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.

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DECLARATION

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.

Signature…… Date …….....

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance of Masinde Muliro University of Science and Technology (MMUST) a thesis entitled: **Disaster Preparedness and Safety Standards in Public Secondary Schools of Nairobi County, Kenya.**

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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

The frequency and impact of disaster incidents in secondary schools have notably escalated in recent years, significantly obstructing the educational process. For example, in addition to the tragic loss of lives and injuries, there has been significant damage to school properties, leading to closures and necessitating prolonged absences for children during their recovery periods. Kenya continues to face several school catastrophes in spite of the government's and other stakeholders' continuous efforts to emphasize readiness. The general objective of the study was 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. Findings indicated that schools are highly vulnerable to fire related incidences (24.5%) compared to other disasters. 71.09% of the respondents revealed that their schools did not have plans for emergency evacuations. Majority of the respondents (75.78%) lacked training on disaster preparedness and safety standards. Classrooms and dormitories were observed to be majorly crowded and some were filled to capacity giving rise to the need more capacity for the schools. The findings showed that only 46.02% of the schools had a school dispensary and for those who had, some did not have the necessary equipment to handle emergencies. 50.26% of the school buildings lacked emergency exit routes and 52.34% had no assembly points as shown in the findings. The research findings indicated that the educational institutions were inadequately equipped to handle emergencies, and a significant portion of the physical structures was deemed unsafe. The research advocated for the systematic evaluation of educational facilities, the provision of safety training by certified experts, and the necessity of accounting for the diverse capabilities and resources of various schools when establishing benchmarks for disaster readiness and safety protocols.

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ABBREVIATION AND ACRONYMS

DRR: Disaster Risk Reduction

FEMA: Federal Emergency Management Agency

FGD: Focus group discussion

GAR: Global Assessment Report

ISDR: International Strategy for Disaster Reduction

KESI: Kenya Education Staff Institute

KRCS: Kenya Red Cross Society

MOE: Ministry of Education

UNDP: United Nations Development Program

UNISDR: United Nations International Strategy for Disaster Reduction

U.S.D.E: The United States Department of Education

DEFINITION OF OPERATIONAL TERMS

Catastrophes: The term has been used in the study to denote an event that causes great and usually, sudden damage or suffering to the society.

Community: A group of people living in the same place. In this case community will include the students, both teaching and nonteaching staff and those who live close to the school.

Disaster: Severe societal disruption resulting in extensive loss of human life, injuries, and material or environmental damage that surpasses the afflicted society's capacity to manage the crisis with its own resources.

Disaster preparedness: Actions implemented to anticipate and diminish the repercussions of catastrophes by forecasting and, where feasible, averting disasters, alleviating their impacts on at-risk populations, and responding to and managing their aftermath efficiently.

Preparedness planning: Actions implemented to guarantee swift and effective response to disasters, while considering the local disaster management framework and adapting it to the specific conditions of the area.

Public Secondary school: This is an establishment that offers secondary education, typically encompassing the facility where instruction occurs. It succeeds primary education in readiness for university education.

Safety standards: Standards are established to guarantee the safety of products, activities, or processes. They can be either advisory or mandatory and are often established by an advisory or regulatory entity, which may be voluntary or statutory.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The educational process has faced significant impediments due to the occurrence of disasters, which have led to loss of life and injuries, social unrest, damage to school property, and closures. Consequently, children are frequently compelled to abandon their studies for extended durations during recovery periods (Clerveaux, 2010). Globally, there has been a notable increase in the incidence of school children suffering fatalities or injuries due to violence, disasters, and emergencies—situations that could have been averted through the rigorous implementation of safety policies (Omolo and Simatwa, 2010). Nonetheless, the impact and scale of the disasters differ significantly across various nations. This can be ascribed to the varying degrees of disaster preparedness across nations, where developed countries have effectively mitigated the impact of disasters, while developing countries often bear the full force of such events due to insufficient readiness (Ozmen, 2006).

A survey carried out by the Arson Control Forum in 2006 (Adams, 2009) revealed that almost fifty percent of the secondary schools surveyed had encountered a substantial fire that necessitated the involvement of fire and rescue services. Fortunately, the extent of the situation was mitigated by the thorough preparedness fostered through the dissemination of fire safety education, guidance on fire prevention, comprehensive risk assessments, and the implementation of evaluative and anti-arson strategies by the government. Countries including Bangladesh, China, Cambodia, the Philippines, Honduras, India, and Indonesia have incorporated disaster risk reduction (DRR) into their educational curricula (Fennis

and Johnston, 2010). In Sri Lanka, disaster risk reduction elements are incorporated within the geography curriculum for secondary education, whereas in India, disaster management has been established as a distinct subject in certain grades of secondary school (Pinar, 2017). In the Philippines, China, and Cambodia, disaster risk reduction was integrated into the second-grade subjects of the national curriculum, and educators received training in the relevant curriculum modules (UNDP, 2010). Their influence on disaster management in these nations has been significant.

In Africa, calamities in secondary schools occur with notable regularity and prevalence. In 2001, a devastating fire consumed a girls' secondary school in Gadhiri village, Northern Nigeria, resulting in the tragic loss of twenty-three students and injuries to fourteen others (Ndetu and Kaluyu, 2016). The loss of life was significant due to the students being confined within the dormitory, which was secured with iron bars and a chain. In March 2009, a dormitory at Alliance Secondary School in the Ibanda district of Uganda was consumed by flames, resulting in the destruction of property valued in the millions of shillings. Despite the urgent endeavors undertaken by the Police Fire Unit to reach the fire scene, the truck was unable to approach the dormitory due to restricted access (Wanjala and Onyango, 2016).

In Kenya, calamities affecting secondary schools, such as lightning, flooding, and severe winds, have resulted in significant damage to school property and, tragically, loss of life (Gichuru, 2013). Instances of school fires and arson attacks have been documented, notably the 1998 Bombolulu and 2001 Kyanguli fire disasters (Republic of Kenya, 2001). The recent floods have inflicted significant damage on numerous educational institutions, as well as water and sanitation facilities in regions including Budalangi, Nyando, Baringo,

and Tana River. This devastation has heightened the risk of diarrheal diseases, such as cholera (Omukuti, 2008). The powerful winds that accompanied the rainfall resulted in the removal of roofs from several schools in the Emuhaya district, thereby jeopardizing the safety of the students (UNICEF, 2007).

The Kenya Red Cross Society (KRCS, 2001) notes that the susceptibility of secondary schools to disasters stems from insufficient specialized training in fire drills, inadequate firefighting equipment, limited resources, and the absence of systematic disaster mitigation and response strategies (Government of Kenya, 2008). Akali and colleagues (2011) observed that there has been minimal progress in equipping secondary schools in Kenya for disaster preparedness, despite governmental initiatives aimed at improving disaster risk management and ensuring the safety of educational institutions. The researchers hypothesized that merely a select few secondary schools are adequately equipped for emergencies, having implemented fire extinguishers in laboratories, storage areas, and kitchens in alignment with the prescribed safety standards manual. Nderitu (2009) indicated that a significant number of secondary schools in Kenya lacked sufficient firefighting equipment and dependable alarm systems. This serves as unequivocal evidence of insufficient disaster preparedness within secondary schools in Kenya. Nairobi ranks prominently among counties concerning incidents of disasters in secondary schools (Kimathi, 2011). In 2008, a form three student at Upper Hill School in Nairobi tragically lost their life in a fire that was thought to have been ignited by student unrest within the institution (Aluanga, 2008). The postelection violence of 2007/2008 had a detrimental impact on the educational landscape in Nairobi, particularly within the informal settlements of Mathare and Kibera, where significant destruction occurred,

displacing both learners and educators (Ministry of Education, 2008). The most recent incident occurred in September 2017, involving a fire at the Moi Girls Nairobi dormitory, which tragically resulted in the deaths of 10 students. The incident was attributed to the inadequate design of the dormitories, which lacked proper exit routes for emergency situations.

Fire is set in one of the dormitories at the Highway Secondary School in Nairobi's South B. Twelve victims were sent to Kenyatta National Hospital after to the event. The parents asserted that it is imperative for schools nationwide to implement surveillance cameras to combat the increasing occurrences of arson, indicating that the rise in such instances reflects the determination of undisciplined pupils to create disorder within educational institutions.

A dormitory at Kangemi High School in Nairobi was attacked at night, resulting in several pupils being hospitalized. A total of 12 kids were reported injured during the nocturnal event, while others were hospitalized due to smoke inhalation. The impacted dormitory is reported to have been obliterated, along with the students' possessions. A comparable fire event occurred at Dagoretti High School in July 2015, attributed to defective wiring (Gagawala, 2016).

The Federal Emergency Management Agency (FEMA) (2009) observed that for disaster preparedness to be effective, schools must possess guide maps indicating designated evacuation routes, assembly areas, fire extinguishers, first aid stations, and clearly communicated evacuation alarm information, which is largely absent in most Nairobi schools (Mwangi, 2008).

