbe (2011), financial management is a key responsibility of school administration. It involves the careful consideration of expenditures related to the provision of educational services, as well as the identification of income sources and the allocation of funds in a manner that aligns with educational objectives. According to the findings of Kimani et al. (2016), various factors such as budget management, financial controls, governance, and accountability were found to have a substantial impact on the financial management practices inside public secondary schools. According to Kaguri (2014), budgeting serves as a valuable complement to the planning process as it quantifies objectives, identifies priorities, coordinates activities, and facilitates communication of plans within the organization. Furthermore, budgeting plays a crucial role in motivating individuals and enhancing accountability, as it authorizes expenditures and activities. Additionally, budgeting enables effective control, monitoring, and analysis of expenditures, while also facilitating the evaluation of organizational performance.

According to Kitheka (2016), it is crucial for school management to prioritize the creation of a learner-friendly physical environment within the school. Furthermore, educational institutions must develop comprehensive security and emergency preparedness protocols that actively engage students. In relation to this matter, it is imperative for school administrators to guarantee that classrooms, dormitories, offices, kitchen facilities, bathrooms, and other physical structures are maintained in a clean, safe, and suitable manner, while also being adequately located and utilized. According to Kemunto et al. (2015), it is recommended that the school compound be delineated and enclosed by a secure gate.

According to Part 30 of the Basic Education Regulations (2015), it is required that each institution of basic education establish school rules. These rules must undergo a process of public engagement and must align with the Basic Education Act of 2013 as well as any other relevant legislation. According to the Republic of Kenya (2015), it is stipulated that no institution is permitted to enforce the regulations outlined in Regulation 30 without prior approval from the institution's administration. According to Nyabuto (2015), it is crucial for the management to demonstrate effectiveness in handling student discipline by allocating funds for counseling sessions and providing consultation and support to the head teacher for matters related to student and teacher discipline.

The study conducted by Wanyama (2011) examines the extent to which secondary schools in Sabatia District, Vihiga County adhere to health and safety regulations for emergency response. The research findings indicated that although the majority of schools demonstrated compliance with safety and standards regulations, a significant proportion of schools had not yet established safety committees.

Ng'ang'a (2013) conducted a study examining the application of safety standards and guidelines in Nyeri county. The findings revealed that there was a lack of readiness among the staff members in public secondary schools about safety standards. As per the findings of the study, a subset of the Heads of Departments expressed a lack of familiarity with the manual, stating that they had neither encountered nor been aware of its existence. This finding aligns with the research conducted by Muigai (2011), which revealed a low level of awareness among institutional teachers regarding the safety requirements established by

the Ministry of Education. This observation highlights the sluggish implementation of the safety standards policy by the BOMs.

In a study conducted by Kirui et al. (2011), the researchers examined the difficulties encountered by head teachers in the management of security in public secondary schools within Kisii County. The findings revealed that a mere 37% of school heads had received formal training in safety and security management, in contrast to 21.4% of management staff and 40% of security guards. This implies that the individuals in positions of authority within the educational institution, including school administrators and other members of management, shown a lack of awareness or knowledge while addressing matters pertaining to safety and security. Consequently, their actions or decisions inadvertently put the lives and assets at risk.

Research examining the impact of financial execution on the efficacy of school safety measures has yielded inconclusive findings. The study conducted by Wainaina (2012) examined the safety measures used in secondary schools within the Kikuyu Division of Kiambu County, Kenya. The findings of the study revealed that a significant obstacle faced by principals in the effective implementation of safety policies was the lack of financial resources and inadequate capacity building. The author noted that the application of safety policies necessitated significant adjustments to the current infrastructure, procurement of safety equipment such as fire-fighting apparatus, and the provision of training to enhance the preparedness of the school community.

In a study conducted by Omolo and Simatwa (2010), the assessment of safety policy implementation in public secondary schools in Kisumu East and West Districts, Kenya, indicated that a majority of head teachers (86.67%) expressed concerns about insufficient funds, while 26.67% cited a lack of skills, and 6.67% identified poor coordination from the Ministry of Education (MOE) in relation to the issuance of safety policies. Mito and Simatwa (2012) assert that inadequate budgeting practices significantly impede the successful administration of educational institutions, as they result in either excessive or insufficient expenditure. Consequently, this might engender the misallocation and mishandling of financial resources. The report also observed that, with inadequate budgeting, the delayed disbursement of Free Secondary School Funds presents a financial management difficulty due to the tardy resolution of transactions.

According to Leandri (2011), the allocation of finances is necessary for the implementation of safety measures at educational institutions, including the installation of safety devices, the development of security plan rules and procedures, and the subsequent monitoring of their implementation. According to the study conducted by Kirui (2011), it was observed that the budgetary allocation made by the management for safety and security concerns accounted for less than 10% of the total school budget. This phenomenon can be attributed to conflicting interests. According to Gagawala (2016), Nyakundi (2012), Omolo and Simatwa (2010), as well as Wainaina (2012), insufficiency of financial resources has been identified as a significant obstacle impeding the effective enforcement of safety protocols within secondary educational institutions. According to Gagawala (2016), the provision of financial resources is necessary in order to facilitate the training of administrators, instructors, and students on matters pertaining to school safety. Chepkurui (2017), on the

other hand, challenges this perspective and argues that school safety programs do not require significant financial investment, but rather necessitate a clear vision, effective structure, and collaborative leadership.

2.5 Conceptual Framework

The study reviewed the theories and concepts that have been put in place in the field of disaster management. The study discussed the theories and concepts relating to emergency management.

2.6.1 Modern Disaster Theory

The research was based on Chen's (2011) Modern Disaster Theory. The idea posits a contemporary framework of catastrophe law, which encompasses a collection of legal principles and regulations aimed at effectively addressing and managing catastrophic risks. According to Chen's (2014) research, preparation refers to the effectiveness of legal institutions and regulations in responding to disasters, taking into account the risks associated with environmental factors, hazards, and social vulnerability. The goals of disaster law can be expressed in financial terms by defining disaster readiness as the institutional performance that is adjusted for risks. The enhancement of social preparedness for catastrophic events and the implementation of an ideal set of regulations are vital in disaster law. The concept of preparedness can be understood as the inverse of disaster, wherein the impact of a disaster is contingent upon the level of readiness exhibited by an organization, family, or individual.

By deconstructing vulnerability into its fundamental elements of susceptibility and resilience, all four factors can be aligned on a unified continuum.

Hazard → Susceptibility → Resilience → Capacity

Various stakeholders, including individuals, communities, and organizations, are vulnerable to various risks and so necessitate the development of their capacities to enhance their resilience. According to KESI (2011), the impact of a disaster might vary in severity based on the extent to which human activities have contributed to the vulnerability of the environment, so putting both life and property at danger. Hence, it is imperative for all educational institutions, with a specific emphasis on schools, to establish comprehensive legislative structures pertaining to disaster preparedness. Additionally, the implementation of social networks and social support systems is crucial in order to effectively achieve proper disaster management.

2.6.2 Systemic theory

According to Beard's proposed method, a system can be deemed as "failed" if there exist elements inside the system that are perceived as undesirable by one or several individuals involved. Taking this into consideration, it is conceivable to conceptualize fire as a system malfunction. The management of fire safety is crucial. Within this particular framework, the concept of management encompasses the proactive measures taken by the governing body to address and mitigate the risks associated with fire incidents. These measures involve the formulation of comprehensive strategies, the allocation of resources, and the implementation of timely interventions (Rudolf, 2011). The lack of consideration for fire emergency preparedness within the system contributes to catastrophic events that cause significant destruction. Nevertheless, an academic approach entails perceiving the "dynamic wholeness" of a given situation through the identification of patterns and

interrelationships within a complex entity. This suggests that addressing fire outbreaks necessitates the implementation of joint measures by several stakeholders, as these incidents often give rise to intricate socio-economic challenges.

According to Garis (2009), the utilization of the system approach was deemed advantageous in addressing the management of fires in buildings. The primary emphasis was placed on the implementation of code enforcement measures pertaining to fire protection systems, occupant communications systems, and structural fire protection inside building constructions. Additional concerns encompassed the provision of comprehensive public instruction regarding pertinent aspects pertaining to the protective attributes of their edifice, requisite measures to be undertaken in the event of a reported or actual conflagration, and a grasp of the operational procedures employed by fire service personnel. Additionally, the scope of the study encompassed fire suppression, which entails activities such as dispatching, response policies, as well as firefighting techniques and tactics.

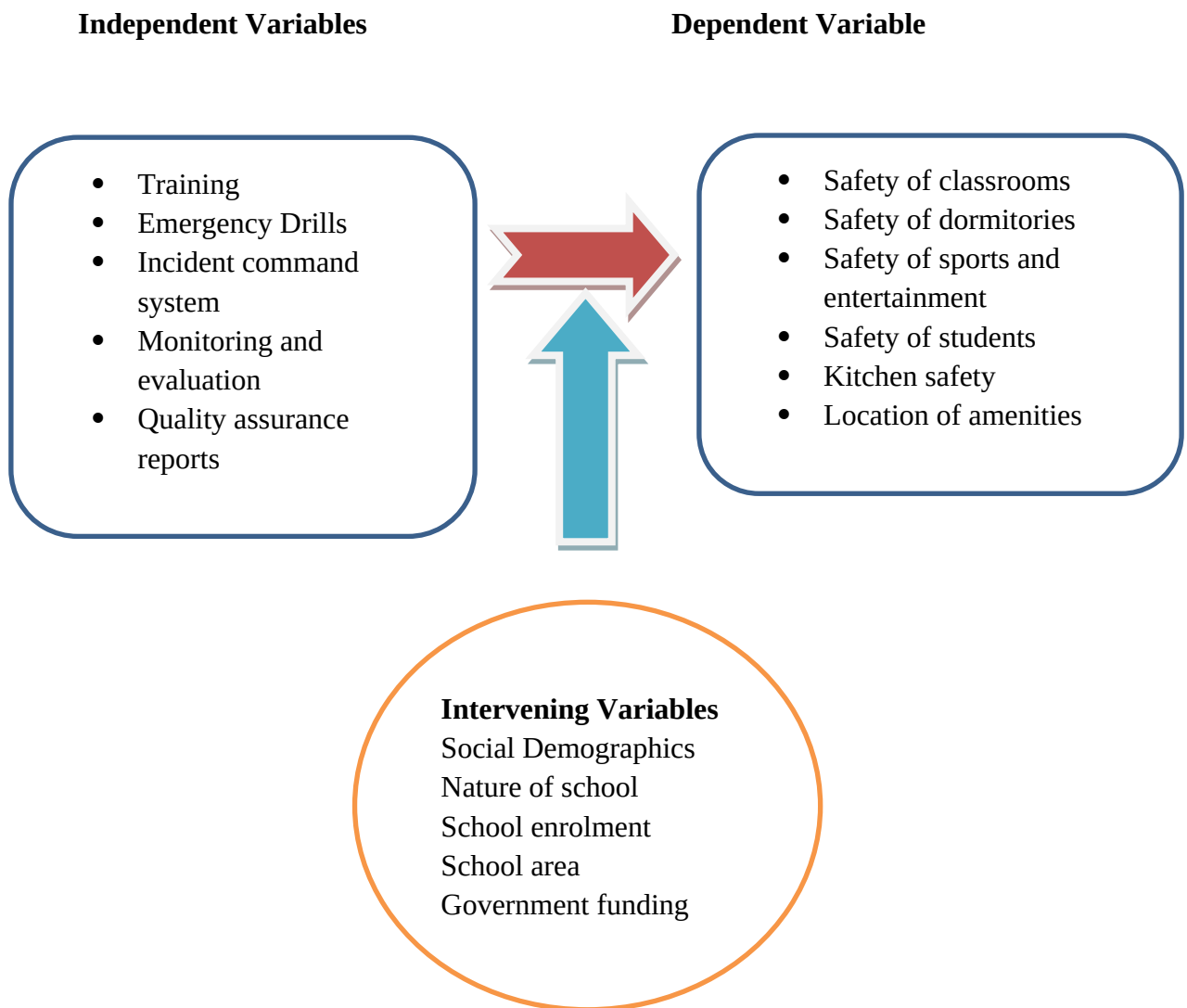


Figure 2.1 Conceptual Model

Researcher, 2022

The establishment of school safety standards is a direct outcome of the implementation of comprehensive school disaster preparedness measures. Through the cultivation of

awareness and proactive measures, educational institutions are able to effectively mitigate the potential hazards and perils linked with catastrophic events. Preparedness encompasses the implementation of risk reduction measures and the cultivation of readiness, which is accomplished through training or education, meticulous planning, and strategic administration under effective leadership. Additionally, any proactive activities or measures undertaken prior to an emergency, aimed at minimizing the impacts and facilitating an effective response and recovery, are considered integral to achieving the established standards of school safety.

2.7 Summary of the knowledge gap

This chapter has presented a comprehensive review of the relevant literature pertaining to the impact of disaster preparedness on safety standards in public secondary schools within Nairobi County. The literature review encompasses a global, regional, and national viewpoint. The occurrence of disasters has had a profound impact on public schools in Nairobi County, leading to a condition of bewilderment due to the detrimental consequences they inflict on both infrastructure and human life. On the contrary, the factors contributing to susceptibility to disasters, the extent of vulnerability of public secondary schools to disasters, and the level of disaster preparedness in accordance with school safety standards in public secondary schools collectively determine the efficacy of safety measures in public secondary schools within Nairobi County. The conceptual framework demonstrates that contemporary disaster theory and systems theory concur that achieving sufficient catastrophe preparedness necessitates the inclusion of independent variables, as it elucidates the interconnection between the variables under investigation.

The subsequent chapter offers a comprehensive examination of the research technique employed in this study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section discusses the research methodology utilized for this study. The study emphasizes several aspects of the research, including the research design, the target population, the sample size and sampling strategies, the research instruments, the validity and reliability of these instruments, the data collection procedures, and the data analysis methodologies employed.

3.2 Research Design

The research design employed in this study was a descriptive approach. The chosen design was considered appropriate for the research, since it offers the opportunity to investigate the various elements that influence disaster preparedness in secondary schools within Nairobi County. This is attributed to its capacity to provide a concise overview of statistical data by presenting the replies to all potential items in a questionnaire, hence facilitating the identification of necessary modifications (Bryman, 2008). Descriptive survey studies primarily aim to ascertain the state of affairs or "what is" (Mutai, 2000). Hence, the utilization of a descriptive survey design might provide valuable insights into a given occurrence. Surveys serve as effective instruments for gathering primary data with the aim of examining the attitudes, orientations, and opinions of a significantly large population. The descriptive survey design is considered the most suitable approach when the objective of the study is to generate a comprehensive depiction of a particular occurrence (Wiersma & Jur, 2005).

3.3 The site of study

The research was conducted within Nairobi County, the capital city of Kenya. Nairobi County is classified as one of the 47 administrative units under the political framework of the Republic of Kenya. According to the National Climate Change Implementation and Disaster Preparedness (NCIDP) report of 2014, the region in question shares its boundaries with Kiambu County to the North and West, Kajiado to the South, and Machakos to the East. Nairobi County is geographically located within the coordinates of 1°09'S 36°39'E and 1°27'S 37°06'E, encompassing an area of 696 square kilometers (270 sq mi). According to the data provided by Nairobi City-data in 2010, the population of Nairobi amounts to four million individuals.

3.3.1: Nairobi County Administrative Units

Nairobi is geographically partitioned into a collection of constituencies, each of which is allocated representation by elected members of Parliament within the National Assembly. The aforementioned constituencies include Makadara, Kamukunji, Starehe, Langata, Dagoretti, Westlands, Kasarani, and Embakasi. The primary administrative divisions of Nairobi encompass Central, Dagoretti, Embakasi, Kasarani, Kibera, Makadara, Pumwani, and Westlands. The majority of affluent residential areas are located in the western and north-central regions of Nairobi, which were predominantly inhabited by European settlers during the colonial era, sometimes referred to as 'Ubabini'. The aforementioned areas encompass Karen, Langata, Lavington, Gigiri, Muthaiga, Brookside, Spring Valley, Loresho, Kilimani, Kileleshwa, Hurlingham, Runda, Kitisuru, Nyari, Kyuna, Lower Kabete, Westlands, and Highridge. It is worth noting that Kangemi, Kawangware, and

Dagoretti, while geographically proximate to these prosperous suburbs, are characterized as lower income regions (Nairobi City Council, 2007).

3.3.2: Nairobi County climatic condition

The urban center is situated along the River Athi in the southern region of the nation, with a vertical distance of 1,795 meters (5,889 ft) relative to sea level. According to the Köppen climate classification, Nairobi exhibits a subtropical highland climate. In this climatic zone, evenings in Nairobi can be somewhat cold, particularly during the June/July season, with temperatures potentially reaching as low as 9 °C (48 °F). The period from December to March is characterized by the highest levels of sunshine and warmth, with typical daytime temperatures ranging in the mid-twenties. There exist two distinct periods of precipitation, commonly referred to as rainy seasons, during which rainfall levels are characterized by a moderate intensity. The period immediately following the initial rainy season is characterized by a high degree of cloud cover, making it the cloudiest time of the year. From this point until September, prevailing weather conditions often consist of cloudy skies accompanied by light, continuous rainfall. Due to its proximity to the equator, Nairobi experiences little variations in seasonal conditions. The seasons are commonly denoted as the wet season and dry season. The consistency in the timing of sunrise and sunset throughout the year can be attributed to a common underlying factor.

3.3.3 Nairobi County as an Economic Hub

Nairobi accommodates the Nairobi Securities Exchange (NSE), which is recognized as one of the largest stock exchanges in Africa. In 1953, the London Stock Exchange formally

acknowledged the NSE as an international stock exchange. The African exchange ranks fourth in terms of trading volumes and fifth in terms of market capitalization as a proportion of GDP. The urban area serves as the regional hub for numerous multinational corporations and organizations. In the year 2007, several prominent multinational corporations, like General Electric, Young & Rubicam, Google, Coca-Cola, IBM Services, Airtel, and Cisco Systems, made the decision to transfer their African headquarters to the aforementioned city. The headquarters of UN Environment and UN-Habitat are hosted at the United Nations Office at Nairobi. Nairobi serves as the headquarters for a number of Africa's prominent corporations. The city is home to Ken Gen, the largest African stock exchange outside of South Africa. Kenya Airways, which is ranked as the fourth largest airline in Africa, operates mostly out of Jomo Kenyatta International Airport in Nairobi (Ranter, 2017). Nairobi is a prominent hub for the production of various goods, encompassing a range of industries such as clothes, textiles, building materials, processed foods, beverages, and cigarettes. A number of multinational corporations have established manufacturing facilities in the vicinity of the urban area. The aforementioned companies encompass Goodyear, General Motors, Toyota Motors, and Coca-Cola. Nairobi possesses a substantial tourist economy, serving as both a prominent tourist destination and a pivotal transportation hub (Roger, et al., 2013)..

3.3.4 Natural and Human induced school Hazards in Nairobi County

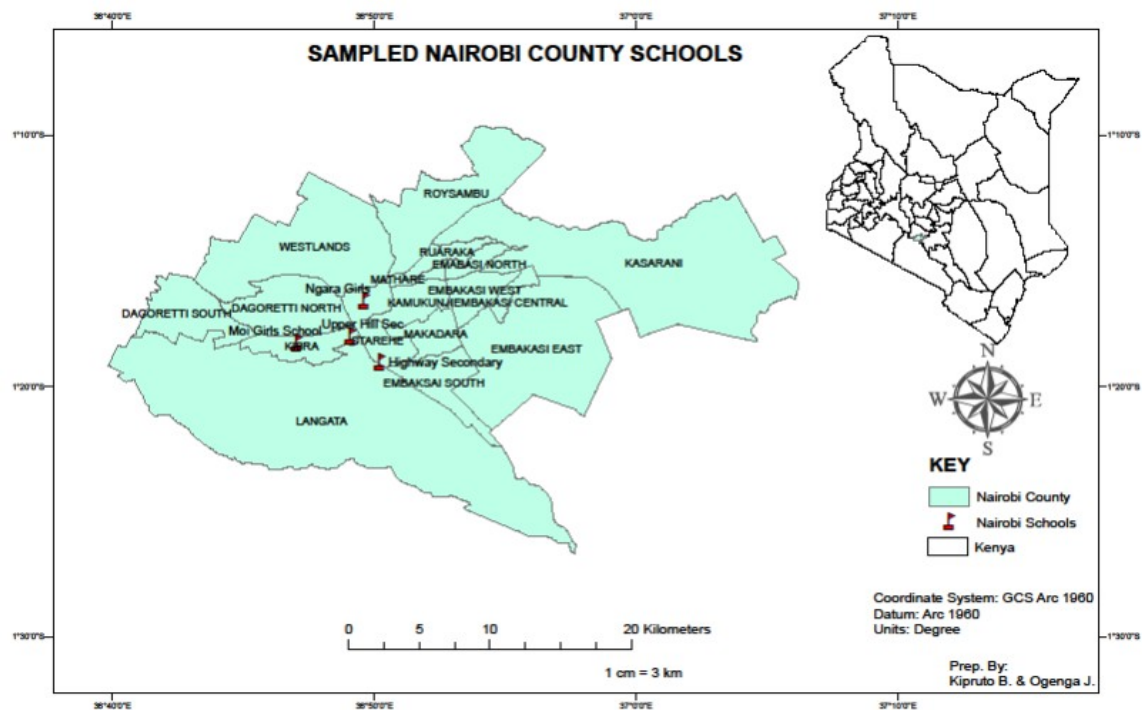


Figure 3.1 map of Nairobi County

Source: Researcher, 2022

3.4 Study population

The study sample consisted of all the public secondary schools located in Nairobi County. Based on the findings of the County Director of Education, Nairobi County, Statistics division (2019), it has been determined that there exist a total of 73 public secondary schools within Nairobi County. The study focused on individuals in key roles within the educational system, including administrators, instructors, students, and ministry officials responsible for quality assurance and standards. Furthermore, the research population included several entities such as the Nairobi County government department of Disaster Management, the Fire department, the Kenya Red Cross, the St. Johns Ambulance, the board of management, the Parent association, and the Officer commanding station.

3.5 Sampling Strategy

Polit and Hungler (1999) explain that a sampling strategy is a plan designed to ensure that the sample used in the research is representative of the population from which it is derived.

3.5.1 Sampling Technique

The study employed a simple random sample method to pick students and teachers. Additionally, a purposive sampling methodology was utilized to select key informants from various organizations including the Ministry of Education, Kenya Red Cross, St. Johns Ambulance, Director of Emergency Services Nairobi County, and principals of public secondary schools. The basic random sampling technique involves the researcher identifying groups within the population and collecting samples from each group (Oso & Onen, 2005).

Table 3.1: Number of Public Secondary School per Sub County of Nairobi County

Sub – County	Number of Public Secondary School	30% of number of schools per sub county
Dagoretti North	5	2
Westlands	8	3
Dagoretti South	5	2
Langata	5	2
Kibra	2	1
Roysambu	3	1
Kasarani	7	3
Ruaraka	1	1
Embakasi South	2	1
Embakasi North	6	2
Embakasi Central	3	1
Embakasi East	5	2
Embakasi West	4	2
Makadara	5	2
Kamukunji	5	2
Starehe	5	2
Mathare	2	1

Total	73	30
(Filled Data,2023)		

3.6 Sample Size

Fischer (2004) suggests that for populations consisting of 10,000 or more units, a sample size of 384 is typically employed. The present study employed a sample size of 384 participants, who were selected using multistage random sampling, from multiple public secondary schools located in Nairobi County. Equation 3.1 illustrates the methodology employed to ascertain the appropriate sample size.

$$n = \frac{Z^2 p q}{d^2} \quad \text{.....3.1}$$

Where; n- the desired sample size (number of smallholder farmers) if the target population is more than 10,000 (ten thousand).

Z- the standard normal deviation at the required confidence level (95%) or Z= 1.96

p- the proportion in the target population estimated to have the characteristic being investigated in this study is equal to 0.5

$$q = 1 - p = 0.5$$

d- the level of statistical significance required for level precision (0.05)

On computation, $n = 384.16$, which to the nearest whole number is 384.

Hence, the sample size to be used was 384 for students.

Initially, a comprehensive compilation of the 73 publicly-funded secondary schools was procured from the County Director of Education Office, namely from the statistics unit. A classification system consisting of seven strata was devised, based on the criteria of whether the groups consisted of males, girls, or a mixture of both. Subsequently, a simple random selection technique was employed to select a sample of six sub-counties, representing 30% of the overall sub-counties within Nairobi County. The study included a sample of schools from each sub county, representing 30% of the total number of public secondary schools in that particular sub county. In order to conduct this study, a total of 458 participants were included in the sample. This sample consisted of individuals from various roles and organizations, including 6 sub county quality assurance and standards officers, 3 officials from the Kenya Red Cross, 3 officials from St. Johns Ambulance, 3 officials from the fire department, 1 official from the department of disaster management, 13 teachers responsible for quality assurance and standards from selected schools, 13 head teachers, 13 board of management members, 13 parent association members, 6 officers commanding station, and 384 students.

Table 3.2: Number of Sampled Sub counties and the sampled public Secondary schools per Sub County

Name of Sub County Sampled	Total Number of Public Secondary schools	No. of Schools Sampled purposively
Dagoretti North Sub County	5	2
Embakasi East Sub County	5	2
Kasarani Sub County	7	3

Langata Sub County	5	2
Makadara Sub County	5	2
Starehe Sub County	5	2

(Filled Data,2023)

Table 3.2 presents the data regarding the sampled sub counties and the corresponding number of public secondary schools that are to be included in the study. The sampling technique employed to determine the number of pupils per school was proportionate random sampling. In the context of coeducational institutions, it was ensured that 30% of the sample consisted of individuals of the opposing gender, hence ensuring adequate representation of all genders within the sample. Table 3.3 displays the sample size pertaining to the target population.

Table 3.3 the sample size of the target population

Respondent	Sample size	Sampling Technique
Sub county Quality assurance and standards officers	6	Purposive sampling
Officials from Kenya Red Cross	3	Purposive sampling
Officials from St. Johns Ambulance	3	Purposive sampling
Fire department officials (Fire fighters)	3	Purposive sampling
Department of disaster management	1	Purposive sampling
Head teachers	13	Purposive sampling
Teachers in charge of quality insurance and standards	13	Purposive sampling
board of management,	13	Simple random Sampling

Parent association,	13	Simple random sampling
Officer commanding station	6	Simple random sampling
Students	384	Multi-stage sampling

(Filled Data,2023)

3.7 Data Collection Instruments

The process of data collecting involves the systematic gathering of both qualitative and quantitative information, which is subsequently utilized for analysis in research (Bogdan & Biklen, 2007). Both primary data and secondary data were acquired in this study. The research employed a mixed-methods approach, incorporating both quantitative and qualitative data to investigate the research inquiries.

3.71 Primary data

To collect primary data, the following instruments were used.

3.7.1.1 Questionnaires

Closed-ended questions were employed in order to provide respondents with a limited set of predetermined answer options. The utilization of structured questions facilitated the process of comparing and quantifying the obtained data. In addition to closed-ended questions, open-ended questions were employed to provide respondents the opportunity to freely articulate their perspectives. (appendix ii)

3.7.2 Interview Schedules

The data collection process involved the utilization of qualitative, in-depth interviews with head teachers hailing from a specific set of schools located in Nairobi County. The interview guidelines include comprehensive information regarding disaster preparedness and safety standards in public secondary schools throughout Nairobi County. The open-ended interview guide questions aim to elicit the respondents' perspectives on the several variables encompassing catastrophe preparedness and safety standards, in order to fulfill the research objectives..

3.7.3 Focus Group Discussion

The practice of focus group discussion is convening a collective of individuals with the purpose of engaging in discourse over a certain matter, with the aim of soliciting a diverse array of perspectives and viewpoints on that matter. A series of focus group conversations were conducted with key stakeholders including ministry of education officials, representatives from Kenya Red Cross and St. Johns Ambulance, teachers responsible for quality assurance, and students. The purpose of these meetings was to gather information pertaining to schools' disaster preparedness and school safety. The study involved three cohorts, each consisting of twelve participants. A researcher was assigned to each group, responsible for facilitating the discussions by introducing the themes and providing guidance to ensure active participation from the group members. The participants of the discussion included members from the school administration, students, officials from the Ministry of Education, and emergency service providers. The primary focus of the discussion was to thoroughly examine the challenges associated with disasters in schools and evaluate the level of preparedness of public secondary schools in responding to emergency situations. The utilization of focus group discussions also facilitated

adaptability in addressing many aspects pertaining to school safety. Nevertheless, it is important to acknowledge that certain viewpoints may have been expressed in an exaggerated manner, while others might have remained unspoken due to the influence of group dynamics.

3.7.4 Observation Checklist

A qualitative research methodology encompasses various techniques, including participant observation. The utilization of qualitative methodology facilitates the comprehension of individuals' living experiences and enables critical contemplation on the interpretations and collective significance of their daily social existence and reality (Marshall and Gretchen, 1999). The study employed a qualitative research approach to gather primary data through direct personal observation. The researcher saw various scenarios during disaster response in schools with the aim of assessing the level of readiness exhibited by these educational institutions.

Table 3.4 Observation checklist

	Exceeds expectatio n	Meets expectatio n	Below expectatio n	Unacceptab le	Not observe d
Electricals Presence of security protocol and guards Classroom physical condition Classroom population Dormitory population Other amenities' conditions					

3.7.5 Document Analysis

A comprehensive literature research was undertaken, involving the analysis of relevant documents pertaining to the topics of disaster preparedness and safety standards in educational institutions. A preliminary evaluation of the current policy regarding school preparedness in response to catastrophes was conducted to collect further data pertaining to disaster preparedness and safety protocols. The evaluated documents encompass a range of sources, such as academic journals, official records on disaster management, online blogs, and social media posts that pertain to the subject matter under investigation.

Table 3.5 Showing Data Collection Instruments

Study population	Sample size	Sampling Technique	Data collection instrument
Sub county Quality assurance and standards officers	6	Purposive sampling	Interview Schedules Appendix 3
Officials from Kenya Red Cross	3	Purposive sampling	Interview Schedules Appendix 4
Officials from St. Johns Ambulance	3	Purposive sampling	Interview Schedules Appendix 4
Fire department officials (Fire fighters)	3	Purposive sampling	Interview schedules Appendix 5
Department of disaster management	1	Purposive sampling	Interview schedules Appendix 5
Head teachers	13	Purposive sampling	Interview Schedules Appendix 3
Teachers in charge of quality assurance and standards	13	Simple random sampling	Interview Schedules Appendix 3
Board of Management	13	Purposive sampling	Interview Schedules Appendix 3
Parents association	13	Purposive sampling	Interview Schedules Appendix 3
Officer Commanding Station	6	Purposive sampling	Interview Schedules Appendix 5
Students	384	Multi-stage sampling	Questionnaires Appendix 2

(Filled Data,2023)

3.8 Validity and Reliability of Instruments

This section is divided into validity and reliability of the instruments.

3.8.1 Instrument Validity

Validity refers to the capacity of a research instrument to acquire reliable, transferrable, objective, and dependable data (Matula, et al., 2018). According to Kimberlin and Winterstein (2008), it is argued that an instrument's validity can only be achieved once it meets the necessary level of dependability. The instrument's content validity was established through the solicitation of expert opinions from the designated University supervisor and staff members from the school of disaster management regarding the substance of the questionnaires and interview schedules. The items were subjected to peer review by supervisors, who provided recommendations for enhancing their quality in order to gather more precise and significant results (Matula et al., 2018).

3.8.2 Instrument Reliability

According to Kothari (2008), reliability refers to the degree to which a data collection procedure produces consistent outcomes when applied under consistent circumstances. In order to assess the trustworthiness of the data, a preliminary research was carried out in two secondary schools located in Kiambu County. The selection of these schools was done randomly, ensuring that they represented 3.4% of the total sample size. This aligns with the suggestion made by Mugenda & Mugenda (2008) to allocate a sample size ranging from 1% to 10% of the whole population. The aforementioned activity was conducted once again following a two-week interval. The correlation between the scores obtained from both tests was examined in order to assess the reliability of the instruments. The data derived from the pretesting phase were computed utilizing Pearson's Product Moment Correlation Coefficient Formula.

3.9 Data Analysis and presentation

The data was initially enhanced to eliminate any ambiguity introduced by the participants. The process of coding was thereafter employed to convert the responses to questions into distinct categories. The coded items were subjected to analysis using the Statistical Package for Social Sciences (SPSS) version 22 software. The study of quantitative data involved the utilization of descriptive statistics, including frequency distribution, percentages, and mean, as well as inferential statistics, such as chi-square and principal component analysis. The qualitative data obtained from the interview schedules was systematically categorized into topics, categories, and patterns that were relevant to the study. The findings derived from the analysis of the data will be presented in the form of tables, charts, and graphs.

Table 3.6: Summary of Data Analysis per Specific Objective

Specific Objective		Data Analysis Method
(i)	Establish the level of disaster preparedness in public secondary schools in Nairobi County	Thematic analysis Qualitative analysis
(ii)	Determining the causes of vulnerability to disasters in public secondary schools in Nairobi County	Frequency analysis Qualitative analysis
(iii)	Assess safety of physical infrastructure in public secondary schools in Nairobi County	Thematic analysis Qualitative analysis

(Filled Data,2023)

3.10 Limitation and delimitation of the study

The following were the limitations and delimitation of the study;

- i. The respondents may have exhibited hesitancy in providing information due to concerns regarding the confidentiality and sensitivity of the data to be gathered for the study. The confidentiality of the participants was guaranteed.

- ii. The challenge lies in obtaining information from the participants, as the desired information is sensitive in nature, particularly when addressing the emotional experiences of pupils who have lost friends due to the consequences of the accident, as well as the broader impact on parents. The focus group discussion was limited to participants such as head teachers, Ministry of Education officials, Kenya Red Cross officials, and officials from St. Johns Ambulance. The decision to exclude students from the conversation was based on their past experiences, which had resulted in psychological issues.
- iii. In instances where feasible, the researcher employed observation and document analysis to supplement some aspects that were deemed to potentially contribute to post-traumatic stress among the participants.

3.10.1 Assumptions

The basic assumptions of the study were;

- i. There are causes of vulnerability to disasters in public secondary schools in Nairobi County
- ii. That public secondary schools in Nairobi County are vulnerable to disasters.
- iii. There are disaster preparedness and safety standards for public secondary schools in Nairobi county

3.11 Ethical Consideration

The researcher obtained a letter of introduction from the Directorate of Postgraduate Studies at Masinde Muliro University of Science and Technology after the approval of the proposal by the supervisors. The researcher obtained a research authorization from the

National Commission for Science, Technology, and Innovation (NACOSTI) prior to commencing the data gathering phase. The researcher obtained the informed consent of the participant by means of an introductory letter, ensuring that any concerns or questions generated by the participant were addressed before to their participation. The confidentiality of the participants was guaranteed. Participation in the study was limited to a select group of respondents who were eager to be included, and the collected data was exclusively utilized for its intended purpose. The researcher demonstrated a courteous attitude towards the concerns expressed by the participants regarding the study, emphasizing that participation was voluntary and that respondents had the freedom to withdraw from participating at any point in time..

CHAPTER FOUR

ESTABLISH THE LEVEL OF DISASTER PREPAREDNESS IN PUBLIC SECONDARY SCHOOLS IN NAIROBI COUNTY

4.1 Introduction

This chapter provides an overview of the study's findings, offering insights into the experiences of the participants. The provided information outlines the social demographic attributes of the participants involved in the study. The survey conducted among the participants achieved a response rate of 100%. The discussion revolved around the findings and their connection to the primary research purpose, which aimed to determine the extent of disaster preparedness in public secondary schools within Nairobi County.

4.2 Social Demographics of the Respondents

4.2.1 Gender of Respondents

The study sought to establish the gender of the student respondents. The findings were recorded as shown in table 4.1

Table 4.1: Gender of Students Sampled

	Frequency	Percent	Cumulative Percent
Female	163	42.4	42.4
Male	221	57.6	100.0
Total	384	100.0	

(Filled Data,2023)

The participants were requested to indicate their gender. According to the findings presented in Table 4.1, it is evident that a significant proportion of the participants in the study were male, accounting for 57.6% (n=221) of the total number of students included. In contrast, the study included a total of 163 participants, accounting for 42.4% of the sample,

who identified as females. The data indicates a higher level of male participation compared to female participation in the study.

According to the research conducted by Mururi (2014), it was observed that mixed schools had a higher susceptibility to disasters in comparison to single gender schools. Furthermore, it was noted that a substantial correlation existed between the category of secondary educational institution and susceptibility to calamities.