1.2 Statement of the Problem

Disasters at public secondary schools in Nairobi County continue to be a worry for both the government and stakeholders in the sector owing to the extent of destruction and loss of life and school property. The relevant government authorities and school administration are consistently unprepared and reactive in the face of disasters. Newport and Jawahar (2003) assert that disaster preparedness is ineffective without the involvement of vulnerable populations and associated institutional or informal organizations. They assert that community engagement must prioritize elements such as contingency planning, community readiness, task forces, and reaction mechanisms, which are mostly absent in our schools.

Harper (1989) contends that schools were once seen as "islands of safety." A propensity for reactive behavior rather than proactive engagement is a prevalent characteristic among Kenyans. The propensity for double standards is increasingly ingrained in Kenya's education system. There is a lack of a reliable, robust, coordinated, and continuous national information source about school crimes, violence, and associated prevention, intervention, enforcement, and crisis readiness initiatives in Kenyan schools. The issue of school fires and arson is a reality inside Kenya's education system. Besides fire, schools are susceptible to many catastrophes, including floods, structural collapse, and terrorist attacks, due to insufficient facilities and infrastructure to mitigate the hazards associated with these incidents.

Numerous incidences of fatal school violence transpired in Kenya from the 1990s till early 2019. These occurrences prompted Kenyans to seek explanations on their causes, prevention methods, and strategies for improved management of similar incidents. Most terrible incidents in schools are avoidable (Trump, 2000). Nichols (1997) observes that contemporary schools are susceptible to several challenges that afflict society as large. The current reality of society and its educational institutions is that there are few environments where one may expect to feel secure. Crisis situations increasingly arise throughout educational institutions, although many are ill-equipped to manage them successfully. The Government's Safety and Standards Manual for schools is designed to equip educational institutions for catastrophe risk management. Since its introduction in 2008, schools continue to struggle with catastrophe risk management, resulting in significant loss of life and property (Decker, 2007). Although the Government's Safety and Standards Manual for schools exists for disaster risk management, each school possesses distinct characteristics influenced by its population, resources, and infrastructure. This assesses their readiness and reaction to calamities. Based on the study's backdrop, it aims to investigate disaster preparedness and safety standards in public secondary schools 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:

i. To establish the level of disaster preparedness in public secondary schools in Nairobi County, Kenya.
ii. To determine the causes of vulnerability to disasters in public secondary schools in Nairobi County, Kenya.
iii. To assess safety of physical infrastructure in public secondary schools in Nairobi County, Kenya.

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, Kenya?
ii. What are the causes of vulnerability to disasters in public secondary schools in Nairobi County, Kenya?
iii. How safe is the physical infrastructure in public secondary schools in Nairobi County, Kenya?

1.5 Justification and Significance

1.5.1 Academic justification

The study will contribute to the existing literature with regard to disaster preparedness and safety standards in public secondary schools in Kenya. The Researcher sought to conduct this research in Nairobi County purposely because of the many public secondary schools which have a high population of students. In addition, many secondary schools have been affected by disaster despite of the laid down school safety standards.

1.5.2 Policy Justification

The secondary school management will find the study useful in planning, policy revision and development with regard to disaster preparedness in secondary schools. It documents the effectiveness of disaster management policy for public secondary schools in Kenya. The government and particularly the policy makers in the education sector will be able to formulate informed policies that will help mitigate disasters in secondary schools in Kenya.

1.6 Scope of the Study

The study was carried out in public secondary schools in Nairobi County. The target population was the head-teachers, teachers, students of the selected schools, ministry of education officials, disaster management department, fire department, Kenya Red-Cross and St John's ambulance. Disasters in schools include floods, terrorist attacks, fire incidences, sports injuries, motor vehicles accidents among others. The study mainly focused on fire incidences since it's the most prevalent disaster in public secondary schools in Nairobi County. Safety standards were measured by the number of emergencies in the school and how the schools have been able to respond to these emergencies. The study frame was from 1998 to 2022. The study was conducted from August 2022 to march 2023. However, the study did not classify public secondary schools as mixed, boys and girls or day and boarding. In addition, the size of the school was not used as a factor to segregate the school from the study.

1.7 Chapter Summary

The chapter provides a comprehensive overview of disaster preparedness and safety requirements in public secondary schools in Nairobi County, Kenya, from global, regional,

national, and county perspectives. The problem statement emphasizes significant deficiencies that the research aimed to address. The study was directed by its aims and research questions. The rationale and extent of the study emphasize the necessity for further research. The subsequent chapter presents a comprehensive overview of the literature pertinent to the subject.

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

The United Nations International Strategy for Disaster Reduction (UNISDR) (2009) characterizes a disaster as a substantial disruption to a community or society's operations, leading to considerable human, material, economic, or environmental losses and effects that exceed the affected community's or society's ability to cope with its own resources. Wisner et al. (2004) assert that catastrophes impede economic and human growth at both household and national levels when infrastructure such as roads, bridges, hospitals, and schools is compromised.

The Global Assessment Report (GAR) (2011) indicates that catastrophes disproportionately affect the impoverished in developing nations, particularly impacting the most vulnerable parts of the population. Children, particularly young ones, are inadequately suited to manage deprivation and stress owing to their distinct physical, social, and psychological attributes. Hassanain (2006) asserts that children at educational institutions are prone to panic, rendering them challenging to control during emergencies or crises, resulting in significant damage in the event of a tragedy at the school.

Katie et al. (2012) assert that safety standards encompass a range of actions executed by the government and educational institutions to fulfill the aims and objectives outlined in safety policy declarations. It also involves establishing essential regulations to provide a safe school environment for all students, teachers, and non-teaching personnel. This may involve acquiring equipment and technology, modifying the quantity of settings and systems, and enhancing the practitioners' competencies (Kemunto, et al., 2015). The safety standards policy and guidelines require schools to be equipped for any potential calamity and to ensure a secure learning environment for students (Chemeli, 2015). Muthiani (2016) states that the New Jersey Department of Education in the United States implemented proactive measures to ensure the safety and security of all students and personnel. Every school is required to develop a safety and security plan in collaboration with law enforcement authorities, emergency service providers, public health officials, and other essential stakeholders (Ng'ang'a, 2013).

The United Nations International Strategy for Disaster Reduction (UNISDR) (2009) characterizes a disaster as a substantial disruption to a community or society's operations, leading to considerable human, material, economic, or environmental losses and effects that exceed the affected community's or society's ability to cope with its own resources.

Cavanagh (2004) contends in a research about schools' responses to the threat of terrorism that the implementation of safety and security protocols in European schools has been profoundly influenced by occurrences of school tragedies and near misses. The September 2004 hostage crisis at School Number One in Beslan, Russia, which led to the deaths of

320 kids, teachers, and parents, necessitated the deployment of armed military personnel to safeguard schools and prevent future terrorist attacks.

Soomeren (2002) asserts that in the Netherlands, initiatives for school safety have concentrated on securing facilities, enhancing school capacity, addressing bullying, and improving incident response. The Amsterdam School Safety Project is a five-year initiative encompassing 40 secondary schools. It employs school safety plans, infrastructural enhancements, curricular modifications, and social support systems to foster a comprehensive, preventative strategy for school safety in participating institutions. The inadequate or complete absence of school safety policy implementation has been attributed to tragedies in India. Reuters (2004) attributed the Indian school fire catastrophe of July 2004, which resulted in the deaths of 90 students, on the inadequate enforcement of safety regulations. The author asserts that the school building was congested and possessed a singular exit, without emergency doors or firefighting apparatus.

2.2. Disaster Preparedness

The International Strategy for Disaster Reduction (ISDR) (2002) defines disaster preparedness as proactive measures and activities designed to enable an effective response to disasters, including the provision of timely and efficient early warnings and the temporary evacuation of individuals and assets from vulnerable areas. The United Nations Development Program (UNDP) (1994) defines disaster preparedness as the process of predicting and executing preventive measures prior to an imminent danger, contingent upon the feasibility of advance warnings. Preparedness planning improves disaster

response by methodically organizing the delivery of timely and effective rescue, relief, and support services.

Disaster preparedness encompasses the development and regular assessment of warning systems linked to forecasting systems, including strategies for evacuation or other measures to be executed during a disaster alert period to reduce potential loss of life and physical damage (Kakuli & Kabuka, 2009). It includes the education and training of officials and vulnerable groups, the preparation of response teams, and the development of policies, standards, organizational frameworks, and operational strategies to be executed following a disaster (Mathbor, 2007).

Children are acknowledged as one of the most vulnerable populations following a disaster, particularly during their time in educational institutions (GADRRRES, 2014; United Nations International Strategy for Disaster Reduction (UNISDR), 2006). The welfare of children in educational environments has been a central concern of global disaster risk reduction (DRR) efforts.

The Sendai Framework for Disaster Risk Reduction 2015-2030 is built upon the achievements and elements established by its predecessor, the Hyogo Framework for Action: Building the Resilience of Nations and Communities 2005-2015. The agreement introduces several notable modifications, particularly an increased emphasis on catastrophe risk management as opposed to disaster management. The Sendai Framework underscores the importance of disaster risk reduction as a fundamental component in the pursuit of sustainable development (Gadrrres, 2014).