4.2.2 Age of the student respondents

The study also sought to establish the student respondents. The findings are as recorded in

Table 4.2

Table 4.2 Age bracket of the student respondents

	Frequency	Percent	Cumulative Percent
13-15yrs	160	41.7	41.7
16-18yrs	196	51.0	92.7.0
Above 18yrs	28	7.3	100
Total	384	100.0	

(Filled Data,2023)

The age distribution of the participants in the study is presented in Table 4.2. The study included a sample of participants aged 13-15 years, which accounted for 41.7% (n=160) of the total sample size. The age group of 16-18 years, consisting of 196 individuals, accounted for 51.0% of the whole population. The sample consisted of 28 individuals, all of whom were above the age of 18. These individuals accounted for 7.3% of the entire population. Based on the observation, it was found that the study had the highest number of participants within the age range of 16 to 18 years. In the study conducted by Kishoyian (2021), it was found that there is no statistically significant association between students' age, gender, religion, and year of study with their level of readiness for fire disasters.

4.3 The level of disaster preparedness in public secondary schools in Nairobi County.

This section pertains to the first objective of the study, which examines the extent of disaster preparedness in Nairobi county. The primary objective of this study was to determine the various categories of disasters encountered by public secondary schools. Additionally, the study aimed to assess the extent to which public schools have implemented disaster evacuation plans, the frequency of emergency drills conducted, the effectiveness of fire safety and emergency training programs, the level of community engagement in disaster safety awareness, and the degree of involvement in disaster planning.

4.3.1 Types of disasters that public secondary schools face.

The objective of this study was to identify the many forms of disasters encountered by public secondary schools. Participants were requested to indicate the prevalent types of disasters experienced within their respective school environments. The data obtained from the participants was gathered via a survey instrument, and the results are presented in Figure 4.1.

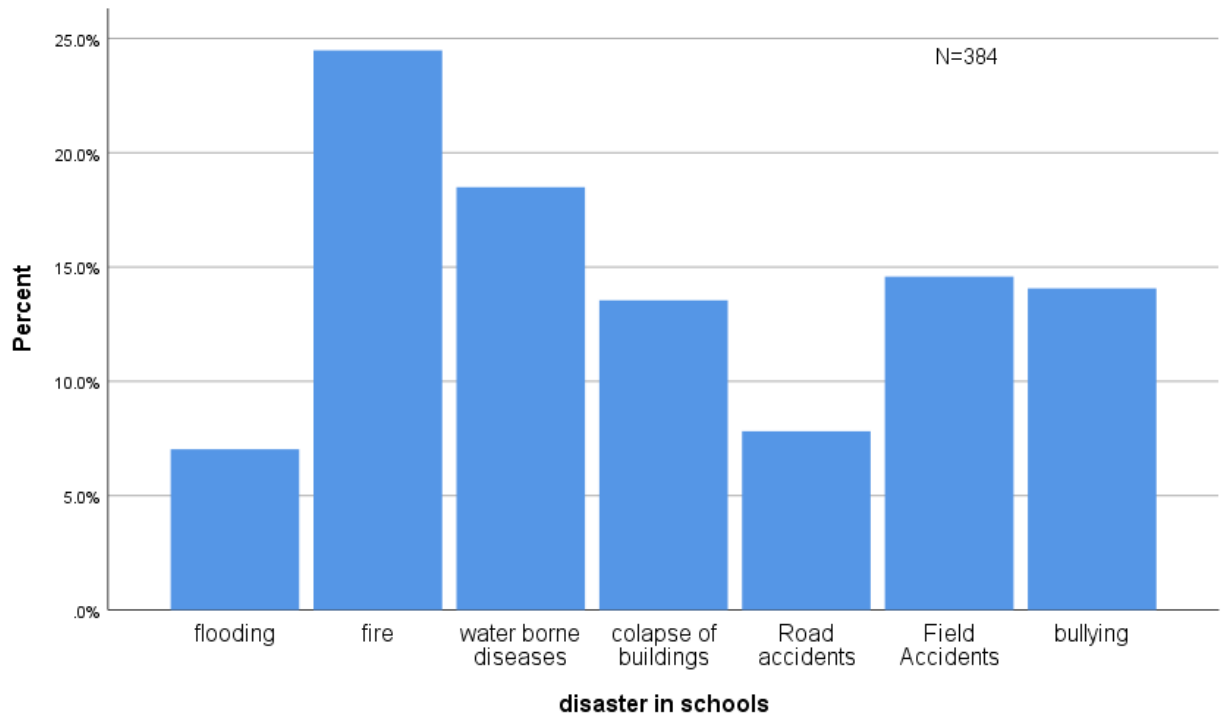


Figure 4.1 Types of disaster that institutions are vulnerable to

The respondents were questioned regarding past disasters in order to determine the sort of disaster to which the institution is vulnerable. Figure 4.1 illustrates the many types of disasters that a majority of secondary schools have encountered in the past or at any given point in time. Based on the research findings, it has been determined that fire is the most prevalent disaster encountered in educational institutions, accounting for a frequency occurrence of 94 incidents (24.5%). This is followed by water borne diseases, which occur at a rate of 71 incidents (18%). Field accidents rank third with 56 occurrences (14.6%), while incidents of bullying are reported at a rate of 54 (14.1%). The collapse of structures is the fifth most common disaster, with 52 incidents (13.5%), and road accidents conclude the list with 30 occurrences (7.8%). Schools with a 7.0% incidence rate experience the lowest frequency of flooding, totaling 27 instances. The chi-square analysis yielded a statistically significant result, with a chi-square value of 56.276 and a p-value less than .01. Based on

the available data, it can be concluded that the institutions under consideration exhibit a significant susceptibility to fire hazards. This finding aligns with the consensus among the main informants involved in this study, who assert that the majority of schools exhibit a high susceptibility to fire-related tragedies. Consensus was reached among all the focus group discussions (FGDs) that fire and waterborne infections are the primary calamities encountered by schools in Nairobi county. The escalating occurrence of fire disasters within educational institutions has resulted in the loss of human lives, extensive damage to property, and disruption of instructional activities (Gichuru, 2013). The findings align with the data obtained from interview schedules, in which a representative from the Kenya Red Cross reported that a significant proportion of the emergencies they address in public secondary schools within Nairobi County are due to fires.

4.3.2 Respondents disaster experience in the institution

The study further determined the respondents experience in the institutions, the respondents were asked to indicate if they experience any disaster in the school, the findings were as indicated in figure 4.2

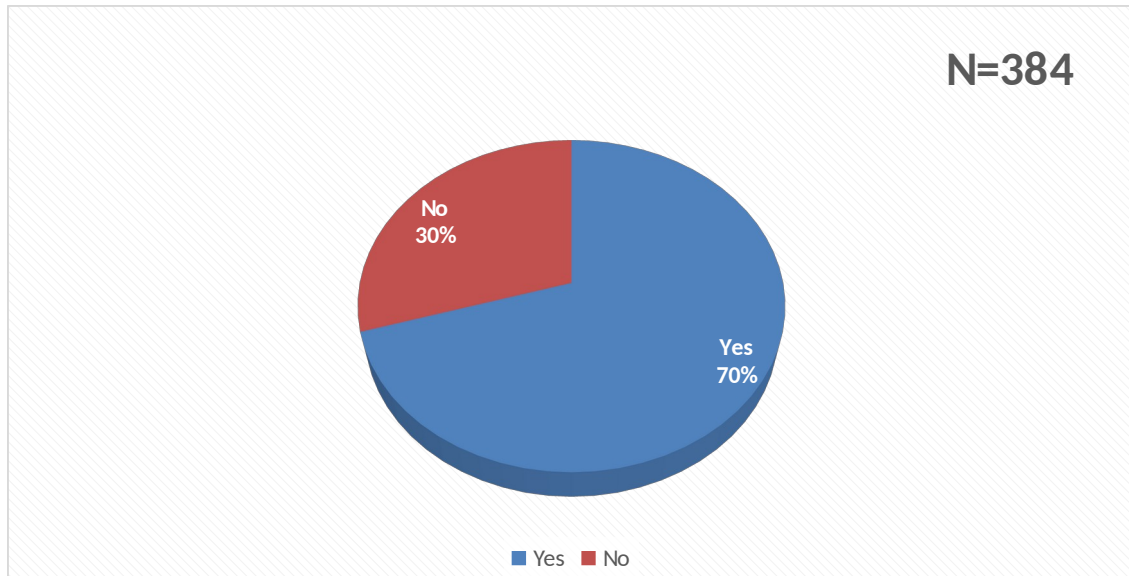


Figure 4.2 Respondents on disaster experience in the institution

The participants were queried regarding if their educational institutions encountered any form of calamity. In Figure 4.2, the depicted data represents the perspectives of students regarding the occurrence of disasters within their educational institutions. The results of the study reveal that a significant majority of the participants, specifically 70.31%, expressed agreement with the notion that their respective educational institutions had encountered some form of calamitous event. Conversely, a mere 29.69% of the study participants asserted that their educational institutions did not encounter any form of calamity. Consequently, the research findings indicate that a majority of the schools included in the study encountered a calamitous event.

4.3.3 Schools emergency evacuation plans

The objective of this study was to investigate the presence of emergency evacuation plans in public secondary schools within Nairobi County. Participants were requested to identify whether such plans were implemented in their respective schools. The results are depicted in Figure 4.3.

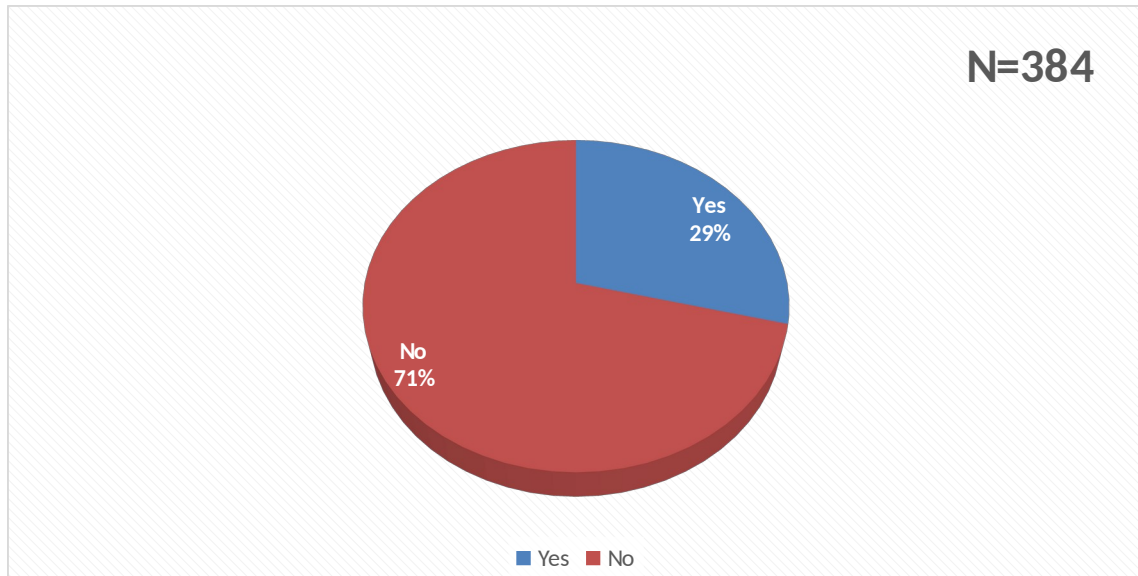


Figure 4.3 Schools emergency evacuation plans

The respondents were questioned about whether the schools had an emergency evacuation plan in place to ascertain whether the study's participating schools had emergency response plans. According to the data presented in Figure 4.3, it can be observed that 28.91% of the surveyed students expressed agreement with the statement that their respective schools possessed an evacuation plan. Conversely, the majority of students, comprising 71.09% of the respondents, said that their schools did not have any established procedures in place for emergency evacuations. The survey revealed that a majority of the schools included in the research possess an evacuation plan as part of their emergency preparedness measures. This study aligns with the findings of Mwenga (2011), which revealed that a significant number of schools lacked comprehensive site plans encompassing building layouts and evacuation routes for potential natural disasters. Consequently, it may be inferred that a considerable proportion of schools were insufficiently equipped to handle such emergencies.

4.3.4 How often institutions carry out emergency drills for disaster preparedness

To establish how often public secondary schools, carry out emergency drills for disaster preparedness, the respondents were asked about emergency drills.

Table 4.3 How often your institution carries out emergency drills for disaster preparedness?

	Frequency	Percent	Cumulative Percent
Termly	23	5.99	5.99
After every six months	47	12.24	18.24
Yearly	78	20.31	38.54
Not at all	236	61.46	100
Total	384	100.0	

The study sought to ascertain the level of readiness and reaction exhibited by pupils in the event of a catastrophic event. Table 4.3 presents the frequency at which the educational institutions participating in the study carried out emergency drills. The findings indicated that a majority of schools (61.46%) do not regularly conduct emergency drills. Among the students surveyed, 20.31% reported that their schools conduct emergency drills on an annual basis, 12.24% reported drills being conducted every six months, and 5.99% reported drills being conducted on a termly basis.

The results presented exhibit a resemblance to the research conducted by Gichuru (2013). The individuals mentioned a deficiency in fire drills, a deficiency in disaster preparedness plans and First Aid Kits, and a deficiency in fundamental capabilities to effectively respond to crises. According to an official from St. John's Ambulance, it was disclosed during the interviews that the organization actively promotes the implementation of exercises in educational institutions and other establishments. The primary objective of these drills is to enhance preparedness and facilitate effective response strategies in the face of potential disasters.

4.3.5 Training programs on the use of fire safety equipment.

The respondents were asked on the frequency of training programs on the use of fire safety equipment. This was to establish the frequency of training programs on fire safety equipment.

Table 4.4: Training programs on the use of fire safety facilities

	Frequency	Percent	Cumulative Percent
Most Frequently	39	10.16	10.16
Frequently	50	13.02	23.18
Less frequently	110	28.65	51.83
Not at all	185	48.17	100
Total	384	100.0	

According to table 4.4, when questioned about training programs for using fire safety equipment in the institution, 10.16% (n=39) of the overall population said that schools hold training sessions the most frequently. Thirteen point zero two percent (n=50) of the entire population indicated that training sessions are conducted on a regular basis. Out of a sample size of 110 students, 28.65% reported that trainings on fire safety facilities are conducted less frequently. The data indicates that the majority of trainings (48.17%) are not conducted. The researcher made an observation indicating that a limited number of schools have fire extinguishers capable of combating minor flames prior to their escalation. According to Kukali (2013), educational institutions lacked comprehensive protocols for managing emergencies, including predetermined evacuation routes, unambiguous delineations of evacuation zones, and designated gathering locations situated beyond the confines of the school premises. The data collected through observations and interviews indicated that a majority of the respondents possessed limited understanding regarding the utilization of safety equipment. As exemplified by a statement made by a fire department official, it has been observed that several educational

institutions possess fire safety equipment, such as fire extinguishers, however a limited number of individuals within the school community possess the requisite knowledge and skills to effectively operate them.

4.3.6 Students attended training on disaster safety

Table 4.5 shows the disaster safety training attendance by respondents. It was aimed to establish if the student had attended any training on disaster safety.

Table 4.5: Students attended training on disaster safety

	Frequency	Percent	Cumulative Percent
Yes	55	14.32	14.32
No	329	85.68	100
Total	384	100.0	

(Filled Data,2023)

According to the data shown in Table 4.5, it can be observed that a mere 14.32% (n=55) of the overall population have participated in disaster safety training. A total of 329 participants, including 85.68% of the sample, reported that they had never received any form of instruction on disaster safety. This demographic constituted the bulk of the populace. The researcher noted that the participants had a deficiency in their understanding

of disaster preparedness and adherence to safety protocols inside educational institutions. This aligns with the findings of Gatua (2015), which revealed that a majority of the research participants exhibited insufficient understanding regarding safety standard manuals for schools and had not yet received sufficient training on disaster preparedness and safety.

In his study titled "An Investigation of Fire Emergency Preparedness in Kenyan Schools: A Case Study of Public Secondary Schools in Nairobi," Ayonga (2016) suggested that it is imperative to provide training in Fire Emergency response to teaching staff, workers, and students. This observation follows the discovery that while the majority of schools possess Fire Fighting Equipment, they are insufficiently equipped to handle Fire Emergencies due to inadequate training of teachers, staff, and students, as well as limited accessibility to these resources. The official who was interviewed from the department of disaster management proposed a similar recommendation, namely, the implementation of training programs for both staff and students in order to enhance their readiness and reaction capabilities in the face of disasters.

4.3.7: Community awareness sessions on disaster safety

The study sought to determine if the schools had community awareness sessions on disaster safety. Table 4.6 has the students' responses on community awareness sessions on disaster safety.

Table 4.6 Community awareness sessions on disaster safety

	Frequency	Percent	Cumulative Percent
Yes	97	25.26	25.26
No	287	74.74	100
Total	384	100.0	

(Filled Data,2023)

According to the data presented in Table 4.6, a total of 97 participants, accounting for 25.26% of the sample, reported having attended community awareness sessions focused on disaster safety. A total of 287 participants, accounting for 74.74% of the sample, reported a lack of community awareness workshops pertaining to disaster safety.

The authors of the study conducted by Omari et al. (2021) acknowledged the importance of staff awareness regarding safety. Their research revealed a noteworthy correlation between principals' staff awareness and their ability to effectively manage crisis situations. The study subsequently proposed the need for ongoing and regular awareness campaigns on disaster management to enhance teachers' understanding of its significance in mitigating disasters, hence fostering educational progress and minimizing casualties. One recommendation put up by an Officer Commanding Station is to promote and routinely conduct community awareness seminars, as the community plays a crucial role as initial responders in emergency situations.

4.3.8: Rate of preparedness of schools in response to disasters

To establish how prepared public secondary schools in Nairobi county are to respond to disasters, the respondents gave their rating on their schools' preparedness in response to disasters. The findings are as shown in table 4.7.

Table 4.7: Rate of preparedness of schools in response to disasters

	Frequency	Percent	Cumulative Percent
Highly	13	3.39	3.39
Moderately	62	16.15	19.54
Low	208	54.16	73.70

I don't know	101	26.30	100
Total	384	100.0	

(Field Data,2023)

The objective of this inquiry was to assess the degree of readiness exhibited by the schools under examination, as perceived and expressed by the pupils. According to the findings presented in Table 4.7, a significant proportion of participants, specifically 26.3% (n=101), reported a lack of knowledge regarding the level of preparation of their respective schools in responding to catastrophes. Out of the total sample size of 208 respondents, 54.16% indicated a low rating, 16.15% expressed a moderate rating, and a mere 3.39% believed the rating to be high. This finding aligns with the researcher's observation, which revealed that numerous educational institutions lacked well-defined communication tactics to employ in emergency situations. This lack of precise plans delineating their primary duties and responsibilities during an emergency was the reason for this outcome. Additionally, it was observed that several educational institutions lacked first aid kits altogether, whereas others possessed a limited number of rudimentary kits that were inadequately supplied with vital medications, with the added concern that certain medications had reached their expiration dates. Consequently, their use in assisting pupils with minor injuries was found to be limited (Nyakundi, 2012).

4.3.9: Availability of plans for disaster emergency response

To determine the schools plans for disaster emergency response, the researcher asked the respondents if the plans were available. Table 4.8 shows the findings.

Table 4.8: Availability of plans for disaster emergency response

	Frequency	Percent	Cumulative Percent
Yes	77	20.05	20.05
No	307	79.95	100.0
Total	384	100.0	

(Field Data, 2023)

The objective of the study was to examine if the schools included in the study have established protocols for catastrophe emergency preparedness. The findings suggest that a significant majority of pupils, specifically 79.95% (n=307), reported a lack of disaster emergency response strategies in schools. A total of 77 respondents, including 20.2% of the sample, expressed the viewpoint that there existed established protocols for catastrophe emergency response. Educational institutions exhibited limited implementation of control measures to address potential disasters, including the establishment of predetermined evacuation routes, explicit demarcation of evacuation regions, and designated assembly sites situated beyond the confines of the school premises. According to Kukali (2013), it was observed that there was a lack of clearly defined duties among instructors, pupils, and support staff in schools during emergency situations. The researcher observed that a majority of the head teachers, teachers, board of management members, and parent's association representatives who were interviewed lacked access to contact information for emergency responders.

4.3.10: Importance of disaster planning for safety in schools

The study sought to determine the students' perception on the importance of disaster planning for safety in schools. The respondents were asked about the importance of disaster planning for safety in schools. Findings are as shown in table 4.9.

Table 4.9: Importance of disaster planning for safety in schools

	Frequency	Percent	Cumulative Percent
Very important	204	53.13	53.13
Important	103	26.82	79.95
Not important	22	5.73	85.68
I don't Know	55	14.32	100.0
Total	384	100.0	

(Field Data,2023)

The objective of the research was to ascertain the perceptions of students regarding disaster planning in relation to their preparedness for potential disasters. The findings of the study reveal that a significant proportion of participants, specifically 53.13% (n=204), expressed a strong belief in the high importance of the subject matter. A total of 103 participants, constituting 26.82% of the sample, expressed agreement with the significance of disaster planning. Conversely, a minority of respondents, specifically 5.73%, held the view that disaster planning is not necessary. A total of 14.32% of respondents expressed uncertainty on the significance of implementing disaster planning measures for ensuring safety within educational institutions. Educational institutions exhibited limited implementation of control mechanisms to address potential disasters, including but not limited to predetermined evacuation routes, unambiguous delineation of evacuation areas, and designated assembly sites situated beyond the confines of the school premises. The study revealed that a majority of students hold the perception that disaster planning plays a crucial role in both catastrophe preparedness and the maintenance of safety standards.

Likewise, the emotions expressed by parents' associations, boards of management, head teachers, and instructors were found to be consistent during the interviews. Wanjala and Onyango (2018) assert that educational planning plays a crucial role in establishing the

foundation for catastrophe awareness. The process commences with a visionary perspective aimed at instigating transformative outcomes. The identification of activities within the realm of disaster risk management is crucial for schools to have a comprehensive understanding of disasters and effectively mitigate associated risks. This proactive approach enables schools to enhance their disaster preparedness and response capabilities.

4.4 Chapter Summary

The objective of the study was to determine the extent of disaster preparedness in public secondary schools located in Nairobi County. The primary findings of the study revealed that educational institutions have a significantly higher susceptibility to fire-related incidents when compared to other types of disasters. The participants acknowledged that their respective educational institutions had encountered a catastrophic event. The research revealed that a majority of the schools included in the study have implemented evacuation protocols as part of their emergency preparedness measures. Emergency drills are not regularly conducted, and students have not received instruction on the proper use of fire safety facilities. Additionally, community awareness workshops are not held. Although the majority of participants acknowledged the absence of catastrophe emergency response plans in schools, they acknowledged the significance of implementing such plans to ensure safety within educational institutions.

CHAPTER FIVE

CAUSES OF VULNERABILITY TO DISASTERS IN PUBLIC SECONDARY SCHOOLS IN NAIROBI COUNTY.

5.1 Introduction

This chapter addresses objective two and it present different causes of vulnerability to disasters in public school in Nairobi County. This chapter covers the following; population density, allocation of resources, the organisational structure, management rigidity and lack of training, availability of school dispensary, emergency exit or escape route in school buildings and presence of assembly point in case of a disaster.

5.2 Population density of public secondary schools in Nairobi County

The study sought to establish the population density of secondary schools in Nairobi County. The respondents were asked about the schools' population. The results are shown in table 5.1

Table 5.1: Population density of public secondary schools in Nairobi County

	Frequenc y	Percent	Cumulative percent
High population	274	71.35	71.35
Low population	73	19.01	90.36
I don't know	37	9.64	100.00
Total	384	100	

According to the data presented in Table 5.1, a significant proportion of the participants expressed the perception that the schools under consideration were characterized by a high population density. A total of 19.01% of the student participants said that the schools under consideration exhibited a low student population. The findings are consistent with the observations made by the researcher. The researcher made an observation that the classrooms and dorms were predominantly characterized by a high degree of overcrowding. Certain schools reached their maximum capacity, leading to a demand for increased capacity in educational institutions. The results presented in this study align with the findings of Gatua (2015), who conducted a study on the evaluation of safety conditions in physical infrastructure, including classrooms, dormitories, sanitation facilities, laboratories, and kitchens, within public secondary schools located in the Nairobi West Region of Kenya. Gatua's research uncovered that certain dormitories in these schools exhibited insufficient or absent safety provisions. Moreover, the fire extinguishers that were accessible were not strategically positioned and were found to be inoperable. Students who expressed concerns about the safety of their dormitories identified several factors, including insufficient facilities, overcrowding, limited access to water, and unsanitary bathroom and toilet conditions.

5.3 Allocation of resources

The objective of this study was to assess the influence of resource allocation on disaster preparedness and safety standards in public secondary schools within Nairobi County. The majority of head teachers expressed their concerns regarding insufficient resources in their endeavors to promote catastrophe preparedness and response. The assertions made by the individuals aligned with the declarations put forth by the authorities that addressed the

calamities occurring within these educational institutions. One example is when a Kenya Red Cross official made a statement indicating that many schools, particularly low-level public secondary schools, lack sufficient resources and struggle to procure essential supplies needed for emergency response. According to Kimathi (2015), a significant factor contributing to the vulnerability of secondary school buildings is the insufficiency of financial resources. The institution's potential to completely develop its facilities is constrained by a shortage of people and insufficient funding. There is a lack of qualified professionals equipped to effectively manage and respond to disasters.

In a similar vein, Kukali (2013) identified other factors contributing to vulnerability, such as insufficient financial resources, limited levels of engagement, ineffective governance, and inadequate infrastructure. The results of the study indicate that the presence of insufficient financial resources, ineffective managerial practices, and inadequate infrastructure are significant factors that contribute to vulnerabilities. The majority of these institutions depend on external sources of finance, resulting in delays in the execution of development programs.

As per the findings of FEMA (2009), in order to mitigate the occurrence of a disaster, it is crucial to prioritize the accessibility of financial resources, provide comprehensive training to personnel regarding disaster preparedness and evacuation protocols, and acknowledge the various elements that contribute to vulnerability, particularly in relation to educational institutions.

5.4 Organization structure

During the investigation into the potential influence of the school's organizational structure on disaster preparedness and safety standards, it was noticed that a significant number of

schools lacked designated employees responsible for emergency management. Furthermore, a significant number of schools exhibited a lack of designated teachers responsible for overseeing quality assurance. Moreover, the few teachers who did hold such positions were found to be inadequately qualified in this particular domain. This has the potential to impede the effective execution of policies and the attainment of safety benchmarks. In a study conducted by Nyakundi (2012), similar findings were seen, leading to the argument that schools' lack of explicit standards about the necessary level of security for permitted access, as well as the delineation of roles and responsibilities among instructors, students, and support personnel during emergency situations, contributed to this outcome.

According to the study conducted by Gichuru (2013), a significant number of school stakeholders were found to be deficient in fire safety training. This deficiency can be attributed to the absence of a perceived necessity for such training, as well as the lack of available instructional resources. The researcher proceeded to propose that school administrators should contemplate augmenting the firefighting apparatus to achieve sufficiency and ensure regular inspections.

5.5 Lack of training on disaster preparedness and safety standards

To establish if the respondents were equipped with knowledge on disaster preparedness and safety standards, they were asked if they had training on the same. Table 5.2 shows the results.

Table 5.2. Training on disaster preparedness and safety standards

	Frequenc y	Percen t	Cumulative percent
Yes	93	24.22	25.22

No	291	75.78	100
Total	384	100	

When queried about their familiarity with disaster preparedness and adherence to safety standards, a significant majority of the participants (75.78%) reported a lack of training in this area. A mere 24.22% of the student population acknowledged receiving instruction on catastrophe planning and safety protocols.

This aligns with the findings of Gatua (2015), which revealed that a majority of the participants in the research exhibited insufficient understanding regarding safety standard manuals for schools and had not yet received proper training in disaster preparedness and safety. Ng'ang'a (2013) posited that insufficiency in the instruction of children regarding safety had a negative correlation with schools' adherence to the safety standards manual. It is suggested that teachers undergo training in safety protocols in order to enhance their ability to educate students in this regard.

In his research on "An Investigation of Fire Emergency Preparedness in Kenyan Schools: A Case Study of Public Secondary Schools in Nairobi," Ayonga (2016) suggested that it is imperative to provide training in Fire Emergency response for teaching staff, workers, and students. This observation follows the discovery that despite the presence of Fire Fighting Equipment in the majority of schools, their level of preparedness for Fire Emergencies remains insufficient due to inadequate training of teachers, staff, and pupils, as well as limited accessibility to these equipment.

5.6 Availability of school dispensary

The respondents were asked if their schools had a school dispensary. This was to establish the availability of school dispensary to offer emergency medical services in case of a disaster. The findings are as shown in Figure 5.1.

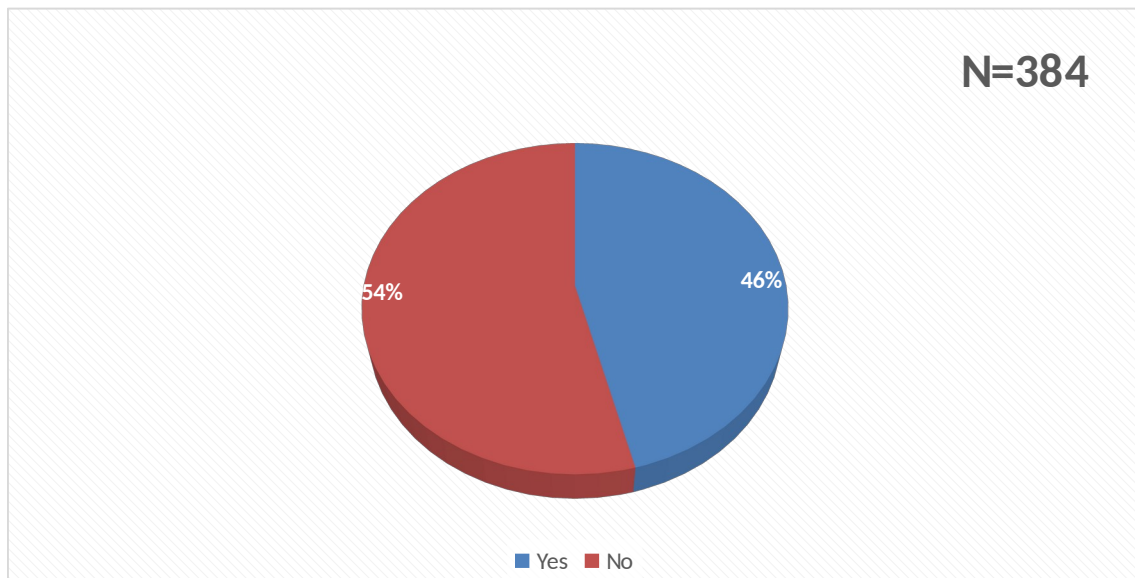


Figure 5.1 Availability of school dispensary

The results indicate that a mere 46.02% of the educational institutions has a designated facility for dispensing medication on their premises. The majority of the participants' educational institutions lacked on-site medical facilities. The researcher noted that individuals who possessed a dispensary were found to employ only a single medical professional. This indicates that a significant proportion of educational institutions were deficient in having staff members who possessed the necessary training to effectively manage medical crises. Furthermore, a subset of individuals lacked the requisite resources to effectively manage unforeseen circumstances. One educator proposed that the educational institution should get suitable medical apparatus in order to provide essential medical interventions and care.

5.7 Emergency exit routes in school buildings

The study sought to establish if the school building had emergency exit routes. The respondents were asked if buildings in their schools had exits built for emergencies. The results are in table 5.3.

Table 5.3 Presence of emergency exit routes in school buildings

	Frequency	Percent	Cumulative percent
Yes	191	49.74	49.74
No	193	50.26	100
Total	384	100	

According to the data presented in Table 5.3, it can be observed that a significant proportion, specifically 50.26%, of the school buildings surveyed do not possess emergency evacuation routes. A mere 49.74% of the surveyed buildings were found to possess emergency evacuation pathways. When examining the presence of emergency exit pathways, the researcher took into account the evacuation of individuals from a structure during an emergency situation. The procedure involved assessing the existence of an exit door/corridor, an emergency escape route, and a well marked exit. The absence of adequate emergency exit pathways in the majority of school buildings poses a significant obstacle to effective evacuation and response during times of disaster.

5.8 Presence of assembly points

In an aim to establish the existence of emergency assembly points in schools, the students were asked whether assembly points were present in their schools. Table 5.5 shows the findings.

Table 5.4 Presence of assembly points

	Frequenc y	Percent	Cumulative percent
Yes	183	47.66	47.66
No	201	52.34	100
Total	384	100	

(Field data, 2023)

When asked about the presence of assembly sites in the event of an emergency, 47.66% of the student participants provided an affirmative response, while 52.34% replied negatively. The aforementioned findings can be observed in Table 6.4. This finding aligned with the researcher's observation, indicating a prevalent absence of clearly designated assembly sites in the majority of schools. This suggests that the students lack knowledge regarding the appropriate course of action to take in the event of an emergency.

In a study conducted by Kihila (2017), it was observed that a significant number of learning institutions lacked clearly designated fire assembly points. Additionally, the findings revealed that a majority of the respondents lacked the necessary skills to operate the firefighting facilities that were installed on the premises. Furthermore, a considerable proportion of the participants reported never having received any training on firefighting and prevention measures. Based on the findings, it can be inferred that higher education institutions are inadequately equipped to effectively handle fire emergencies, thereby necessitating the implementation of strategies to address this issue.

5.9. Water and electrical facilities

Water and electricity was available in all the schools. However, the study sought to find out the reliability of water supply in the school and also if electrical appliances and installation

can be the leading cause of fire in schools. For water, the respondents' if the water supply was reliable. The findings were as shown in Table 5.5.

Table 5.5: Responses on the reliability of water in schools

	Frequency	Valid Percent	Cumulative Percent
Strongly agree	14	3.6	3.6
Agree	24	6.3	9.9
Undecided	49	12.8	22.7
Disagree	132	34.4	57.0
Strongly disagree	165	43.0	100.0
Total	384	100.0	

The data presented in Table 5.5 indicates that a significant proportion of the schools surveyed did not encounter water-related issues, as evidenced by the fact that 165 respondents (43.0%) strongly disagreed, 132 (34.4%) disagreed, 49 (12.8%) were indecisive, 24 (6.3%) agreed, and 14 (3.4%) highly agreed with the statement that water was reliable. During the interview, the principals provided information regarding the research, stating that the school depends on Nairobi County water for its supply. Additionally, they mentioned that the school occasionally experiences water rationing. There was consensus among certain individuals that, under certain circumstances, they are compelled to purchase water from water vendors in order to address the shortage. The consensus among the focus group discussions (FGDs) participants was that certain schools have resorted to excavating boreholes in order to secure a reliable water supply, as revealed during the course of the study. When queried about water treatment, the majority of principals exhibited skepticism and were unable to provide a definitive indication of the frequency at which water treatment occurs.

The replies about the potential role of electrical facilities in causing fires in schools are depicted in Figure 5.2.

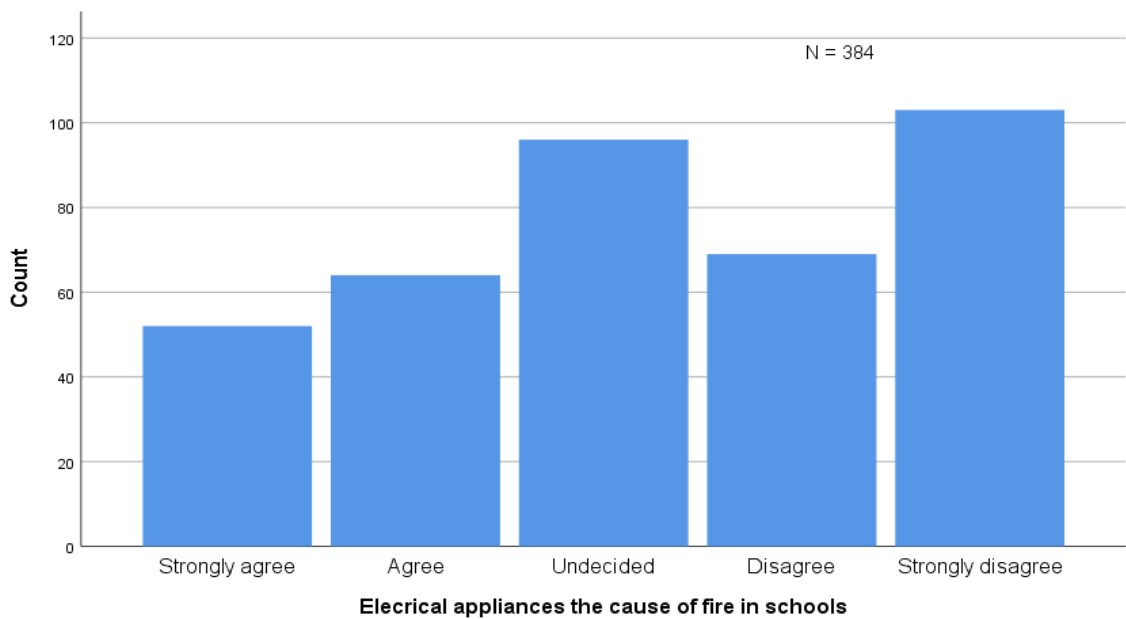


Figure 5.2: Electrical appliances and installations are the causes of fires in schools

The data presented in Figure 5.2 indicates that a significant proportion of the participants, specifically 103 individuals (26.8%), expressed disagreement with the notion that electrical appliances and installations are responsible for fires in schools. Additionally, 69 participants (18.0%) also disagreed, while 96 participants (25.0%) remained undecided. On the other hand, 64 participants (16.7%) agreed with this statement, and 52 participants (13.5%) strongly agreed. This finding aligns with the predetermined interview times. Based on the information gathered from the interviews, the study revealed that the majority of school fires were not attributed to electrical installations and appliances. During the course of the examination, it was observed that several classrooms were equipped with electrical switches that posed a potential hazard to pupils due to inadequate installation. Please refer

to Figures 5.1 and 5.2, which depict the presence of electrical switches located at the entrance of the classrooms.