The Sendai Framework for Disaster Risk Reduction articulates seven distinct objectives and four strategic priorities for action, focused on the prevention of emerging disaster risks and the mitigation of existing ones. Understanding disaster risk, strengthening governance for effective management; allocating resources for risk reduction to enhance resilience, and enhancing preparedness for efficient response, alongside recovery, rehabilitation, and rebuilding initiatives. The aim is to substantially reduce the risks and losses associated with disasters, impacting lives, livelihoods, health, and the economic, physical, social, cultural, and environmental resources of individuals, businesses, communities, and nations (Kihila, 2017).

In order to enhance this framework for educational institutions, numerous frameworks and global initiatives focused on disaster risk reduction have been instituted since 2005. The Disaster Risk Reduction Begins at School campaign, initiated by the United Nations International Strategy for Disaster Reduction in 2006, aims to promote the integration of disaster risk reduction within educational curricula and to facilitate the development of disaster-resilient schools, which includes the necessary retrofitting of structures when deemed essential. An essential element of the campaign is the engagement of significant stakeholders across local, regional, national, and international spheres to achieve its desired outcomes (United Nations International Strategy for Disaster Reduction, UNISDR, 2005).

Ozmen (2006) posits that after significant investments in school repairs following a disaster, certain governments require specific disaster preparedness measures to be integrated into educational frameworks. He underscores the imperative for school administrators to devise strategies for potential disasters, mitigate risks, ensure the safety of students and educators, and enable the swift restoration of educational institutions.

Afedzie and McEntire (2010), in their study on rethinking catastrophes by design, analyzed preparation within the frameworks of households, organizations, communities, states, and the nation. The authors emphasized that knowledge concerning preparedness, response, and recovery must be internalized, and they regard preparedness as the formulation, testing, and execution of disaster plans, as well as the communication with the public and others about disasters and strategies to mitigate them.

Disaster preparation in the education sector is a systematic process comprising policy formation, ongoing monitoring, and assessments, necessitating continual enhancements and refinements (UNDP Team-Nepa, 2001). It is essential to formulate strategies for emergency preparedness to guarantee that various departments engaged in disaster readiness follow shared objectives (Allen, 2006).

A primary element of the school disaster preparation strategy is planning. The planning process produces reaction measures and processes that may be recorded in a written plan. It is essential to recognize that the written plan does not ensure preparation (Morrow, 2007), but should be seen as a component of preparedness efforts intended to enhance disaster response (Ansal, 2009). The safeguarding of personnel is a fundamental principle of the hospital disaster preparedness framework and must encompass the provision of critical components such as personal protective equipment (PPE), firefighting apparatus, training and education, along with the formulation of policies to guarantee that protective measures are suitable and sufficient (UN, 2003).

2.3 Causes of vulnerability to disasters in public secondary schools

Instructing individuals, especially the younger generation, on the dangers posed by hazards and the appropriate responses can be crucial for preserving lives (UNICEF, 2011). The incorporation of hazards education within the formal educational framework is considered a potent approach for spreading knowledge about hazards throughout the broader community, thereby bolstering resilience, given that schools act as a vital link among children, families, and communities (Ronan and Johnston, 2005).

Two recent global studies have clarified the current understanding of risk education programs and their effectiveness. Johnson et al. (2014) carried out a comprehensive analysis of 35 assessments of hazard education programs that are implemented in schools. The study revealed significant shortcomings in the evidence framework used to evaluate the effectiveness of educational programs, due to notable methodological limitations such as inadequate sample sizes, lack of baseline data, and absence of control groups. The United Nations International Strategy for Disaster Reduction (UNISDR) (2006) posits that the mitigation of disaster risk can be greatly enhanced when individuals are well-informed and motivated to embrace a culture of disaster prevention and resilience. This requires the systematic collection, organization, and dissemination of relevant knowledge and information concerning hazards, vulnerabilities, and capacities. Priority 3 of the Hyogo Framework for Action 2005-2015 underscores the importance of leveraging knowledge, innovation, and education to cultivate a culture of safety and resilience across all strata of society.

Pala and Vankar (1997) undertook a study assessing the knowledge and attitudes of

primary teachers regarding catastrophes, revealing that only one-fifth of the 113 teachers surveyed expressed confidence in their ability to manage such incidents. A lack of understanding was observed, especially regarding the frequency of accidents. Widespread misunderstandings concerning first aid practices were evident. There was a conspicuous absence of communication concerning incidents among instructors, parents, and the physician.

2.3.1 Level of public secondary school vulnerability to disasters

Plans must function as dynamic documents encompassing actions to be executed prior to, during, and subsequent to an emergency event (Burling and Hyle, 1997) and should undergo continuous review (RiskRED, 2009) to ensure they accommodate alterations (social, economic, psychological) within the school and broader community (Stuart, Patterson, Johnston, and Peace, 2013). Moreover, all emergency plans must remain operational when substitute individuals assume critical positions (MacNeil and Topping, 2007).

Although there is no universal optimal plan type for schools, some fundamental elements must be incorporated into every plan, taking into account the distinct needs of each institution (American Academy of Pediatrics, 2008). School plans must address the requirements of diverse emergency scenarios, not only those that appear most probable. However, this does not require the formulation of distinct strategies for each sort of emergency. Chung et al. (2009) assert that the optimal guidance in school readiness literature recommends that educational institutions concentrate their disaster preparedness initiatives on formulating plans for four fundamental response procedures: shelter-in-place, lockdown, building evacuation, and relocation.

Alongside the formulation of plans for the four principal response processes, the importance of schools adopting strategies for family reunification is recognized (International Finance Corporation, 2010; Ronan and Johnston, 2005). The process of family reunion represents a significant challenge within the realm of disaster response; therefore, it is imperative for educational institutions to develop thorough and clearly articulated strategies for facilitating the reunification of families following an event (Takao, et al., 2004). Furthermore, an understanding among parents regarding the school's reunification protocols could reduce anxiety and misconceptions among both children and parents, consequently decreasing the chances of hindering staff response efforts (Johnson, Johnston, Ronan, and Peace, 2014).

Investigations conducted in the United States and Australia indicate that a significant number of school districts and individual institutions have established emergency plans; however, the efficacy of these responses varied (Smith et al., 2001). In the United States, Graham et al. (2006) found that 96% of schools possessed emergency relocation plans for students, 92% implemented lockdown procedures, 86% developed strategies for mass casualty incidents, and 75% established protocols for family reunification. Clarke et al. (2014) emphasized that an important facet of school-based emergency preparedness requiring focus is the acknowledgment of the response needs of children and staff with disabilities or special needs. This concerns the accessibility of evacuation routes and any additional support needed at the assembly area. According to the research conducted by Petal et al. (2011) on educational institutions in the Central Southern United States, it was found that 89% of these schools had established plans to accommodate

children with disabilities or special needs. An analysis conducted across 80 schools in Australia concerning the readiness for students with disabilities, categorized by hazard type, indicated that less than one-third possessed plans tailored to meet the requirements of these students, with some hazards showing compliance rates plummeting to as low as ten percent (Boon, et al., 2014).

Another aspect of school-based planning involves devising strategies to sustain school operations, specifically through alternative learning environments and instructional methods during a crisis or emergency, thereby ensuring that children retain access to education (United States Department of Education, 2013). Ensuring continued access to educational institutions is beneficial for the ongoing welfare of students following emergencies and contributes to the recovery of families and communities (Peek, 2008). The interruption of educational processes in the wake of an emergency or disaster can adversely impact students' academic performance and long-term educational trajectories. Prolonged absences or school dropout may ensue, resulting in harmful consequences not only for the students themselves but also for their families and the wider community. This situation is exacerbated when pre-existing issues, such as displacement and family instability, are present (International Finance Corporation, 2010). Educational institutions might be required to suspend operations temporarily in response to an emergency situation (Awofisayo, Ibbotson, Smith, Janmohamed, Mohamed, and Olowokure, 2013). Therefore, it is essential to develop protocols for the sudden closure of schools, including strategies for informing parents and guaranteeing the oversight of students until they are picked up. An evaluation of preparedness initiatives in American educational institutions (US Government Accountability Office, 2007) revealed that

certain schools may already have established plans for temporary closures and the continuity of education within their current pandemic response frameworks, thereby providing a basis for further development in this area.

Njoroge (2008) conducted a study on the interaction among school inspectors, school characteristics, and school disaster preparation. The researcher performed interviews and surveys with school inspectors, providing insight into the implementation of the supervision act and the methods used to evaluate and enhance school safety. The study's results indicated that all schools began to enhance safety measures following a school visit. Moreover, they observed that the school's innovative ability for disaster preparedness does not appear to enhance school development following inspections. No effects were seen on the processes for enhancing school safety based on the scores assigned by inspectors, the volume of comments, or the recommendations for improvement following school inspections.

2.4 Assessment of disaster preparedness in public secondary schools

The school management and administration are responsible for implementing rules, standards, and regulations related to basic education institutions. Crooks (2008) asserts that school boards must prioritize school safety initiatives by securing and coordinating financing, staffing, training, professional development, and resources necessary for their execution.

Okumbe (2011) asserts that financial management, a fundamental component of school administration, pertains to the expenses associated with delivering educational services,

the sources of money, and expenditures conducted in an objective manner to fulfill educational objectives. Kimani et al. (2016) observed that budget management, financial controls, governance, and accountability substantially impacted financial management in public secondary schools. Kaguri (2014) contends that budgeting enhances the planning process by quantifying objectives, establishing priorities, coordinating activities, and disseminating plans within the organization; it also serves to motivate and augment accountability, authorize expenditures and activities, and facilitate the control, monitoring, analysis of expenditures, and evaluation of performance.

Kitheka (2016) emphasized that school administration should prioritize creating a learner-friendly physical environment. Furthermore, schools should establish security and disaster preparation strategies that actively include students. School administrators must guarantee that classrooms, dorms, offices, kitchens, restrooms, and other facilities are clean, well-maintained, safe, and suitably located and utilized. The school premises must be delineated and enclosed by a safe gate (Kemunto, et al., 2015).

The Basic Education Regulations (2015) part 30 states that, “every institution of basic education shall develop school rules which shall be subjected to public participation and which shall not be inconsistent with the Basic Education Act 2013 or any other written law”. It further states that, no institution shall implement the rules referred to Regulation 30 until they have been approved by the management of the institution (Republic of Kenya, 2015). Nyabuto (2015) noted that the management should be effective in the management of student discipline through financing of counseling sessions; consulting and supporting the head teacher on matters of student and teacher discipline.

Wanyama (2011) investigated how well secondary schools in Sabatia District, Vihiga County, adhered to health and safety regulations for emergency response. The research indicated that although a significant number of educational institutions adhered to the stipulated safety and standards, a considerable portion had not yet established safety committees.

An insightful examination carried out by Ng'ang'a (2013) concerning the implementation of safety standards and guidelines in Nyeri County uncovered a significant lack of preparedness among staff members in public secondary schools to comply with these safety protocols. The investigation indicates that specific Heads of Departments conveyed a lack of familiarity with the manual, asserting that they had neither come across nor witnessed it previously. This observation corresponds with the insights presented by Muigai (2011), who identified a limited awareness of the Ministry of Education's safety guidelines among educators within institutions. This illustrates the slow advancement in the execution of the safety standards policy by the BOMs.

Kirui et al. (2011) found that only 37% of school administrators had taken safety and security management training, compared to 21.4% of management staff and 40% of security guards. The study focused on the difficulties head teachers face in overseeing security in public secondary schools in Kisii County. This suggests that the individuals in leadership and management roles responsible for safety and security decisions were approaching these vital matters with insufficient comprehension, thereby endangering both lives and property.

Investigations into the influence of budgetary execution on the successful implementation of school safety programs have produced a range of results. The research undertaken by

Wainaina (2012) concerning safety protocols in secondary schools located in the Kikuyu Division of Kiambu County, Kenya, indicated that inadequate funding and a deficiency in capacity building represented considerable challenges faced by principals in the implementation of safety policy. She observed that the execution of safety policies required substantial modifications to the existing infrastructure, the acquisition of safety equipment like fire-fighting tools, and the improvement of competencies within the school community. The study conducted by Omolo and Simatwa (2010) on the assessment of safety policy implementation in public secondary schools in the Kisumu East and West Districts of Kenya revealed that 86.67% of head teachers expressed concerns over inadequate funding, 26.67% identified a lack of skills, and 6.67% highlighted insufficient coordination from the Ministry of Education regarding the dissemination of safety policies. Mito and Simatwa (2012) contend that insufficient budgeting profoundly impacts the effective governance of educational institutions, as it may lead to either excessive expenditure or insufficient allocation, ultimately resulting in the misallocation and mismanagement of financial resources. The study additionally noted that, in conjunction with insufficient budgeting, the delay in the allocation of Free Secondary School Funds constitutes a considerable challenge in financial management, leading to postponed transaction settlements.

Leandri (2011) identified the necessity of financial resources for the installation of safety devices in educational institutions, the formulation of security policy frameworks, and the diligent monitoring of their implementation. Kirui (2011) discovered that the management's budgetary allocation for safety and security concerns constituted less than 10% of the overall school budget. This arose from conflicting interests. Gagawala (2016),

Nyakundi (2012), Omolo and Simatwa (2010), and Wainaina (2012) demonstrate that insufficient financial resources obstructed the execution of safety standards in secondary schools. Gagawala (2016) emphasized the necessity of financial resources for the training of principals, teachers, and students regarding school safety. Chepkurui (2017) challenges this perspective, asserting that the financial implications of school safety programs are not prohibitive; rather, they require a clear vision, effective organization, and strong leadership collaboration.

2.5 Theories Relevant to Current Study

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.

2.5.1 Modern Disaster Theory

The research was grounded on the Modern Disaster Theory proposed by Chen in 2011. The theory posits a contemporary framework of disaster law, comprising a collection of legal principles aimed at addressing catastrophic risks. As noted by Chen (2014), preparedness encompasses the functioning of legal institutions and regulations in the face of disaster, taking into account the risks associated with environmental factors, hazards, and social vulnerabilities. Characterizing disaster preparedness as the efficacy of institutions adjusted for risks articulates the objectives of disaster law in monetary terms. Disaster law should enhance societal readiness for catastrophic occurrences and must implement the most effective framework of regulations when such events transpire. Preparedness stands in contrast to disaster; the impact of a disaster is invariably contingent upon the level of

readiness exhibited by the organization, family, or individual involved. Dissecting vulnerability into its fundamental elements of susceptibility and resilience organizes all four variables along a unified continuum:

Hazard → Susceptibility → Resilience → Capacity

Individuals, communities, and organizations are vulnerable to hazards and thus should be empowered to enhance their resilience. The severity of a disaster's effects can fluctuate based on the extent to which humanity has fashioned an environment prone to harm, one in which both life and property face significant risk, as noted by KESI (2011). Consequently, it is imperative that all institutions, especially educational establishments, establish comprehensive legal frameworks for disaster preparedness, alongside fostering social networks and support systems, to ensure effective disaster management is achieved.

2.5.2 Systemic theory

The framework proposed by Beard indicates that a system can be deemed 'failed' if certain elements are perceived as undesirable by one or more stakeholders involved. Considering this perspective, one might conceptualize fire as a manifestation of systemic failure. The management of fire safety is essential. In this context, management involves the readiness of the system (authority) for fire control, encompassing planning, resource mobilization, and intervention (Rudolf, 2011). The system's failure to adequately consider fire emergency preparedness culminates in disasters that lead to significant destruction. Nevertheless, adopting a systemic perspective involves recognizing the 'dynamic

wholeness' of a situation by identifying patterns and interrelationships within a complex entirety. This suggests the necessity for collaborative actions to be implemented by various stakeholders in addressing fire outbreaks, as they invariably lead to intricate socio-economic challenges.

The system approach, as articulated by Garis (2009), was deemed advantageous in the management of fires within buildings. This involved an emphasis on the enforcement of codes in building constructions, particularly concerning fire protection systems, occupant communication systems, and structural fire safety measures. Additional concerns included the dissemination of knowledge regarding the protective attributes of their structure, the essential measures to undertake in the event of a reported or actual fire emergency, and a comprehension of the operations conducted by fire services. The discussion also encompassed fire suppression, which includes the intricacies of dispatching, response policies, and the various techniques and tactics employed in firefighting.