Plates 5.1: Electrical switch in a class



Plate 5.2: Electrical switch in a class

5.10. Emergency facilities in the dormitories and classes

The main areas where students spend the majority of their school time are in their classes and dorms. Hence, the present study aimed to ascertain the presence of emergency amenities in courses and dorms to cater to students during times of calamity. Upon observation, the study observed that both dormitories and classrooms were equipped with outward-opening doors. The survey observed that the dormitories were equipped with additional doors on emergency exits, albeit these doors remain in a constantly closed state. The objective of the study was to determine whether the participants had utilized the additional entrances in their dormitories. The collected data regarding this inquiry is presented in Figure 5.3.

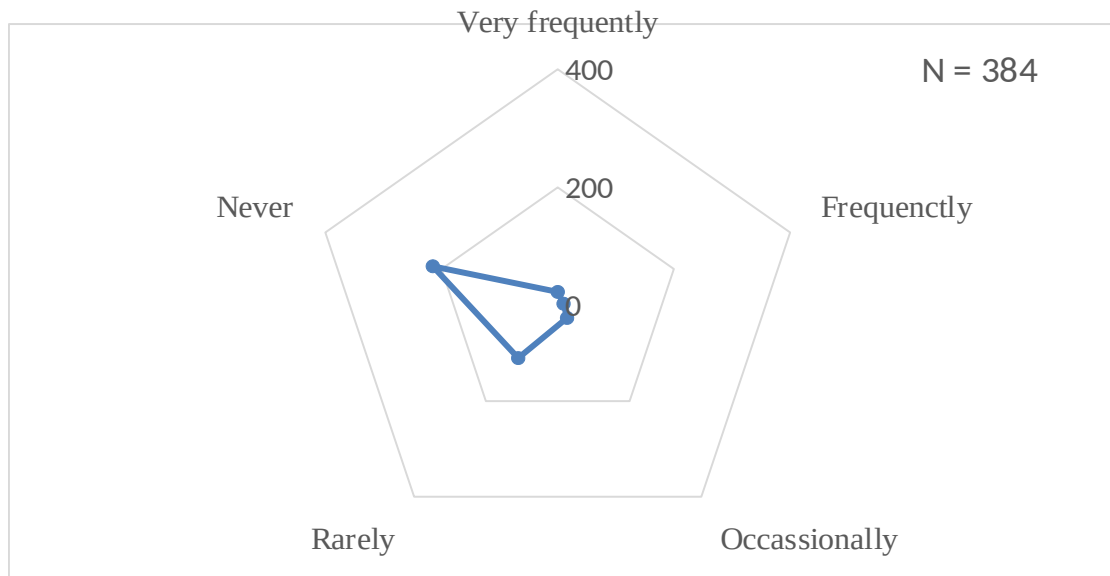


Figure 5.3: The usage of emergency doors in the dormitories by students

Figure 5.2 reveals that the majority of students, 215 (56.0%), have never used the emergency door, while 110 (28.6%), 26 (6.8%), 23 (6.0%), and 10 (6.0%) have done so frequently, very frequently, or sporadically, respectively. Participants who responded that they had never witnessed the opening of the doors. When queried about the reasons for the infrequent use of emergency doors, several faculty members involved in student supervision indicated to the researchers that this practice serves as a measure to mitigate instances of theft within the residential quarters. Conversely, other respondents expressed a lack of knowledge regarding this matter.

The report additionally noted that certain classrooms were found to have window grills, which contravenes the established safety regulations at educational institutions. Plate 5.2 depicts a window including a fractured glass pane and a protective grill, which potentially exposes kids to increased vulnerability during emergency situations.



Plate 5.3: Showing a window with a grill and a broken glass in one of the schools

5.11. Security personnel in the school

The study determined that each of the institutions surveyed had security professionals, with some schools having contracted security services from external companies, while others employed security employees directly. The objective of the study was to assess the proficiency of security employees in the field of emergency management, specifically focusing on their completion of training courses related to disaster response and management. The survey determined that there was a lack of professional security personnel in all of the institutions when it came to managing emergency situations. During a survey conducted in the schools of Nairobi county, an investigation was carried out to assess the availability of emergency response facilities. As a result, the study identified the establishment of an emergency control center, which provided contact information for fire brigades and ambulance services. The security officers did not possess the necessary contact information for fire brigades or medical services. One of the security personnel said:

Namba za wazima moto na watu wa ambulansi sisi hatawahi pewa. Hiyo ni kazi ya boarding teacher ama principal. Kazi yetu ni kulinda shule pekee. Kama kuma kitu sisi hupikia tuu mwalimu wa boarding simu ama deputi ama headmaster. (Interview schedule, 2023)

5.15. Chapter summary

The second objective of the study was to establish the factors contributing to the susceptibility of public secondary schools in Nairobi County to disasters. A significant number of students expressed concerns with the high population density at their respective institutions, which therefore led to safety issues in the dormitories. These concerns were primarily attributed to insufficient facilities, overcrowding, limited access to water, and unsanitary conditions in the bathrooms and toilets. The institution's potential to fully develop its facilities is constrained by a shortage of people and inadequate funding. There is a lack of individuals who possess the necessary training to effectively manage and respond to disasters. A significant proportion of educational institutions are insufficiently equipped to handle emergency situations, primarily due to inadequate training of teachers, staff, and students, as well as limited accessibility to necessary equipment. The absence of adequate emergency exit routes in the majority of schools poses a significant obstacle to effective evacuation and response during times of disaster. The results indicated that a significant proportion of the surveyed schools experienced issues with their water supply, as 165 respondents (43.0%) strongly agreed that the water was not dependable. The establishment of water treatment protocols, particularly for borehole water, was a significant challenge due to the lack of documented records inside the institution. The results indicate that a significant proportion of the participants, specifically 103 individuals (26.8%), expressed disagreement with the notion that electrical equipment and installations are responsible for fires occurring in educational institutions. Nevertheless, there were certain educational institutions in which the electrical switches were inadequately secured, hence providing potential hazards to students. A significant proportion of the student participants, specifically 215 individuals (56.0%), said that they had not utilized the emergency door and

saw that those doors remained in a permanently closed state. Furthermore, a significant observation is that a majority of the educational institutions exhibited a deficiency in clearly designated assembly areas, thus indicating a lack of knowledge among students regarding appropriate emergency response locations. The study additionally determined that educational institutions lack adequately trained security personnel.

CHAPTER SIX

SAFETY ASSESMENT OF PHYSICAL INFRASTRUCTURE IN PUBLIC SECONDARY SCHOOLS IN NAIROBI COUNTY

6.1 Introduction

This chapter provides study results and a discussion on safety assessment of physical infrastructure in public secondary schools in Nairobi county. The facilities assessed include the availability and efficiency of the school dispensary, availability of functional fire detectors and alarms systems, availability and condition of school van, availability of assembly point, existence and condition of emergency exit routes in school buildings, Safety of playing fields, Safety of toilets and latrines, availability of hand washing points, condition of classrooms, condition of dormitories, the condition of the kitchen and dining hall and the condition of the toilets and latrines. The study also sought to establish the source and the safety of water used in schools in Nairobi county.

6.2 Availability and efficiency of school dispensary

The respondents were asked if their schools had a school dispensary. This was to establish the availability and efficiency of school dispensary to offer emergency medical services in case of a disaster. The findings were as indicated in Figure 6.1 and Table 6.1.

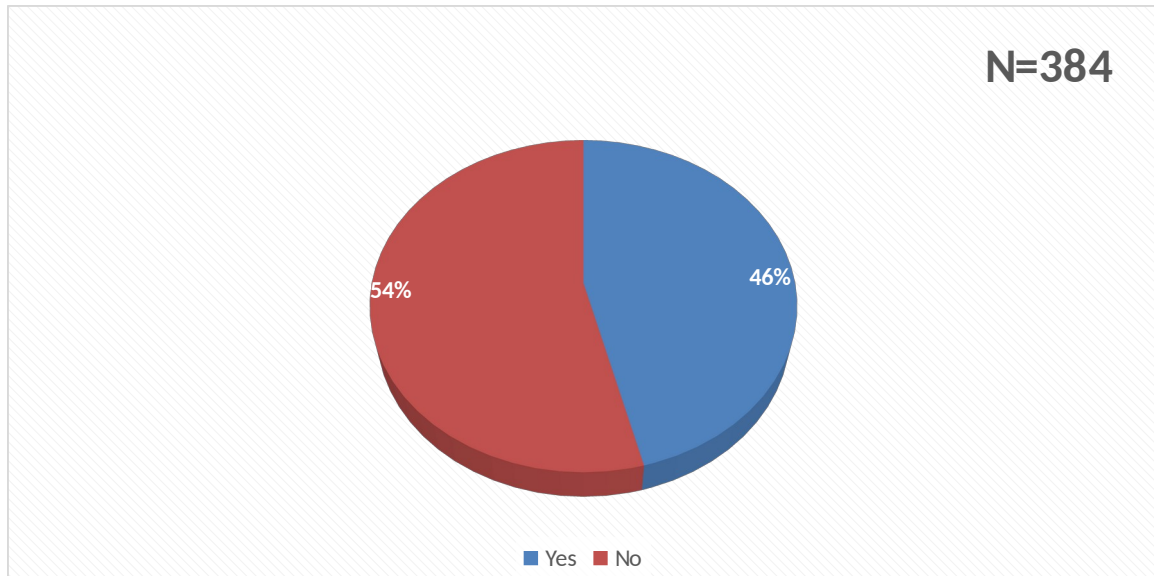


Figure 6.1. Availability of school dispensary

The findings show that only 46.0% of the schools had a school dispensary while 54.0% did not have a dispensary. Majority of the respondents' schools did not have school dispensaries. The study also sought to establish the condition of the dispensaries and the finding as shown in Table 6.1.

Table 6.1: The Condition of the school dispensaries

	Frequency	Valid Percent	Cumulative Percent
Very good	20	11.3	11.3
Good	25	14.1	25.4
Acceptable	66	37.3	62.7
Poor	54	30.5	93.2
Very poor	12	6.8	100.0
Total	177	100.0	

(Source, Field data, 2023)

The results indicate that among the schools with dispensaries, 66 (37.3%) were deemed to be in an acceptable state, 54 (30.5%) were classified as being in poor condition, 20 (14.1%) were rated as good, 20 (11.3%) were considered to be in very good condition, and 12 (6.8%) were assessed as being in very poor condition. The researcher noted that individuals who own a dispensary exhibited a singular medical professional and a lack of adequate

resources. This indicates that a significant proportion of educational institutions were deficient in staff members who have the necessary training to effectively manage medical crises. Furthermore, a subset of individuals lacked the requisite resources to effectively manage unforeseen situations. One educator proposed the acquisition of suitable medical equipment by the educational institution in order to facilitate the provision of essential medical emergency response and treatment. In order for a dispensary to be deemed safe, it is imperative that it possesses adequate emergency equipment and employs employees who are proficient in handling and responding to situations. These assertions were reiterated by other members of the parents' association.

6.3 Availability of functional fire detectors and alarms systems

In a bid to assess the availability and functionality of fire detectors and alarms systems in schools in Nairobi County, Kenya. The study first sought to establish the availability of fire detectors and alarms systems, Table 6.2 has the findings.

Table 6.2 Availability of functional fire detectors and alarms systems

	Frequenc y	Percen t	Cumulative percent
Yes	107	28.08	28.08
No	277	71.92	100
Total	384	100	

As shown in Table 6.2, findings show that 277 (71.92%) of the respondents indicated that schools do not have fire detectors and alarms systems, while 107 (28.08%) noted that they had.

The fire detectors and alarm systems need not only to be there but also be functional. Therefore, the sought also sought the functionality of the alarm systems and fire detectors and the findings are a shown in the Figure 6.2.

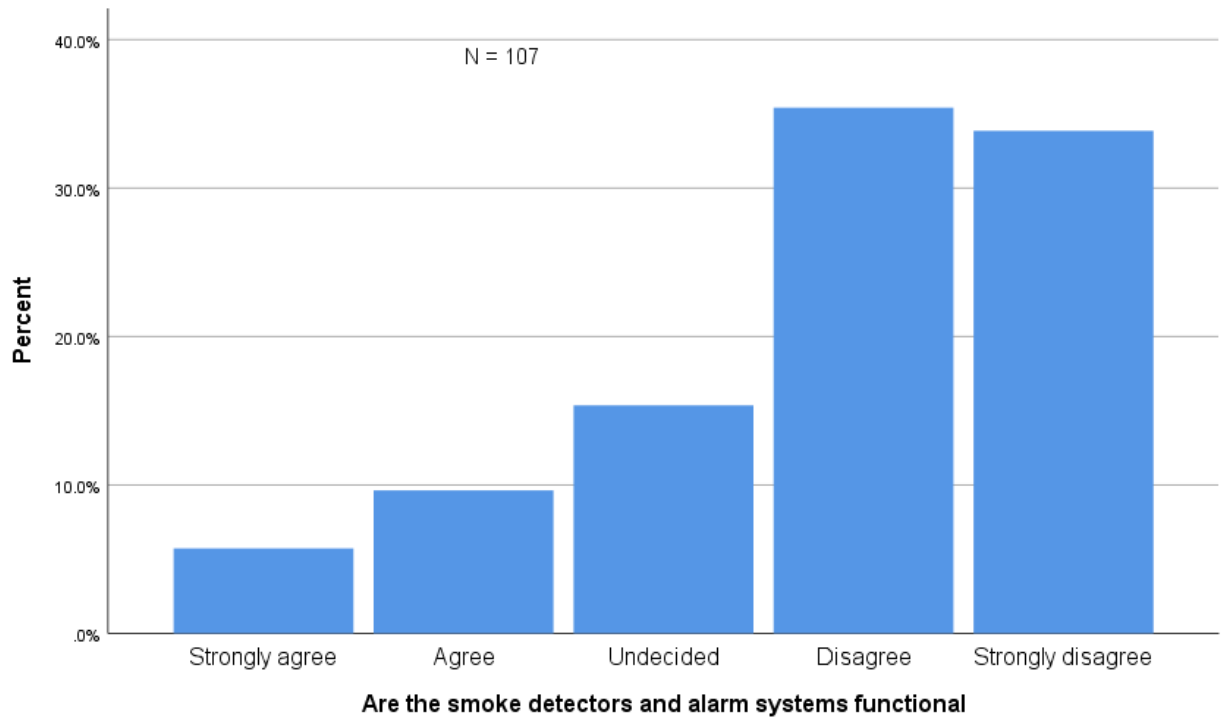


Figure 6.2: The functionality of the smoke detectors and alarm systems in schools

According to the data presented in Figure 6.2, a significant proportion of the participants expressed disagreement on the functionality of smoke detectors and alarm systems. Conversely, less than 10% of the respondents firmly agreed that these systems were indeed functional. The researcher observed that certain educational institutions possessed such facilities, albeit in a state of disrepair and with limited operational capacity. In a study conducted by Muthwii et al. (2015), an examination of disaster preparedness and safety standards in secondary schools in Kenya revealed that the education minister issued a directive mandating the allocation of funding to provincial secondary boarding schools for the procurement and installation of fire-fighting equipment. This would facilitate their

preparedness for fire-related disasters. In order to evaluate the safety of physical infrastructure within educational institutions, it is imperative that the fire safety facilities are appropriately constructed and that students receive comprehensive training on their proper utilization. Moreover, the fire extinguishers that were provided were not strategically positioned in easily reachable locations and were found to be non-operational.

6.4 Availability and condition of school van

The respondents were asked if their school had a school van. This was to establish the availability of a school van in response to emergencies. The results are in Table 6.3.

Table 6.3 Availability of school van

	Frequenc y	Percen t	Cumulative percent
Yes	157	40.89	40.89
No	227	59.11	100
Total	384	100	

When asked if a school van was available in their schools, 227 (59.11%) responded with a no while 157 (40.89%) had school vans. The study further sought to establish the condition of the school van in terms usage in emergency response. The findings are as shown in Figure 6.3.