2.6 Conceptual Framework

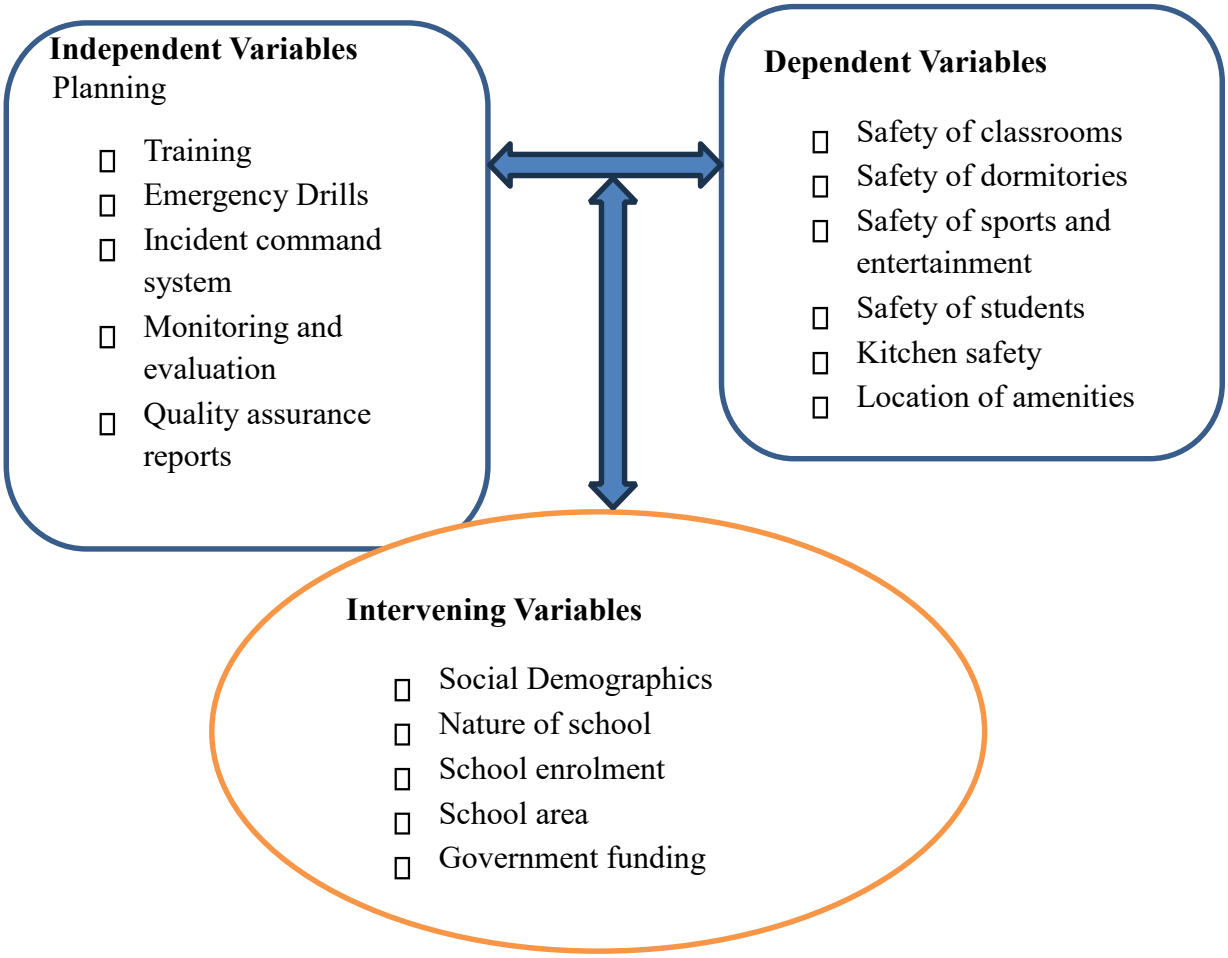

Figure 2.1 Conceptual Model for Disaster Preparedness and safety Standards in Public Secondary Schools of Nairobi County, Kenya.

Source: Researcher (2022)

The standard for school safety emerges from the preparedness for potential disasters within the educational environment. Through vigilance and preparedness, educational institutions can effectively mitigate the risks linked to disasters. Preparedness involves the reduction of risk and the cultivation of readiness, accomplished through education, training, meticulous planning, and strategic leadership. It encompasses all actions undertaken before

an emergency to mitigate impacts and facilitate response and recovery, ultimately striving to meet established standards for school safety.

2.7 Summary of the knowledge gap

This chapter has presented pertinent literature regarding the impact of disaster preparedness on safety standards in public secondary schools within Nairobi County, examined from global, regional, and national viewpoints. The occurrences of disaster have profoundly placed Nairobi County public schools in a state of disarray due to the repercussions it has on both property and human life. The factors contributing to vulnerability to disasters, the extent of public secondary school susceptibility to such events, and the degree of disaster preparedness in accordance with established safety standards collectively influence the efficacy of safety protocols in public secondary schools within Nairobi County. The conceptual framework illustrates that contemporary disaster theory and systems theory concur that sufficient disaster preparedness cannot be achieved without independent variables, emphasizing the interplay among the study variables. The subsequent chapter presents a comprehensive examination of the research methodology employed in the study.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Introduction

This section addresses the research methods utilized in the study. The study delineates the research design, target population, sample size and sampling methods, research instruments, validity and reliability of the instruments, data collecting processes, and data analysis methodologies employed.

3.2 Study Site

The research was conducted in Nairobi County, the capital city of Kenya. Nairobi County constitutes one of the 47 administrative divisions within the Republic of Kenya. The region is adjacent to Kiambu County to the north and west, Kajiado to the south, and Machakos to the east (NCIDP, 2014). Nairobi County is located between the coordinates of 1°09′S 36°39′E and 1°27′S 37°06′E, encompassing an area of 696 square kilometers (270 square miles). The population stands at 4,000,000 individuals, according to data from Nairobi City in 2010.

3.2.1: Nairobi County Administrative Units

Nairobi is segmented into various constituencies, each represented by members of Parliament within the National Assembly. The constituencies in question include Makadara, Kamukunji, Starehe, Langata, Dagoretti, Westlands, Kasarani, and Embakasi. Nairobi is primarily organized into several administrative divisions: Central, Dagoretti, Embakasi, Kasarani, Kibera, Makadara, Pumwani, and Westlands. The majority of the

affluent neighborhoods are located to the west and north-central regions of Nairobi, areas that were predominantly inhabited by European settlers during the colonial era, often referred to as 'Ubabini.' The areas mentioned encompass Karen, Langata, Lavington, Gigiri, Muthaiga, Brookside, Spring Valley, Loresho, Kilimani, Kileleshwa, Hurlingham, Runda, Kitisuru, Nyari, Kyuna, Lower Kabete, Westlands, and Highridge. In contrast, Kangemi, Kawangware, and Dagoretti represent lower-income regions situated in proximity to these more affluent suburbs (Nairobi City Council, 2007).

3.2.2: Nairobi County climatic condition

The city is situated along the River Athi in the southern region of the country, with an elevation of 1,795 metres (5,889 ft) above sea level. Nairobi is categorized under the Köppen climate classification as possessing a subtropical highland climate. During the evenings, particularly in the June and July months, temperatures may decline to as low as 9 °C (48 °F), resulting in a notably cool atmosphere. The period characterized by the most abundant sunshine and warmth extends from December to March, during which daytime temperatures typically hover around the mid-twenties. There exist two distinct rainy seasons; however, the precipitation may be characterized as moderate. The period characterized by the highest cloud cover occurs immediately following the initial rainy season, persisting until September, during which time the atmosphere is predominantly overcast with intermittent drizzle. Nairobi's proximity to the equator results in negligible seasonal variations. The seasons are categorized as the wet season and the dry season. The variation in the timing of sunrise and sunset remains minimal throughout the year due to consistent underlying factors.

3.2.3 Nairobi County as an Economic Hub of Kenya

Nairobi hosts the Nairobi Securities Exchange (NSE), recognized as one of the largest in Africa. The NSE received formal acknowledgment as an international stock exchange by the London Stock Exchange in 1953. The exchange ranks as the fourth largest in Africa regarding trading volumes and holds the fifth position in terms of market capitalization relative to GDP. The city serves as the regional hub for numerous international corporations and organizations. In 2007, General Electric, Young and Rubicam, Google, Coca-Cola, IBM Services, Airtel, and Cisco Systems made the strategic decision to relocate their African headquarters to the city. The United Nations Office located in Nairobi serves as the headquarters for both UN Environment and UN-Habitat. A number of Africa's most prominent corporations have established their headquarters in Nairobi. Ken Gen, recognized as the largest African stock outside of South Africa, is situated in the city. Kenya Airways, recognized as Africa's fourth largest airline, operates from Nairobi's Jomo Kenyatta International Airport (Ranter, 2017). The array of goods produced in Nairobi encompasses clothing, textiles, construction materials, processed foods, beverages, and tobacco products. A number of international corporations operate manufacturing facilities in and near the city. The list encompasses Goodyear, General Motors, Toyota Motors, and Coca-Cola. Nairobi boasts a significant tourist industry, serving as both a destination for visitors and a crucial transport hub (Roger, et al., 2013).

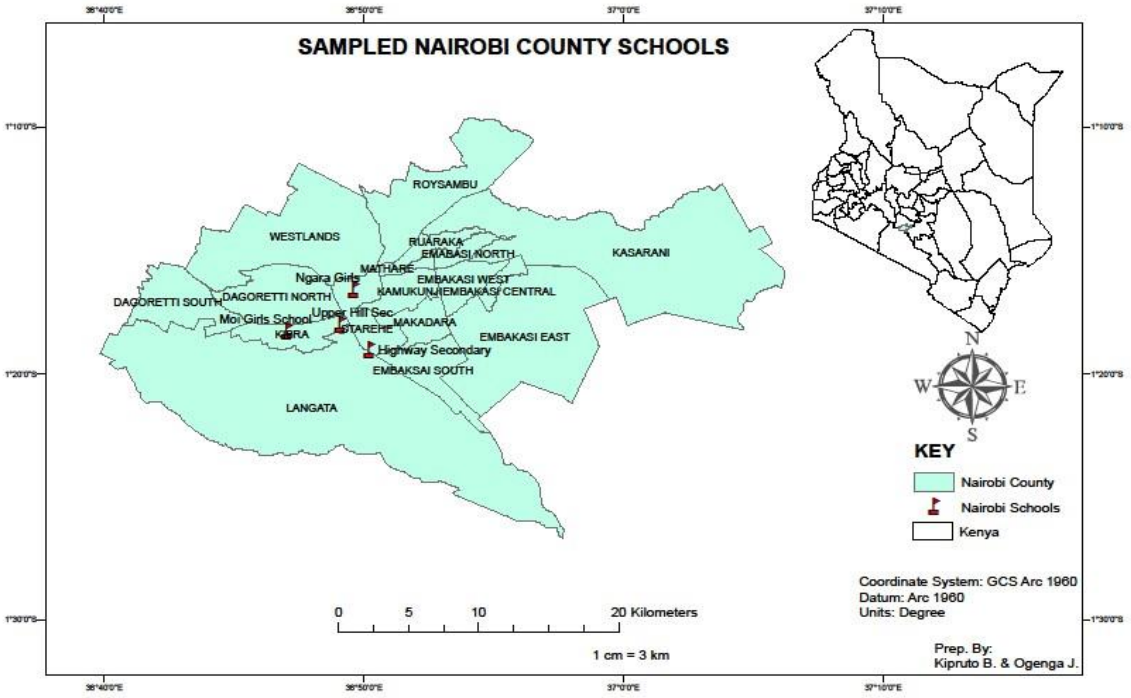

Figure 3.1 Map of Public schools in Nairobi County, Kenya.