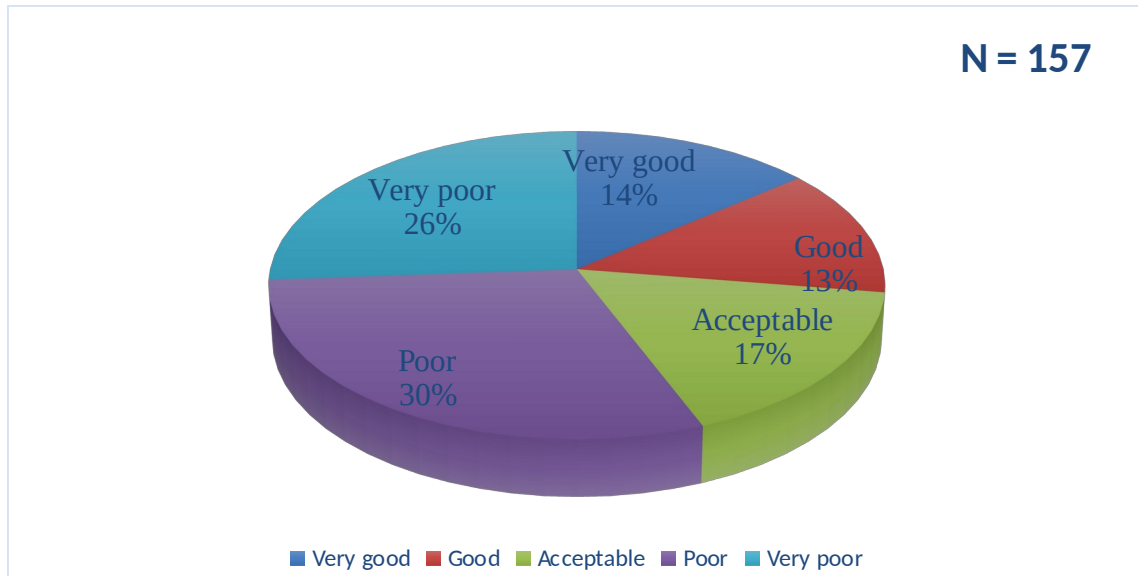


Figure 6.3: The condition of the school van in terms of usage for emergency response

The data presented in Figure 6.3 indicates that a significant proportion of the respondents, specifically 30%, reported that the vans were in poor condition. Additionally, 26% of the respondents rated the condition of the vans as very poor. On the other hand, 17% of the respondents found the state of the vans to be acceptable, while 14% considered it to be very excellent. Lastly, 13% of the respondents perceived the vans to be in good condition. In order to ensure the safety of van users, it is imperative that the van is maintained in optimal condition and that the driver possesses the necessary competence. The researcher made an observation indicating that a significant proportion of the school vans that were accessible exhibited substandard maintenance. During the course of discussions, certain students acknowledged noncompliance with prescribed road safety protocols, such as neglecting to utilize safety belts and exceeding passenger capacity, while traveling in school vans or during school-sponsored excursions. This rendered them susceptible to vehicular collisions. The possession of a school van would signify the school's ability to promptly address emergency situations and facilitate its response to such events. The school

administrators also acknowledged a lack of enough financial resources for hiring drivers, resulting in occasional utilization of teachers' vehicles during emergency situations. One of the school head said:

Sisi hatuna pesa ya kuandika driver na kumentain hii van. Tutakuwa tunalipa wafanyikazi au tunanunulia wanafunzi chakula na vitabu? Serikali yetu haitumi pesa za kutosha na zinachelewa, karo hsitoshi na wazazi hawalipi kwa wakati, I tell you it is difficult. (Interview schedule, 2023)

6.3 Availability of assembly point

The study sought to establish the availability of assembly points in their schools. The students were asked if assembly points were present in their schools.

Table 6.4 Availability of assembly point

	Frequenc y	Percen t	Cumulative percent
Yes	183	47.66	47.66
No	201	52.34	100
Total	384	100	

When probed about the presence of assembly sites in the event of an emergency, 47.66% of the student participants responded affirmatively, while 52.34% responded negatively. The aforementioned findings can be observed in Table 6.4. This finding aligned with the researcher's observation, indicating a prevalent absence of clearly designated assembly sites in the majority of schools. This suggests that the students lack knowledge regarding the appropriate course of action to take in the event of an emergency.

In a study conducted by Kihila (2017), it was observed that a significant number of learning institutions lacked clearly designated fire assembly points. Additionally, the findings revealed that a majority of the participants surveyed were unable to effectively utilize the firefighting equipment installed on the premises, and a considerable proportion had never received any training on fire prevention and firefighting techniques. Based on the findings,

it can be inferred that higher education institutions are inadequately equipped to effectively handle fire incidents, thus necessitating the implementation of strategies to address this issue.

6.6 Existence of emergency exit routes in school buildings

In assessing the existence of emergency exit routes, the researcher checked for the presence of means of escape. The respondents were also asked on the existence of emergency exit routes in school buildings. The findings are shown in table 6.5.

Table 6.5 Existence of emergency exit routes in school buildings

	Frequency	Percent	Cumulative percent
Yes	191	49.74	49.74
No	193	50.26	100
Total	384	100	

According to the data presented in Table 6.5, it can be observed that a significant proportion, specifically 50.26%, of the school buildings surveyed do not possess emergency evacuation routes. A mere 49.74% of the buildings possessed emergency evacuation pathways. When examining the presence of emergency exit pathways, the researcher took into account the evacuation of individuals from a structure during an emergency situation. The study aimed to determine the level of satisfaction among respondents on the state of escape routes in classrooms and dorms during emergency situations. The results are depicted in Figure 6.4.

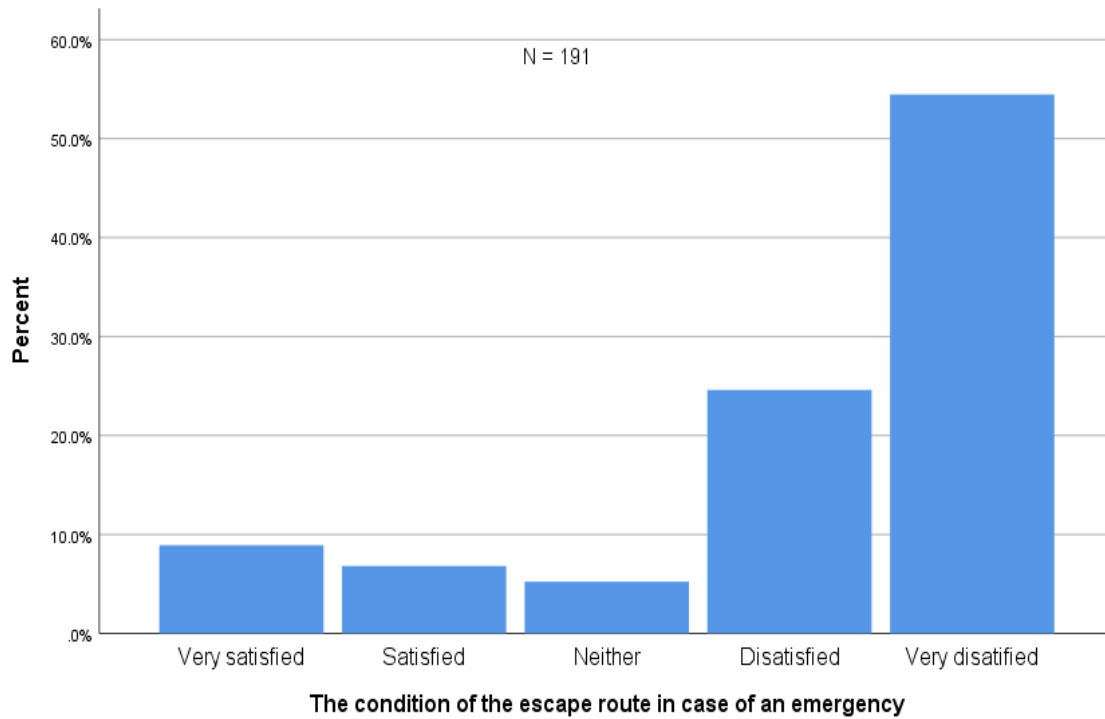


Figure 6.4: The condition of the escape route in case of an emergency in buildings

It included checking for the presence of exit door/ corridor, emergency escape route and labelled exit. With most of the schools lacking emergency exit routes, it hinders meaningful evacuation and response in case of a disaster.

6.7 Safety and condition of playing fields

The researcher aimed to determine if the playing fields of the schools were safe. The students were asked about the safety of playing fields. The findings are shown in table 6.6.

Table 6.6 Safety of playing fields

	Frequency	Percent	Cumulative percent
Yes	185	48.18	48.18
No	199	51.82	100
Total	384	100	

According to the data presented in Table 6.6, a significant proportion (51.82%) of the student population expressed concerns over the safety of their respective school's playing field. A mere 48.18% of respondents said that they perceived the playing fields to be safe. The researcher observed several safety hazards in the surveyed areas, notably the presence of overgrown grass that obscured the fields. There exists a statistically significant correlation between the implementation of safety standards and guidelines for school grounds and the level of student safety. It is imperative for the school administration to prioritize the implementation of thorough inspection and supervision protocols for the school premises, while also assuring strict adherence to the Safety Standards and Guidelines for School Grounds. For example, it is recommended to affix labels on trees indicating their potential toxicity. According to Sigei et al. (2021),

6.8 Safety and condition of school toilets and latrines

The study sought to determine the students' opinion on the toilets and latrines safety.

They were asked about the safety of toilets and latrines. Table 6.7 shows the findings.

Table 6.7 Safety of toilets and latrines

	Frequency	Percent	Cumulative percent
Yes	183	47.66	47.66
No	201	52.34	100
Total	384	100	

The findings reveal that most (52.34) of the students feel that their toilets and latrines are unsafe compared to the 47.66% who agree that they are safe. The study sought to establish the condition of the school toilets and latrines. The respondents were asked if they were satisfied with the condition of their school latrines and toilets. The responses were as shown in Figure 6.5.

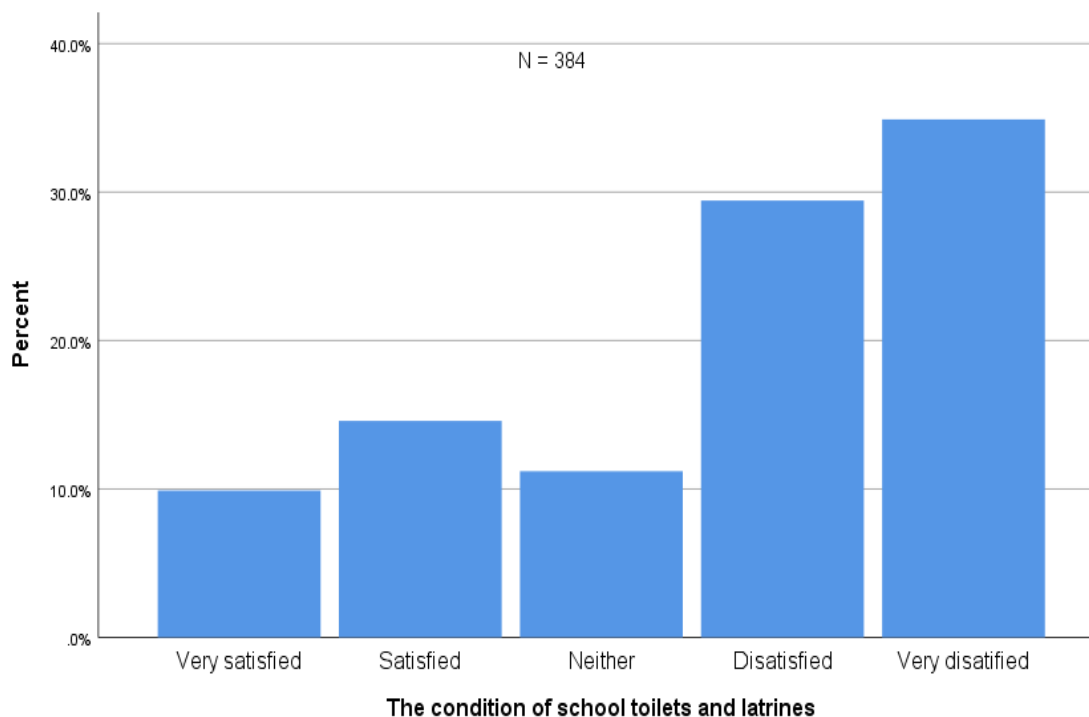


Figure6.5: The condition of the school toilets and latrines

The results of the survey reveal that a significant proportion of the participants, specifically 134 individuals (34.9%), expressed a strong sense of dissatisfaction with the state of the school toilets and latrines. Additionally, 113 respondents (29.4%) reported being unsatisfied, while 56 individuals (14.6%) expressed satisfaction and 38 participants (9.9%) reported being very satisfied. This finding aligns with the results obtained from the student focus group discussions (FGDs), which provided valuable insights for the study. The FGDs revealed that a significant number of school toilets were found to be in poor conditions and posed safety risks, rendering them unsuitable for usage. The present findings align with those of Gatua (2015), whose research focused on evaluating the safety conditions of

physical infrastructure, such as classrooms, dormitories, sanitation facilities, laboratories, and kitchens, in public secondary schools located in the Nairobi West Region of Kenya. Gatua's study revealed that certain dormitories in these schools exhibited deficiencies in terms of safety provisions, either due to inadequate quantities or complete absence of such items. The students who expressed concerns about the safety of their dormitories identified several factors that contributed to this perception. These factors included insufficient facilities, overcrowding, limited access to water, and unsanitary conditions in the bathrooms and toilets.

Certain participants expressed reservations regarding the sufficiency of the toilet facilities and latrines. The researcher observed that there was infrequent inspection of the facilities to ensure compliance with safety regulations. As per the United Nations Development Programme (UNDP) report of 2007, it was suggested that the government should enhance its inspection processes and bolster capacity building efforts in order to enhance the effectiveness of disaster preparedness.

6.9 Availability of hand washing points

The study sought to establish if schools were prepared and preventive measures for water borne diseases. The respondents were asked about hand washing points. Table 6.8 show the findings.

Table 6.8 Availability of hand washing points

	Frequency	Percent	Cumulative percent
Yes	187	48.70	48.70
No	197	51.30	100
Total	384	100	

Table 6.8 shows that 48.7% of the respondents admitted to have hand washing points while 51.3% responded that their schools did not have the washing points. It was noted that most of the hand washing points were established during the covid-19 pandemic. However very few are functional and are still being used regularly by the students. Plate 6.1 shows a hand washing point in one other schools that has no taps, no soap and no water, it not in use now.



Plate 6.1: Showing an abandoned hand washing point in one of the schools in Nairobi County Kenya

Based on empirical research, it has been shown that the act of hand washing, even when using water alone, can effectively mitigate the risk of contracting diarrhoea and hand infections. In addition, it was observed that soap was not consistently accessible for hand washing in all intervention schools during every visit. Consequently, a lack of adherence decreased the probability that all students selected from intervention schools had the chance to wash their hands with soap (Saboori, et al., 2013).

The study aimed to ascertain the level of safety associated with drinking water and assess the satisfaction of the participants on the safety of the water. The findings were as shown in Figure 6.6.

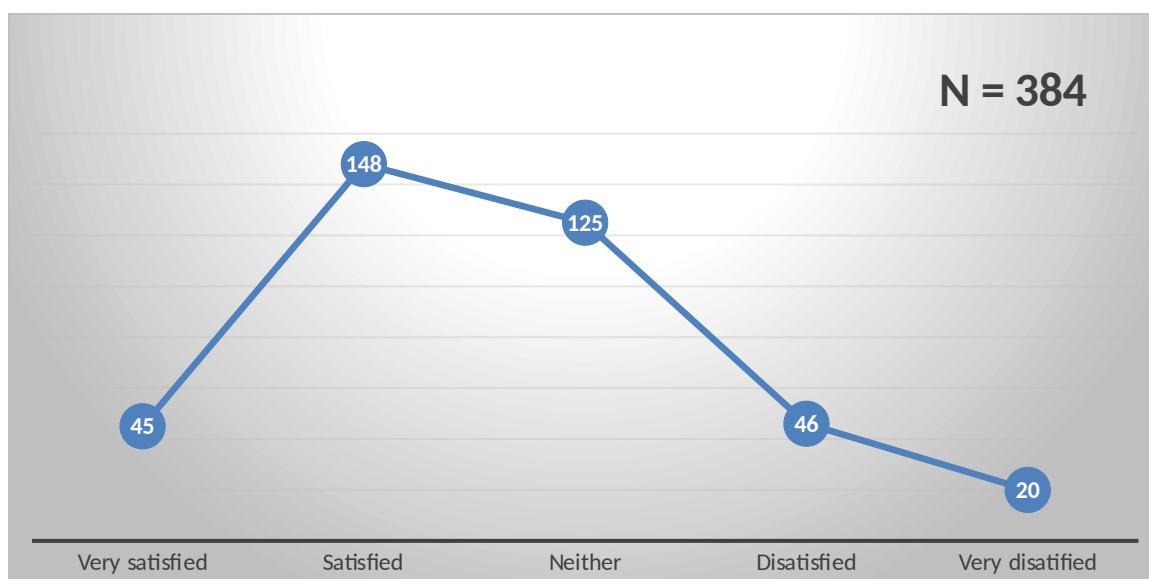


Figure 6.6: Satisfaction of the respondents on the quality of water in schools

The findings in Figure 6.6 shows that 148 (35.8%) of the respondents were satisfied with the quality of water, 125 (32.6%) indicated neither, 46 (12.0%), 45 (11.7%) were very satisfied while 20 (5.2%) were very dissatisfied. This was in agreement with most of the key informants during the interview schedule that water schools use is of good quality and the source is known. All the FGDs were also in agreement that the water used in schools is safe for consumptions.

6.10 Chapter summary

This chapter shows findings on assessment of physical infrastructure in public secondary schools in Nairobi County. Majority of the respondents' schools did not have school dispensaries. For those that had a dispensary, the researcher observed that they had only one medic were not well equipped. Most schools lacked well labeled assembly points implying that the students have no idea on where to go in case of an emergency. With most of the schools lacking emergency exit routes, it hinders meaningful evacuation and

response in case of a disaster. Students who felt their dormitories were not safe cited, inadequate facilities overcrowding, water scarcity, dirty bathrooms and toilets. Some respondents raised concerns on the adequacy of the toilets and the latrines. Very few hand washing points are functional and are still being used regularly by the students. According to studies, even hand washing with only water can protect against diarrhoea and hand infection.

CHAPTER SEVEN

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This chapter has three sections, the first section gives a summary of the study from introduction, methodology to findings and discussion. The second part is the conclusion. It gives the overall conclusion together with a conclusion for each objective. Lastly, the researcher gives their recommendations and suggestions for further studies.

7.2 Summary

The objective of the study was to evaluate the level of disaster preparedness and adherence to safety requirements in public secondary schools located in Nairobi County, Kenya. The survey encompassed a total of 429 participants, consisting of students, instructors, and representatives from various organizations such as the Kenya Red Cross, St. John's Ambulance, the fire department, and the department of disaster management. The researchers collected data from the participants and subsequently conducted an analysis.

With the objective of assessing the extent of disaster preparedness in public secondary schools within Nairobi County. The survey revealed that a majority of educational institutions lacked comprehensive site plans encompassing building layouts and evacuation pathways to be employed in the event of a calamitous incident. The results indicate that a significant number of educational institutions were insufficiently equipped to handle the impact of a natural calamity. Insufficient financial resources and ambiguous school regulations were identified as factors contributing to the poor level of preparedness in educational institutions. In order to ascertain the factors contributing to the susceptibility of

public secondary schools in Nairobi County to catastrophes, the participants also identified insufficient financial resources and personnel as key determinants of vulnerability. The vulnerability of schools to catastrophes can be attributed to various factors, including but not limited to a low level of engagement, ineffective management, and inadequate infrastructure. The dependence on external sources of money led to significant delays in the execution of projects.