Source: Researcher (2022)

3.3 Research Design

The research employed a descriptive design methodology. The design was considered appropriate for the study due to its capacity to investigate the elements influencing disaster preparedness in secondary schools within Nairobi County. This is attributable to its capacity to encapsulate the statistics by illustrating responses to all conceivable questionnaire items, thereby facilitating the identification of necessary modifications (Bryman, 2008). Descriptive survey studies focus primarily on ascertaining the nature of existing conditions (Mutai, 2000). Consequently, a descriptive survey design has the potential to provide significant insights into a particular phenomenon. Surveys serve as

effective instruments for gathering original data aimed at examining the attitudes, orientations, and opinions of a substantial population. The descriptive survey design is particularly suitable when the objective of the study is to formulate a comprehensive depiction of a phenomenon (Wiersma and Jur, 2005).

3.4 Study population

The research cohort included all public secondary educational institutions within Nairobi County. The County Director of Education for Nairobi County, as reported in the Statistics section (2019), indicates that there exist 73 public secondary schools within Nairobi County. The research focused on school principals, educators, students, and officials from the ministry, specifically those responsible for quality assurance and standards. Furthermore, the study population included the Nairobi County government department of Disaster Management, the Fire department, the Kenya Red Cross, St. John's Ambulance, the board of management, the Parent Association, and the Officer Commanding Station.

3.5 Sampling Strategy

Polit and Hungler (1999) notes that sampling strategy is a plan set forth to be sure that the sample used during the research represents the population from which the sample is drawn.

3.5.1 Sampling Technique

The research employed a simple random sampling method to choose students, while a purposive sampling technique was utilized to identify key informants from the Ministry of Education, Kenya Red Cross, St. John's Ambulance, the Director of Emergency Services

in Nairobi County, and principals of public secondary schools. The simple random sampling technique involves the researcher identifying groups within the population and subsequently selecting from each group (Oso and Onen, 2005).

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

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**

Source: Field Data, (2023)

3.5.1 Sample Size

Fischer (2004) indicates that for a population of 10,000 or more units, a sample size of 384 is deemed appropriate. This research involved a sample of 384 participants drawn from diverse public secondary schools in Nairobi County, utilizing a multistage random sampling method for selection. Equation 3.1 elucidates the methodology employed in determining the sample size.

$$\boldsymbol{n = \frac{Z^2 pq}{d^2}} \quad \textbf{.....3.1}$$

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, $n = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2}$ = 384.16, which to the nearest whole number is 384.

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

At first, a compilation of the 73 public secondary schools was acquired from the statistics section of the County Director of Education Office. A framework comprising seven layers

was established, categorized by the presence of boys, girls, or a mixed group. A method of simple random sampling was employed to select 6 sub-counties, representing 30% of the total sub-counties within Nairobi County. The schools selected for the study in each sub-county constituted 30% of the total number of public secondary schools within the respective sub-county. In this study, the sample size consists of 458 respondents, which includes 6 quality assurance and standards officers from various sub-counties, 3 officials from the Kenya Red Cross, 3 representatives from St. John's Ambulance, 3 officials from the fire department, 1 representative from the department of disaster management, 13 teachers responsible for quality assurance and standards from selected schools, 13 head teachers, 13 members of the board of management, 13 members of the parent association, 6 officers commanding stations, 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

Source: Field Data, (2023)

Table 3.2 presents the quantity of sampled sub-counties alongside the corresponding number of public secondary schools designated for sampling in the course of this study. The quantity of students at each school was determined using proportionate random

sampling methods. In coeducational institutions, 30% of the sample comprised individuals of the opposite gender to guarantee adequate representation of all genders within the sample. Table 3.3 presents the sample size of 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 (SCQUASO)	6	Purposive sampling
Branch Coordinator Kenya Red Cross	3	Purposive sampling
Branch Coordinator St. Johns Ambulance	3	Purposive sampling
Branch Heads Fire department	3	Purposive sampling
Director Department of Disaster Management	1	Purposive sampling
Head teachers	13	Purposive sampling
Teachers in charge of Quality Assurance and Standards	13	Purposive sampling
Chairs of Board of Management,	13	Simple random Sampling
Chairs of Parent Association,	13	Simple random sampling
Officer Commanding Station	6	Simple random sampling
Students	384	Multi-stage sampling

Source: Field Data, (2023)

3.6 Data Collection Instruments

The process of data collection involves the systematic gathering of both qualitative and quantitative information, which serves as a foundation for analysis in research (Bogdan and Biklen, 2007). Data was collected from both primary and secondary sources. The research employed a comprehensive methodology, integrating both quantitative and qualitative data to effectively tackle the research questions posed.

3.6.1 Primary data

To collect primary data, the following instruments were used.

3.6.1.1 Questionnaires

Closed-ended questions were employed to provide a selection of responses. Systematic inquiries were employed to facilitate straightforward comparison and measurement of the outcomes. In addition to closed-ended questions, open-ended questions were employed to allow respondents the freedom to articulate their perspectives. Appendix II

3.6.2 Interview Schedules

In-depth qualitative interviews were conducted to gather data from head teachers of selected schools within Nairobi County. Interview guides provide comprehensive insights into disaster preparedness and safety standards within public secondary schools in Nairobi County. The open-ended interview guide questions are designed to elicit respondents' insights regarding the diverse factors that comprise disaster preparedness and safety standards, thereby facilitating the attainment of the research's objectives.

3.6.3 Focus Group Discussion

A focus group discussion entails convening a collective of individuals to engage in discourse regarding a particular issue, thereby drawing out a diverse array of perspectives on the matter at hand. Discussions within focus groups were conducted to gather insights regarding the disaster preparedness and safety measures in schools, involving officials

from the ministry of education, representatives from Kenya Red Cross and St. John's Ambulance, educators responsible for quality assurance, and students. The three groups, each consisting of twelve participants, were facilitated by a researcher who presented the topics for discussion and aided the group in engaging in dialogue. The assembly included representatives from school management, students, officials from the ministry of education, and emergency service providers to engage in a comprehensive discussion regarding disaster-related issues in schools and the preparedness of public secondary institutions to address emergency situations. The focus group discussion facilitated a flexible exploration of diverse topics related to school safety. Nevertheless, certain viewpoints may have been expressed with considerable intensity, while others could remain unarticulated due to the influence of group dynamics.

3.6.4 Observation Checklist

A qualitative research methodology encompasses various techniques, including participant observation. The qualitative method facilitates a deeper comprehension of life experiences, allowing for reflection on the interpretations and collective significance of individuals' daily social existence and realities (Marshall and Gretchen, 1999). The qualitative method was employed to gather primary data via personal observation, wherein the researcher scrutinizes scenarios during disaster response in educational institutions to ascertain the degree of preparedness within these establishments.

Table 3.4 Observation checklist for assessing the safety of physical infrastructure in public secondary schools in Nairobi County, Kenya

	Exceeds expectation	Meets expectation	Below expectation	Unacceptable	Not observed
Electricals					
Presence of security protocol and guards					
Classroom physical condition					
Classroom population					
Dormitory population					
Other amenities' conditions					

Source: Researcher, (2023)

3.6.5 Document Analysis

A comprehensive literature review was undertaken through the meticulous analysis of pertinent documents concerning disaster preparedness and safety standards within educational institutions. A comprehensive examination of the current policy regarding the preparedness of schools in response to disasters was conducted to collect data that enhances the understanding of disaster preparedness and safety standards. The analysis encompasses a range of documents, including journals, records pertaining to disaster management, as well as blogs and social media contributions relevant to the studies.

Table 3.5 Showing Data Collection Instruments for the Study on Disaster Preparedness and Safety Standards in Public Secondary Schools of Nairobi County, Kenya.