The secondary aim of the study was to establish the factors contributing to the susceptibility of public secondary schools in Nairobi County to disasters. A significant number of students expressed concerns about the high population density at their institutions, which led to perceived safety issues in the dormitories. These concerns were primarily attributed to poor facilities, overcrowding, limited access to water, and unsanitary conditions in the bathrooms and toilets. The institution's potential to fully develop its facilities is constrained by a shortage of people and inadequate funding. There is a lack of qualified professionals equipped to effectively manage and respond to disasters. The absence of appropriate training for teachers, staff, and students, as well as limited access to emergency equipment, contributes to the insufficient preparedness of the majority of schools for emergencies. The absence of adequate emergency exit routes at the majority of educational institutions poses a significant obstacle to effective evacuation and response during times of emergency or tragedy. The results indicated that a significant proportion of the surveyed schools experienced issues with their water supply, as 165 respondents (43.0%) strongly agreed that the water was unreliable. The establishment of water treatment protocols, particularly for borehole water, was a significant challenge due to the lack of school records

documenting the water treatment schedule. The results indicate that a significant proportion of the participants, specifically 103 individuals (26.8%), expressed disagreement with the notion that electrical equipment and installations are responsible for fires occurring in educational institutions. Nevertheless, there were instances in certain educational institutions where the electrical switches were inadequately secured, hence posing potential hazards to students. A significant proportion of the student population, specifically 215 individuals (56.0%), said that they had not utilized the emergency door and that those doors remained in a permanently closed state. Furthermore, a significant observation was made regarding the absence of clearly designated assembly points in the majority of schools, hence indicating a lack of knowledge among students regarding appropriate locations to gather during emergency situations. The study additionally determined that educational institutions lack adequately trained security personnel.

The results of the assessment conducted on the safety of physical infrastructure in public secondary schools in Nairobi County indicate that a significant proportion of the examined schools exhibit unsafe conditions. Certain educational institutions were discovered to lack security personnel and possess uncovered roofs. A significant number of switchboards were also found to be defective. The perimeter of the school was enclosed by a boundary wall that had a net.

7.3 Conclusion

In assessing disaster preparedness and safety standards in public secondary schools of Nairobi County, Kenya. The researcher concluded that public schools in Nairobi County

are unprepared for disasters. Also, they had made little to no effort in achieving the safety standards in place. This conclusion was informed by the researcher's analysis of the findings.

1. Establish the level of disaster preparedness in public secondary schools in Nairobi County.

The results indicated that educational institutions at the secondary level within Nairobi County had inadequate levels of preparedness in addressing potential crisis situations. The aforementioned conclusion is derived from the observation that the surveyed schools lacked contingency plans to effectively address potential calamities such as floods, fire outbreaks, terrorist attacks, and strong winds, among other potential hazards. Educational institutions exhibited limited implementation of control mechanisms to address potential disasters, including the establishment of predetermined evacuation routes, unambiguous delineation of evacuation areas, and designated assembly sites situated beyond the confines of the school premises.

A significant number of educational institutions lacked comprehensive protocols to address the issue of unlawful entry by both employees and students in the event of an emergency. The lack of defined standards regarding the necessary level of security for allowed access, as well as the delineation of roles and responsibilities of teachers, pupils, and support staff during emergency situations, contributed to this outcome.

A minority of the surveyed institutions had established contingency plans to address emergency situations, including pandemics or terrorist threats. Additionally, a portion of the schools lacked first aid kits, while those that possessed such kits had limited supplies of essential medications, some of which were deemed unsuitable for use. Additionally, the matter of insufficiently defined communication tactics during emergency situations was

also present. The educational institutions lacked comprehensive strategies delineating essential roles and duties in the event of an emergency response.

2. Determine the causes of vulnerability to disasters in public secondary schools in Nairobi County.

The study conducted to ascertain the causes of vulnerability to disasters in public secondary schools in Nairobi County identified several factors contributing to their vulnerability. These factors encompassed high population density, insufficient resources, organizational structure, inadequate training on disaster preparedness and safety, and a lack of or inadequate facilities required for emergency response. Insufficient financial resources and a dearth of well-defined policies within educational institutions have been identified as contributing factors to the state of unpreparedness. In order to mitigate the potential disaster, it is imperative to prioritize the accessibility of financial resources, provide comprehensive training to personnel about disaster preparedness and evacuation protocols, and acknowledge the various variables that contribute to vulnerability, particularly in relation to school infrastructure. The institution's capacity to completely develop its facilities is constrained by insufficient staffing and funding resources. The majority of these institutions depend on external sources of finance, resulting in delays in the execution of development programs.

In order to mitigate vulnerabilities, it is imperative to implement an allocation of finances towards schools for the purpose of constructing disaster-resistant infrastructure, providing comprehensive training for both school personnel and pupils, and establishing effective governance mechanisms. This approach aims to address the issue of inadequate administration, which is a significant contributing factor to vulnerabilities. The report

continues by recommending that policymakers implement policies aimed at fostering the growth of vulnerable areas, particularly schools, as this would contribute to the overall progress of the communities.

3. Assess safety of physical infrastructure in public secondary schools in Nairobi County.

The results show that most of the assessed schools' physical infrastructure was unsafe, and further interventions are required to assure their safety. The maintenance of various infrastructures such as playing fields, school vans, buildings, toilets, and latrines was found to be inadequate. The dormitories and classrooms experienced a high degree of overcrowding. The outcomes of the study also indicated that certain educational institutions exhibit a high level of maintenance.

The assessment of physical infrastructure encompassed a comprehensive examination of the buildings and surrounding premises of each educational institution. This was followed by direct observation of classroom settings, evaluation of dormitory conditions, assessment of the school van, inspection of hand washing facilities, examination of toilet and latrine conditions, evaluation of playing fields, scrutiny of fire detection and alarm systems, and assessment of the school dispensary. The security assessment encompassed an evaluation of the fencing around the school buildings, both internally and externally, as well as an examination of the gates utilized for accessing the campus and the security measures in place for these gates.

7.4 Recommendations

It is highly desirable for educational institutions to employ competent staff members who are responsible for conducting rigorous standards assessments and ensuring the provision of adequate resources to effectively prepare for potential disasters. Organizations such as scouting and the girl guides association should receive comprehensive training in safety and disaster preparedness, and should be granted regular opportunities to educate fellow students on these matters.

The study further suggested that stakeholders should take into account the schools' capability and resources, as well as their demographics, while developing and executing disaster preparedness programs and safety requirements. The presence of varying capacities and abilities among schools necessitates the recognition that implementing identical programs and standards across all schools would prove unsuccessful in attaining desired objectives.

This study proposes that it is advisable to conduct regular inspections of the physical infrastructures in schools in order to ensure safety and compliance with the requirements handbook. There is a pressing requirement to enhance the inspection procedures and bolster capacity building efforts in order to enhance the efficacy of disaster preparedness.

7.5 Suggestion for further research

This study was particularly based on public secondary schools in Nairobi County. There is need for further studies that would include both public and private schools and all learning institutions.

1. A specific study should be undertaken focusing on those schools that have had major disasters in each County. Such a study would shed light on the specific causes of such disasters and a comparative study on the same would help reveal whether the causes are similar. In addition, the study would help reveal the strategies that are best suited to curb this menace that is killing students
2. There is need for action research especially in rural schools by the key stakeholders in Education, on the topic of vulnerability of Kenyan schools to disaster preparedness, so as to implement some of the recommendations the study generates.
3. There is need for an extensive study to compare disasters preparedness in public and private schools to help understand why there aren't many such cases in private schools.

REFERENCES

- Adams, L. (2009). *Exploring the concept of surge Capacity*. Retrieved April 14, 2011, from DOI: 10.3912/OJIN.Vol14No02PPT03.
- Afedzie R, & McEntire, D.A. (2010). *Rethinking Disasters by Design, Disaster Prevention and Management*, 19 (1): 48-58.
- Akali, N. Khabamba I. & Muyinga, G. (2011). *Fire Sources, Disaster Impacts and Mitigation in Kenyan Secondary Schools*, International Journal of Disaster Management and Risk Reduction, Volume 3. Issue 3
- Allen, K. (2006). *Community-based disaster preparedness and climate adaptation: local capacity-building in the Philippines Disasters*.3. Vol. 30 No. 1, pp. 81-101.
- Aluanga, L. (2008). *What is ailing schools?* Saturday standard 26th June, page 10.
- American Academy of Pediatrics, Council on School Health (AAPCSH, 2008). *Disaster planning for schools. Pediatrics* 122(4).
- Anderson, A. (2010). *Combating climate change through quality education*.US, Washington D.C.
- Ansal, A. A. (2009). *Loss estimation in Istanbul based on deterministic earthquake scenarios of the Marmara sea region*. Soil Dynamics and Earthquake Engineering, pp. 699
- Awofisayo, A., Ibbotson, S., Smith, G. E., Janmohamed, K., Mohamed, H., & Olowokure, B. (2013). *Challenges and lessons learned from implementing a risk-based approach to school advice and closure during the containment phase of the 2009 influenza pandemic in the West Midlands, England. Public health*, 127(7), 637-643.
- Ayonga, I. N. (2016). *An Investigation of Fire Emergency Preparedness in Kenyan Schools: A Case Study of Public Secondary Schools In Nairobi* (Doctoral dissertation, University of Nairobi).
- Berry, M.A. (2002). *Healthy school environment and enhanced educational performance: The case of Charles young elementary school Washington, DC*. Retrieved from [http://www.carpet-rug.org/carpet-and-rug-industry/research-and-resources/scientific-research/Charles young.cfm](http://www.carpet-rug.org/carpet-and-rug-industry/research-and-resources/scientific-research/Charles%20young.cfm)
- Boon, H. Brown, L. & Pagliano, P., (2014). *Emergency planning for students with disabilities: a survey of Australian schools. Australian Journal of Emergency Management*, 29(1), 45-49.
- Bryman, A. (2008). *Of Methods and Methodology*. Qualitative Research in Organizations and Management: *An International Journal*, 3(2). 159-168
- Brock, N. (2011). *Totally Integrated Quality Education and Training (TIQET)*. Report of Commission of Inquiry into the Education System of Kenya. Nairobi.
- Burling, W. K., & Hyle, A. E. (1997). *Disaster preparedness planning: Policy and leadership issues. Disaster Prevention and Management: An International Journal*, 6(4), 234-244.

- Cavanagh (2004). *Schooling for Peace: Creating a Culture of Care in an Elementary School*. A paper presented for the Peace Education Special Interest Group (SIG) at the American Educational Research Association Annual Meeting, San Diego, California.
- Chen, J. M. (2011). *Modern Disaster Theory: Evaluating Disaster Law as a Portfolio of Legal Rules*. Michigan: East Lansing MI 48824-1300.
- Chung, S., Danielson, J., & Shannon, M. (2009). *School-based emergency preparedness: a national analysis and recommended protocol*. Agency for Healthcare Research and Quality. Rockville, MD.
- Clarke, L.S., Embury, D.C., Jones, R. & Yssel, N. (2014). *Supporting students with disabilities during school crises: A teacher's guide*. Teaching Exceptional Children 46(6), 169-178.
- Clerveaux. (2010). *Promoting disaster awareness in multicultural societies: The DAG approach*, *Disaster Prevention and Management*, 19 (2):199-218.
- Crooks, C., Peter, J. & Lynn, W. (2008). *What facilitates sustainable change? What gets in the way? Opportunities and challenges! Sustainable strategies for safe schools*. Retrieved on 31st March, 2012. From www.edu.on.ca.
- Decker, B. (2007). *Management in Education, Educational Research and Publication*, Nairobi, General Printers.
- DeVoe, J. F., Peter, K., Kaufman, P., Miller, A., Noonan, M., Snyder, T. D., & Baum, K. (2004). *Indicators of school crime and safety*. Washington, DC: Government Printing Office.
- Dube, A. K., & Orodho, J. A. (2016). *Level of Disaster Preparedness and Policy Implementation in Public Secondary Schools in Rhamu Town, Madera County, Kenya*. *IOSR Journal of Research & Method in Education*, 6(2), 6-11.
- Federal Emergency Management Agency (FEMA) (2009). *What to do before, during and after a fire* online www.fema.gov/hazard.shtm.
- Fennis, K. K., & Johnston, M. D. (2010). *Hazard Perceptions and Preparedness of Taraniki Youth*. *Disaster Prevention and Management*, 19(2), 175-184.
- Gagawala, J.N. (2016). *Challenges faced by head teachers in the implementation of health and safety programs in public secondary schools in Mvita sub-county, Mombasa County, Kenya*. Unpublished M.Ed. project, Kenyatta University.
- Garis, L. (2009). *Systems Approach in the Management of High Rise Building Fires*.
- Gatua, Jane W. "Assessment of safety status of physical infrastructure (classrooms, dormitories, sanitation facilities, laboratories and kitchen) in public secondary schools in Nairobi West Region, Kenya." *Assessment* 5, no. 3 (2015): 1-9.
- Ghosh, G.K. (2015). *'Disaster Management'* A.P.H. Publishing Corporation, New Delhi
- Gichuru, J. N. (2013). *Fire Disaster Preparedness Strategies in Secondary Schools in Nyeri Central District, Kenya*. Unpublished Project of University of Nairobi.
- Giddens, A. (1991). *Modernity and Self-Identity: Self and Society in the Late Modern Age*. Stanford: Stanford University Press

- Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES). (2014). *Comprehensive school safety. Global Assessment Report on Disaster Risk Reduction Recent Trends in Disaster Impacts on Child and Development, 1999-2009*. 2011.
- Graham, J., Shirm S., Liggin R., Aitken M., & Dick R. (2006). Mass-casualty events at schools: a national preparedness survey. *Pediatrics*, 117(1): 8-15.
- Hassanain, M.A.(2006). *Towards a design and operation of fire safe school facilities, Disaster Prevention and Management*, 15 (5):838-846
- International Finance Corporation. (2010). *Disaster and Emergency Preparedness: Guidance for Schools*. Washington, DC: International Finance Corporation.
- International Strategy for Disaster Reduction, (. (2002). *Living with Risk: A Global Review of Disaster Reduction initiatives*. Geneva, Switzerland: United Nations.
- Johnson, V.A. Johnston, D.M. Ronan, K.R. & Peace, R., (2014). *Evaluating children's learning of adaptive response capacities from Shake Out, an earthquake and tsunami drill in two Washington State school districts. Journal of Homeland Security & Emergency Management*, 11(3), 347-373.
- Kaguru, M. Ibuathu C.N. & Kubaison S.T., (2014). *Financial management challenges facing implementation of free day secondary school education in Imenti North District, Kenya. IOSR Journal of Business and Management*, 16(1): 55-78.
- Kasomo, D. (2007). *Research Methods in Humanities and Education*. Eldoret. Zapf Chancey.
- Katie, B., Morris, K., & McCarrigle, M. (2012). *An introductory guide to safety implementation: Terms, concepts and frameworks*.
- Kemunto, J.N., Elizabeth, R. & Yona, B. (2015). *Safety policy implementation framework for secondary schools in Kenya. Inter-disciplinary research journal*, 5, 27-40,
- Kenya Education Staff Institute. (2011). *Diploma in Education Management for Primary Schools*. Nairobi: Kenya Literature Bureau.
- Kenya Red Cross (2001). *Past Major Disasters in Kenya*, Red Cross, Nairobi – Kenya.
- Kihila, J. M. (2017). *Fire disaster preparedness and situational analysis in higher learning institutions of Tanzania. Jàmbá - Journal of Disaster Risk Studies*, 9(2), 1-9.
- Kimani, M., Munge M.N. & Ngugi, D.G (2016). *Factors influencing financial management in public secondary schools in Nakuru County, Kenya. International Journal of Economics, Commerce and Management*, UK, 4(9) September, 2016.
- Kimathi, J. (2011). *Disaster Preparedness in Public Secondary Schools in Githunguri District, Kiambu County, Kenya*. Unpublished Thesis of Kenyatta University.
- Kimberlin, C. L. & Wintastein, A. G. (2008). *Research Fundamentals*. American Society of Health-Systems Pharmacists Vol. 65.
- Kiongo, J. G. (2015). *Disaster Preparedness among Members of Staff at Kenyatta National Hospital, Nairobi County, Kenya*. Thesis of Kenyatta University.

- Kirui, R., Mbugua, Z., & Sang, A. (2011). *Challenges facing head teachers in security management in public secondary schools in Kisii county Kenya*: International journal of humanities and social science, (1)15
- Kitheka, R.M. (2016). *Institutional factors influencing implementation of safety standards in public secondary schools in Yatta sub-county, Machakos County, Kenya*. Unpublished M.Ed. Project. University of Nairobi.
- Kishoyian, G., Kioko, J., & Muindi, E. (2021). FIRE DISASTER PREPAREDNESS AMONG STUDENTS IN KENYA MEDICAL TRAINING COLLEGES IN EASTERN KENYA. *Journal of Health, Medicine and Nursing*, 6(3), 34-48.
- Kothari, C.R. (2008). *Research Methodology: An Introduction*. New Delhi: New Age International (P) Ltd Publishers.
- Kukali, A.N. & Kabuka, E.K., (2009), 'Fire disasters in secondary boarding schools in Kenya', *Journal of Disaster Management and Risk Reduction* 3, 60–71.
- Leandri, V.J. (2011). *A study on investigation of safety and security measures in secondary schools in Tswane, South Africa*.
- MacNeil, W., & Topping, K. (2009). *Crisis management in schools: evidence based*. *The Journal of Educational Enquiry*, 7(2).
- Mathbor, G.M. (2007). 'Enhancement of community preparedness for natural disasters: The role of social work in building social capital for sustainable disaster relief and management', *International Social Work* 50, 357–369.
- Matula, P.D. Kyalo, D.N. Mulwa, A.S. & Gichuhi, L.W., (2018). *Academic Research Proposal Writing: Principles, Concepts and Structure*. Nairobi. ART Press.
- Mburu, D.M. (2012). *Factors influencing the implementation of safety standards in secondary schools in Limuru district, Kiambu County*. Unpublished M.Ed. thesis. University of Nairobi.
- Ministry of Education (2008) *Safety Standards Manual for Schools in Kenya*. Nairobi: Government Printer
- Mito, E.A. & Simatwa, E.M.W. (2012). *Challenges faced by newly appointed principals in the management of public secondary schools in Bondo District, Kenya: an analytical study*, *Education Research*, 3(4), p.388-401.
- Morrow, B. (2007). *Identifying and mapping vulnerability, Disasters*. 1-18
- Mugenda, O.M. & Mugenda, A.G. (2003). *Research Methods: Quantitative & qualitative Approaches*. Nairobi: African Centre for Technology Studies (ACTS).
- Mururi, S. (2014). *Disaster Preparedness in Secondary Schools in Ruiru Division, Kiambu County, Kenya*. *East African Medical Journal*, 9(11), 414-419.
- Muthiani, R.M. (2016). *Factors influencing schools compliance to safety standards guidelines in public secondary schools in Kitui central sub county, Kenya*. Unpublished M.Ed. projects, South Eastern Kenya University.
- Muthwii, S. M., Telewa, N. C., & Nderitu, M. K. (2015). A Survey of Disaster preparedness and safety standards in secondary schools in Kenya.

- Mwangi, P.W. (2008). *A Survey of the status of Disaster Preparedness in Public Secondary Schools; A case of Kiharu Division. Murang'a District*. Unpublished Project, Kenyatta University.
- Nderitu, C., (2009). *Implementation of safety guidelines in public secondary schools in Githunguri division, Kiambu District*. Unpublished M.Ed Thesis: Kenyatta University.
- Ndetu, D. K., & Kaluyu, V. (2016). *Factors Influencing Fire Disaster Management Preparedness: A Case of Primary Schools in Makueni County, Kenya*. *European Journal of Educational Studies*, 2(6), 22-35.
- Nestory, E. (2017). *Fire Disaster Preparedness in Secondary Schools a Case Study of Ilala Municipal Council*. Unpublished Thesis of Muhimbili University.
- Newport, J. and Jawahar, G. (2003), "Community participation and public awareness in disaster mitigation", *Disaster Prevention and Management*, Vol. 12 No. 1, pp. 33-6.
- Ng'ang'a, A. (2013). *Implementation of safety standards and guidelines in public secondary schools in Nyeri Central district, Nyeri County*. Unpublished M.Ed. Project. University of Nairobi.
- Njoroge, S. (2008). *The effectiveness of school inspection of disaster awareness and preparedness in public secondary schools in Nyandarua District*. Unpublished M. Ed Project, Catholic University of East Africa (CUEA).
- Nyabuto, J.K. (2015). *Effectiveness of Boards of Management in facilitating quality education in secondary schools in Kajiado County, Kenya*. Unpublished M.Ed project, Kenyatta University
- Nyakundi, O. (2012). *Implementation of safety standard and guidelines in public secondary schools in Marani District, Kisii county, Kenya*. M.Ed Thesis; Kenyatta University
- Okumbe, J.A. (2011). *A study of Corporate Governance practices in secondary schools in Nairobi and Kiambu County, Nairobi*. Centre for Corporate Governance (CCG).
- Omari, H., Chepkonga, S., Gori, J., & Mwaura, J. (2021). Influence of Principals' Involvement in Staff Awareness Safety Strategies on Disaster Management in Public Secondary Schools in Nyeri County, Kenya. *GPH-International Journal of Educational Research*, 4(09), 30-42.
- Omolo, O.D., and Simatwa, W.M.E., (2010). *An assessment of the implementation of safety policies in public secondary schools in Kisumu East and West Districts, Kenya* *Educational Research* (ISSN:2141-5161) Vol 1 (II) p.637-649.
- Omukuti, J. A. (2008), *Flood Frequency Analysis in the Lake Victoria Basin*. Unpublished Project on University of Nairobi.
- Oso WY, Onen D (2005). *A General Guide to Writing Research Proposal and Report: A Handbook for Beginning Researchers*. Kisumu, Kenya: Option Press and Publishers.
- Ozmen, F. (2006). The Level of Preparedness of the School for Disasters From the Aspect of the School Principal. *Disaster Prevention and Management*, 5(3), 383-395.

- Pala, I. & Vankar G. K. (2011). "Epilepsy and teachers: A survey Indian J Pediatry" Mar Apr; 64 (2):211-4.
- Peek, L. (2008). *Children and Disasters: Understanding Vulnerability, Developing Capacities, and Promoting Resilience: An Introduction*. *Children, Youth and Environments*, 18(1), 371-388.
- Pilot, D. F., & Hungler, B. P. (1999). *Nursing research: principles and methods*. Philadelphia: JB Lippincott Company.
- Pinar, A. (2017). *What is Secondary School Students' Awareness on Disasters? A Case Study*. *Review of International Geographical Education Online (RIGEO)*, 7(3), 315-331.
- Republic of Kenya (2015). *Basic Education Regulations*. Nairobi. Government Press.
- Reuters (2004). *Indian school fire kills 90 children*. Retrieved September 8th , 2012, from <http://www.Reuters.com/reports>
- RiskRED. (2009). *School Disaster Readiness in California: Lessons from the first Great Southern California Shake Out*. Earthquake Country Alliance, Los Angeles.
- Ronan, K.R. & Johnston, D. M. (2005). *Promoting community resilience in disasters: The role for schools, youth and families*. Springer, New York.
- Rudolf, S. (2011) "Systems Theory",.
- Saboori, S., Greene, L. E., Moe, C. L., Freeman, M. C., Caruso, B. A., Akoko, D., & Rheingans, R. D. (2013). Impact of regular soap provision to primary schools on hand washing and E. coli hand contamination among pupils in Nyanza Province, Kenya: a cluster-randomized trial. *The American journal of tropical medicine and hygiene*, 89(4), 698.
- Shaluf, I.M., (2007), 'An overview on disasters', *Disaster Prevention and Management: An International Journal* 16, 687–703.
- Sigei, J., Kiplangat, H. K., & Tikoko, B. J. (2021). Are school grounds safe for students? An examination of implementation of safety standards and guidelines in secondary schools in Kenya. *Editon Consortium Journal of Curriculum and Educational Studies*, 3(1), 340-354.
- Simatwa, E. (2007) *Management of Student Discipline in Secondary Schools in Bungoma District, Kenya*. Unpublished PhD. Thesis, Maseno University
- Smith, S., Kress, T., Fenstemaker, E., Ballard, M., Hyder, G. (2001). *Crisis Management Preparedness of School Districts in Three Southern States in the USA*. *Safety Science*, 39, 83-92.
- Soomeren, P. (2002). *Prevention of crime in and around high schools: Lessons in implementation*. A paper presented at the conference on the role of schools in crime prevention. 30th September to 1st October 2002. Melbourne, Australia.
- Stuart, K.L. Patterson, L.G., Johnston, D.M., & Peace, R. (2013). *Managing temporary school closure due to environmental hazard: Lessons from New Zealand*. *Management in Education*, 27(1), 25-31
- Surrey City of Park: British Columbia.

- Takao, K. Motoyoshi, T. Sato, T. Fukuzondo, T. Seo, K. & Ikeda, S., (2004), '*Factors determining residents' preparedness for floods in modern megalopolises: The case of the Tokai flood disaster in Japan*', *Journal of Risk Research* 7, 775–787.
- United Nations Disaster Prevention (UNDP) (2010), *Evaluation of UNDP contribution to disaster prevention and recovery*. [On-line] Retrieved from <http://www.undp.org>. [2019, March 20]
- United Nations Development Program (UNDP) (2008). UNDP Practice Note: Capacity development. New York: UNDP.
- United Nations Children's Fund (UNICEF) (2011). Disaster risk reduction in education in emergencies. A guidance note for education clusters and sector coordination groups.
- United Nations International Strategy for Disaster Reduction (UNISDR) (2005). *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*.
- United Nations International Strategy for Disaster Reduction (UNISDR) (2009). *Sendai Framework for Disaster Risk Reduction 2015-2030*.
- United Nations. (2003). General Assembly Resolution 57/256. International Strategy For Disaster Reduction. Geneva: UN.
- United Nations Children's Fund (UNICEF) (2007). Climate Change and Children, Policy New York, 2007a: 6.
- United Nations Disaster Prevention (UNDP) (2002), "Prevention and recovery", UNDP.
- United Nations International Strategy for Disaster Reduction (UNISDR) (2006). *Disaster risk reduction begins at school*.
- United States Department of Education (Office of Elementary and Secondary Education, Office of Safe and Healthy Students). (2013). *Guide for Developing High-Quality School Emergency Operations Plans*. Washington, DC.
- United States Government Accountability Office. (2007). *Most School Districts Have Developed Emergency Management Plans, but Would Benefit from Additional Federal Guidance*. GAO-07-609. Government Accountability Office.
- Wainaina, W.W. (2012). *Factors affecting implementation of safety measures in secondary schools. A case study of Kikuyu District, Kiambu County, Kenya*. Unpublished M.Ed. project, University of Nairobi.
- Wanjala, W. & Onyango, M. A. (2018). *Fire Disaster Preparedness Strategies in Secondary Schools in Nyeri Central District, Kenya Disaster Awareness and Preparedness of Secondary Schools in Homa Bay County, Kenya*. 1st Annual International Conference on Research and Innovation in Education (AICRIE), At University of Nairobi, Kenya
- Wanyama, J. F. (2011). *Level of compliance with health & safety standards for the emergency response in secondary schools in Sabatia District, Kenya; Unpublished M.Ed. project, University of Nairobi*.

- Wapukhulu, W. (2010). *Disaster and crisis response and preparedness in learning institutions*. A working paper for the Kenya Institute of Policy and Research Analysis, Nairobi Kenya.
- Wiersma, W. & Jurs, S. (2009). *Research methods in education: An introduction*. MA: Pearson.
- Wisner, B., Blaikie, P., Cannon, T. & Davis, I. (2004). *At Risk: Natural Hazards, People's Vulnerability and Disasters*. 2nd ed. London: Routledge. 471 p.

APPENDICES

Appendix I: Introductory Letter

ABIGAEL SALERI,

P.O BOX 28784-00100, NAIROBI.

Dear Respondent

REF: REQUEST FOR RESEARCH DATA

I am a Postgraduate Student in the Department of Emergency Management Studies pursuing a Master degree in Disaster Management and Humanitarian Assistance. I am conducting academic research titled “Disaster preparedness and safety standards in public secondary schools of Nairobi County, Kenya”. You are kindly requested to facilitate the research study by filling the attached questionnaire and /or participating in the Focus Group Discussion or interview as truthfully as you can. The information that will be obtained in this research work is confidential and will only be used for the academic purposes.

Your assistance and co-operation will be highly appreciated.

Yours sincerely,

Abigael Malemba Saleri (Researcher).

Appendix II: Questionnaire on disaster preparedness and safety standards in public secondary schools in Nairobi County

Section 1: Background information

1	Current position	
2	Gender	Male.....(1) Female.....(2)
3	Age bracket	13-15yrs (i) 16-18yrs(ii) Above 18yrs
4	Type of disaster that your institution is vulnerable to (Previous disasters)	

Section II: Causes of vulnerability to disasters in public secondary schools in Nairobi County

1. In your opinion, does your institution experience any disaster?

Yes ()

No ()

If yes, what was the cause?

- i.....
- ii.....
- iii.....

2. How frequently has the identified disaster occurred in your institution?

More often ()

Twice ()

Once ()

3. Does your institution have emergency evacuation plan Yes ()

No ()

4. How often does your organization carry out emergency drills for disaster preparedness?

Duration	Response rate
Termly	
After every six months	
Yearly	
Not at all	

5. If you have ever responded to any disaster in your institution, what measures do you think can be explored by your organization to address curb issues of vulnerability?

i.....

ii.....

iii.....

iv.....

6. Indicate your experience on the following aspects concerning fire management programs at your school (For each, Mark under the one that applies.)

a) Training programs on the use of fire safety facilities

MOST FREQUENTLY

FREQUENTLY

LESS FREQUENTLY

NOT AT ALL

- | | | |
|--|-----|----|
| b) Attended training on disaster safety | YES | NO |
| c) Community awareness sessions on disaster safety | YES | NO |

Section III: Level of public secondary school vulnerability to disasters in Nairobi County

1. In view of occurrence of disaster in your school, how would you rate the level of preparedness of the school in response to that disaster?

- a) Highly []
- b) Moderately []
- c) Low []
- d) I don't know []

Give reason for your answer above:

2. Does your institution have plans put in place for disaster emergency response?

Yes ()

No ()

Specify.....

4. In your opinion, to what extent is disaster planning important in preparedness for disaster for ensuring attainment of required safety standards in your institution? (Please tick where appropriate, where.

- a) Very Important []
- b) Important []
- c) Not important []

d) I don't know []

Give reason for your answer above.....

.....

Section IV: Level of disaster preparedness in line with school safety standards in public secondary schools in Nairobi County

1. What is your opinion on the population density of your school?

a) High population []

b) Low population []

c) I don't know []

2. Do you have any training on disaster safety? YES [] NO []

If Yes, specify.....

3. Does your school have a school dispensary? YES [] NO []

4. Does your school buildings have emergency exit/Escape routes? YES [] NO []

5. Does your school have emergency assembly points? YES [] NO []

6. Does your school have functional fire detectors and alarm systems? YES [] NO []

7. Does your school have a school van? YES [] NO []

8. In your own opinion, are your school's playing fields safe? YES [] NO []

9. In your own opinion, are your school's toilets and latrines safe? YES [] NO []

10. Does your school have hand washing points YES [] NO []

Appendix III: Interview schedule for Education officials, Headteachers and Teachers

Focus Area	Questions
Level of Disaster preparedness	a) How do you gauge the initiatives the government has put in place to mitigate disaster incidences in secondary school? b) What extent is disaster planning important in preparedness for disaster for ensuring attainment of required safety standards in your institution? c) What is your overall assessment on state of disaster preparedness and emergency response in public schools in Nairobi County?
Causes of vulnerability to disasters.	a) What role as a parent/education official/teacher/headteacher play in schools in attaining recommended safety standards so that public schools are safe and prepared for disasters? b) What challenges do you think might be contributing to inadequate preparedness to disasters in schools in Nairobi County?
Safety of physical infrastructures	a) What is your opinion on the safety of the physical infrastructures in public secondary schools in Nairobi County?

Appendix IV: Interview schedule for Kenya Red Cross Society and St John's Ambulance officials.

Focus Area	Questions
Level of Disaster preparedness	a) What is your overall assessment on state of disaster preparedness and emergency response in public schools in Nairobi County? b) What extent is disaster planning important in preparedness for disaster for ensuring attainment of required safety standards in your institution? c) What is your overall assessment on state of disaster preparedness and emergency response in public schools in Nairobi County? d) Suggest programs and training that should be undertaken in schools to ensure adequate preparedness in response to disasters and which can help in attaining required safety standards?
Causes of vulnerability to disasters.	a) What role do you play in schools in attaining recommended safety standards so that public schools are safe and prepared for disasters? b) What challenges do you think might be contributing to inadequate preparedness to disasters in schools in Nairobi County? c) What level of training is considered to be effective for preparedness in response to disaster incidences in public schools?
Safety of physical infrastructures	a) What is your opinion on the safety of the physical infrastructures in public secondary schools in Nairobi County?

Appendix V: Interview schedule for Fire Department and Department of Disaster Management officials and Officers Commanding Station

Focus area	Questions
Level of Disaster preparedness	a) What is your overall assessment on state of disaster preparedness and emergency response in public schools in Nairobi County? b) Suggest programs and training that should be undertaken in schools to ensure adequate preparedness in response to disasters and which can help in attaining required safety standards?
Causes of vulnerability to disasters.	a) What role do you play in schools in attaining recommended safety standards so that public schools are safe and prepared for disasters? b) What challenges do you think might be contributing to inadequate preparedness to disasters in schools in Nairobi County? c) How do you gauge the initiatives the government has put in place to mitigate disaster incidences in secondary school?
Safety of physical infrastructures	a) What is your opinion on the safety of the physical infrastructures in public secondary schools in Nairobi County?

Appendix VI: Focus Group Discussion: on disaster preparedness and safety standards in public secondary schools of Nairobi County

1. How do you gauge the initiatives the government has put in place to mitigate disaster incidences in secondary school?
2. What extent is disaster planning important in preparedness for disaster for ensuring attainment of required safety standards in your institution?
3. Suggest strategies you think could be explored by public schools to ensure adequate preparedness in response to disasters to ensure high safety standards?
4. What is your overall assessment on state of disaster preparedness and emergency response in public schools in Nairobi County?
5. What challenges do you think might be contributing to inadequate preparedness to disasters in schools in Nairobi County?
6. What level of training is considered to be effective for preparedness in response to disaster incidences in public schools?
7. Suggest programs and training that should be undertaken in schools to ensure adequate preparedness in response to disasters and which can help in attaining required safety standards?

Appendix VII: Letter from Directorate of Postgraduate studies



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

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P.O Box 190
Kakamega – 50100
Kenya

Directorate of Postgraduate Studies

Ref: MMU/COR: 509099

28th April 2023

Abigael Malemba Saleri
CDM/G/04-55279/2017
P.O. Box 190-50100
KAKAMEGA

Dear Ms. Saleri

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Master's proposal entitled: *"Disaster Preparedness and Safety Standards in Public Secondary Schools of Nairobi County, Kenya"* and appointed the following as supervisors:

1. Dr. Moses N. Akali - SDMHA - MMUST
2. Dr. Maurice Pepela - SDMHA - MMUST

You are required to submit through your supervisor(s) progress reports every three months to the Director of Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Disaster Management and Humanitarian Assistance Graduate Studies Committee and Chairman, Department of Emergency Management Studies. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your Master's thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours sincerely,



Prof. Stephen O. Odongo, PhD, FIEEP
DIRECTOR, DIRECTORATE OF POSTGRADUATE STUDIES

Appendix VIII: NACOSTI Permit

 REPUBLIC OF KENYA Ref No: 376966	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION Date of Issue: 31/May/2023
RESEARCH LICENSE	
	
This is to Certify that Ms.. ABIGAEL MALEMBA SALERI of Masinde Muliro University of Science and Technology, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act; 2013 (Rev.2014) in Nairobi on the topic: DISASTER PREPAREDNESS AND SAFETY STANDARDS IN PUBLIC SECONDARY SCHOOLS OF NAIROBI COUNTY, KENYA for the period ending : 31/May/2024.	
License No: NACOSTI/P/23/26241	
Applicant Identification Number 376966 <i>W. M. M. M.</i> Director General	
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION Verification QR Code 	
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THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)
Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
 - i. Endanger national security
 - ii. Adversely affect the lives of Kenyans
 - iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
 - iv. Result in exploitation of intellectual property rights of communities in Kenya
 - v. Adversely affect the environment
 - vi. Adversely affect the rights of communities
 - vii. Endanger public safety and national cohesion
 - viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

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