Study population	Sample size	Sampling Technique	Data collection instrument
Sub county Quality assurance and standards officers	6	Purposive sampling	Interview Schedules Appendix 3
Branch Coordinator Kenya Red Cross	3	Purposive sampling	Interview Schedules Appendix 4
Branch Coordinator St. Johns Ambulance	3	Purposive sampling	Interview Schedules Appendix 4
Branch Head Fire department	3	Purposive sampling	Interview schedules Appendix 5
Director 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
Chairs Board of Management	13	Purposive sampling	Interview Schedules Appendix 3
Chairs 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

Source: Field Data (2023)

3.7 Ethical Consideration

Subsequent to the supervisors' endorsement of the proposal, the researcher acquired a letter of recommendation from the Directorate of Postgraduate Studies at Masinde Muliro University of Science and Technology. The researcher requested authorization from NACOSTI prior to beginning the data gathering procedure. The respondent's informed

permission was obtained via an introduction letter, and any concerns they voiced were addressed prior to their participation. The participants were guaranteed secrecy. Participation was restricted to selected respondents who consented to engage in the study, and the data was utilized solely for its intended purpose. The researcher acknowledged participants' concerns over the study and told them that participation was optional, allowing respondents to quit at any moment.

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 a research tool's capacity to acquire data that is credible, transferable, objective, and reliable (Matula et al., 2018). Kimberlin and Winterstein (2008) assert that an instrument may only be deemed genuine if it meets the requisite reliability criterion. The content validity of the instrument was established by soliciting the expert opinions of the designated University supervisor and personnel from the school of disaster management about the substance of the questionnaires and interview schedules. The supervisors conducted a peer evaluation of the items and proposed methods for enhancement to yield more precise and significant results (Matula, et al., 2018).

3.8.2 Instrument Reliability

Reliability refers to the degree to which a data collection method yields consistent outcomes under uniform settings (Kothari, 2008). A pilot research was done in two

randomly selected secondary schools in Kiambu County to assess dependability, comprising 3.4% of the sample size. This aligns with the advice by Mugenda & Mugenda (2008) of a sample size ranging from 1% to 10%. The exercise was reiterated after a fortnight. The scores from both assessments were connected to demonstrate the dependability of the tools. The outcomes derived from pretesting were computed utilizing Pearson's Product Moment Correlation Coefficient Formula.

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3.9 Limitations

The following were the limitations and delimitation of the study;

i. Respondents may have been reluctant in giving information fearing the confidentiality and sensitivity of the study the data to be collected. The participants were assured of their confidentiality.

ii. Problem in eliciting information from the respondents as the information required is subject to areas of emotions especially on the students whose friends succumbed to the effects of the disaster and the parents at large. Focus group discussion were only directed to the head teachers, Ministry of education Officials, Kenya Red Cross officials and Officials from St. Johns Ambulance excluding students due to psychological problems related to past occurrences.

iii. Where possible observation and document analysis was used to compliment some areas that the researcher felt that can also contribute to post traumatic stress to the respondents.

3.10 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 Data Analysis and presentation

The data was initially revised to eliminate any ambiguities presented by the respondents. The coding process was conducted to categorize the responses to the questions accurately. The coded items underwent analysis utilizing Statistical Package for Social Sciences (SPSS) version 22 software. The analysis of quantitative data was conducted utilizing descriptive statistics, including frequency distribution, percentages, mean, and principal component analysis. The qualitative data obtained from the interview schedules was systematically organized into relevant themes, categories, and patterns associated with the study. The results from the data analysis will be presented in tables, charts, and graphs.

Table 3.6: Summary of Data Analysis per Specific Objective of the Study on Disaster Preparedness and Safety Standards in Public Secondary Schools of Nairobi County, Kenya

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

Source: Field Data (2023)

CHAPTER FOUR

THE LEVEL OF DISASTER PREPAREDNESS IN PUBLIC SECONDARY SCHOOLS IN NAIROBI COUNTY, KENYA

4.1 Introduction

This chapter presents the findings of the study giving an understanding of the respondents' experiences. It gives characteristics of the social demographics of the study respondents. The questionnaire administered to the respondents had a response rate of 100%. The findings were discussed and associated with the first research objective which was to establish the level of disaster preparedness in public secondary schools in 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 for the Study on Disaster Preparedness and Safety Standards in Public Secondary Schools of Nairobi County, Kenya

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

Source: Researcher, (2023)

The respondents were asked to state their gender. Table 4.1 shows that the number of students who participated in the study, according to the findings 57.6% (n=221) were male.

Conversely, 42.4% (n=163) represents the number of females who participated in the study. Data shows that, males were more compared to females who participated in the study. Mururi's (2014) findings indicated that mixed schools were more vulnerable to disasters compared to single gender schools. This was in addition to indicating that there was a significant relationship between the type of secondary school and vulnerability to disasters.

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 in the Study on Disaster Preparedness and Safety Standards in Public Secondary Schools of Nairobi County, Kenya

	Frequency	**Percent**
13-15yrs	**160**	41.7
16-18yrs	196	51
Above 18yrs	28	7.3
Total	**384**	**100**

Source: Researcher, (2023)

Table 4.2 shows the age distribution of the participants in the study. In the study, 41.7% (n=160) represented participants aged 13-15 years. 16 -18 years (n=196) represented 51.0% of the total population. Student aged above 18 years (n=28) represented 7.3% of the total population. From the observation, students in age bracket 16-18 years were the most participants in the study. According to Kishoyian, (2021) students' age together with gender, religion, and year of study have no significant relationship with fire disaster preparedness.

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

This section covers the first objective of the study which looks at level of disaster preparedness in Nairobi County. First the study sought to establish the types of disasters that public secondary schools face, presence of disaster evacuation plans embraced by public schools, the frequency of emergency drills, training programmes of fire safety and other emergencies, community involvement in disaster safety awareness and disaster planning.

4.3.1 Types of disasters that public secondary schools face

The study sought to establish the types of disasters that public secondary school face, the respondents were asked to indicate common types of disasters that they face in the schools. The information from the respondents was collected through the questionnaire and the findings were as indicated in figure 4.1

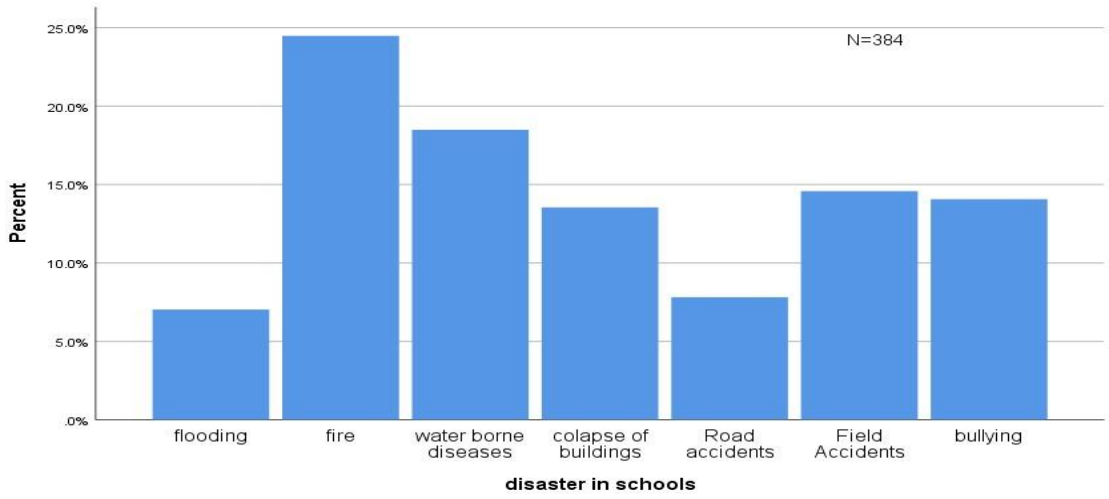

Figure 4.1 Types of disaster that institutions in Nairobi County, Kenya are vulnerable to

Source: Researcher (2023)

To establish the type of disaster the institution is vulnerable to, the respondents were asked about previous disasters. Figure 4.1 shows the types of disasters which most of secondary school experienced previously or any time. According to findings, fire is the most experienced disaster in schools with a 94 (24.5%) frequency occurrence, water borne diseases 71 (18%), field accidents 56 (14.6%) bullying 54 (14.1%) collapse of buildings 52 (13.5%) and road accidents 30 (7.8%). Flooding has the least occurrence in schools with 27 (7.0%). The chi square analysis ($X2 = 56.276$, $p<.01$) indicated a high level of significance. Based on the data, the institutions are highly vulnerable to fire. This aligns with the consensus among all key informants who contributed to this study, indicating that the majority of schools are highly susceptible to fire disasters. All the focus group discussions reached a consensus that fire and waterborne diseases represent the two predominant crises confronting schools in Nairobi County. The rising incidence of fire disasters within educational institutions is resulting in tragic loss of life, significant property damage, and the disruption of educational programs (Gichuru, 2013). The results align with data gathered from interview schedules, wherein an official from the Kenya Red Cross observed that a significant proportion of the disasters they address in public secondary schools within Nairobi County are related to fire incidents.

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

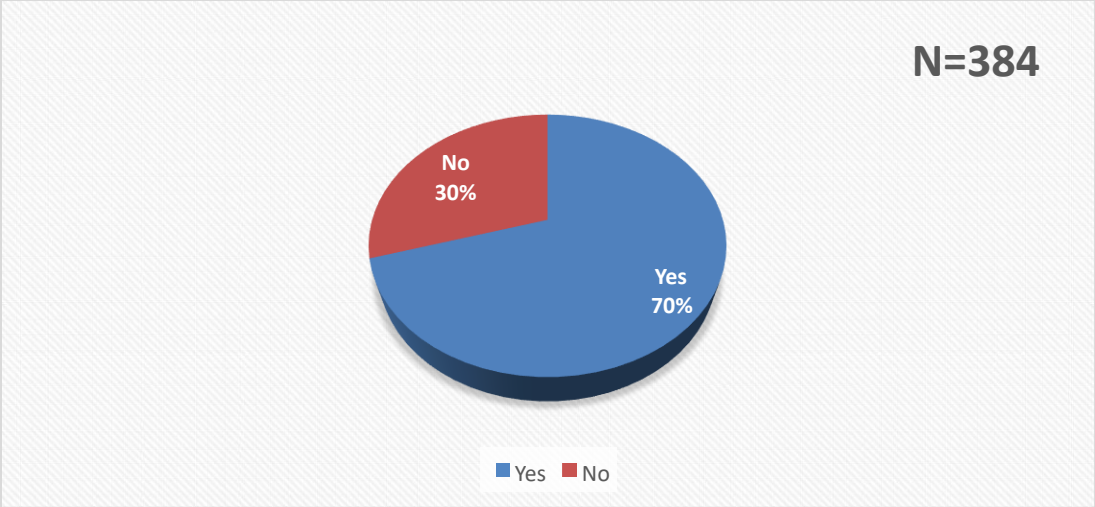

Figure 4.2 Respondents on disaster experience in the sampled schools

Source: Researcher, (2023)

The respondents were asked if their schools experience any kind of disaster. Figure 4.2 shows the opinions of students on whether their schools experience any kind of disasters. Findings indicates that 70.31% of the participants agreed that their schools experienced some kind of disaster. On the other hand, only 29.69% of study participants argued that their schools did not experience any kind of disaster. Accordingly, the study establishes that most of schools involved in the study experienced disaster.

4.3.3 Schools emergency evacuation plans

The study sought to find out if there are emergency evacuation plans in public secondary schools in Nairobi County, the respondents were asked to indicate if there were emergency evacuation plans that were put in place. The findings are as shown in figure 4.3

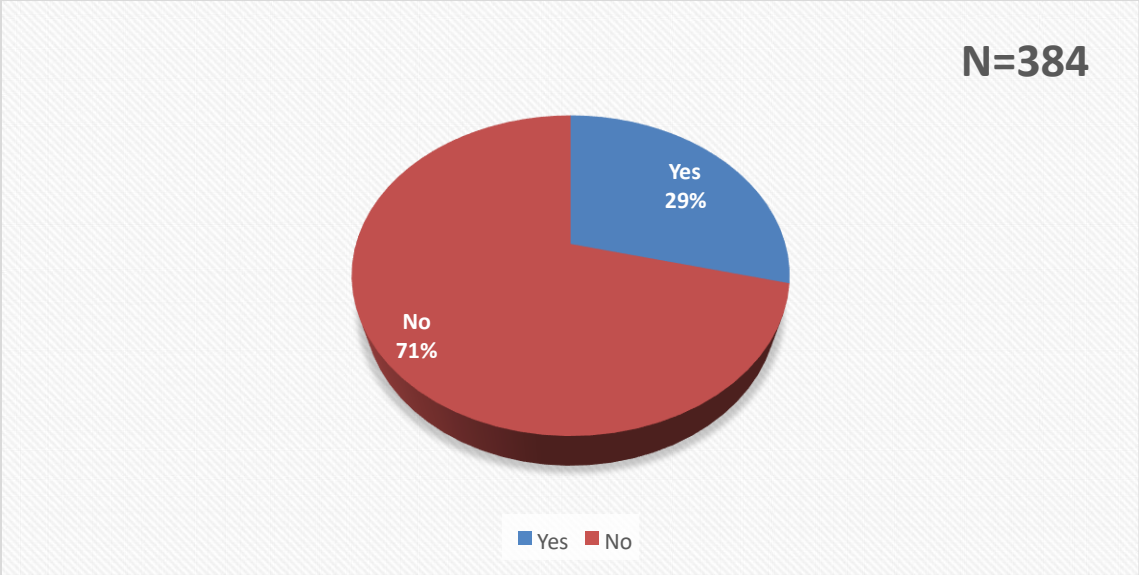

Figure 4.3 Schools emergency evacuation plans in case of a disaster

Source: Researcher, (2023)

To determine if schools involved in the study had emergency response plans, the respondents were asked if the schools did have an evacuation plan in place in case of a disaster. Figure 4.3 reveal that 28.91% of students agreed that their schools did have evacuation plan, 71.09% revealed that their schools did not have plans for emergency evacuations. Accordingly, the study found that most schools involved in the study have evacuation plan for disaster preparedness. This is similar to Mwenga, (2011) who found that most schools did not have site plans that included building layouts and evacuation routes to be used in the case of a natural disaster hence concluding that many schools still were not adequately prepared in the event of a natural disaster.

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 sampled institution carry out emergency drills for disaster preparedness in Nairobi County, Kenya

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

Source: Researcher, (2023)

The question aimed to establish the preparedness and response of students in case of a disaster. Table 4.3 shows the frequency at which the schools involved in the study conducted emergency drill. Findings indicates that most schools do not conduct emergency drills (61.46%); 20.31% of students suggests that their schools conduct emergency drills yearly; 12.24% suggests that their schools conducted emergency drill after every six months; while 5.99% conduct emergency drills termly.

These findings are similar to those of Gichuru, (2013). They indicated lack of fire drills, lack of disaster preparedness plans and First Aid Kits, lack of basic capacities to respond to disasters. From the interviews, one of the officials from St Johns ambulance revealed that they encourage schools and institutions to conduct drills in an effort to ensure preparedness and efficient response to 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 in public secondary schools of Nairobi County, Kenya.

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

Source: Researcher (2023)

When asked on training programs on the use of fire safety facilities in the institution, as shown in table 4.4, 10.16% (n=39) of the total population determining that schools conduct most frequent training. 13.02% (n=50) of the total population responded training programs are done frequently. 28.65 (n=110) of students indicated trainings on fire safety facilities are done less frequently. The highest percentage (48.17%) revealed that the trainings are never done. The researcher observed that only a few schools had fire extinguishers which can be used to fight small fires before they spread. Schools had few control measures in place in case of a disaster, such as pre-determined evacuation routes, clear definitions of evacuation areas, and pre-determined assembly points outside the school premises (Kukali, 2013). Observations and interviews revealed that most of the respondents had little knowledge on the use of safety equipment. For instance, one of the fire department officials

said “Some schools have fire safety equipment like fire extinguishers yet very few members of the school community know how to use 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 of public secondary schools of Nairobi County, Kenya, attendance training on disaster safety.

	Frequency	Percent
Yes	55	14.32
No	329	85.68
Total	**384**	**100.0**

Source: Researcher, (2023)

Table 4.5 indicates that only 14.32% (n=55) of the total population have attended disaster safety training. 85.68% (n=329) revealed they never attended training on disaster safety. This represented majority of the population. The researcher observed that the respondents had inadequate knowledge on disaster preparedness and safety standards in schools. This corresponds with Gatua’s (2015) findings where most of the research participants lacked adequate knowledge on safety standard manual for schools and were yet to receive adequate training on disaster preparedness and safety.

Ayonga (2016) in his study on “An Investigation of Fire Emergency Preparedness in Kenyan Schools: A Case Study of Public Secondary Schools in Nairobi” proposed that teaching staff, workers and students be trained in Fire Emergency response. This is after

findings indicating that even though most schools had the Fire Fighting Equipment, they are not adequately prepared for Fire Emergencies due to lack of proper training of teachers, staff and students and inaccessibility of these equipment. The interviewed official from department of disaster management made a similar suggestion which is to train staff and students in disaster preparedness and response.

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 in public secondary schools of Nairobi County, Kenya

	Frequency	Percent
Yes	97	25.26
No	287	74.74
Total	**384**	**100.0**

Source: Researcher, (2023)

As shown by table 4.6, 25.26% (n=97) of the participants had community awareness sessions on disaster safety. 74.74% (n=287) of the participants indicated they didn't have community awareness sessions on disaster safety.

Omari *et al*, (2021) recognised the significance of staff awareness on safety through the findings which indicated a significant relationship between principals' staff awareness and management of disaster. Their study went on to recommended further frequent

sensitization on disaster management to ensure teachers are well aware of its importance in preventing disasters so as to promote learning and avoid loss of lives. One of the Officer Commanding Station suggested that community awareness sessions should be encouraged and be done regularly as the community are the first responders to emergencies.

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 public secondary schools of Nairobi County, Kenya in response to disasters.

	Frequency	Percent
Highly	13	3.39
Moderately	62	16.15
Low	208	54.16
I don't know	101	26.30
Total	**384**	**100.0**

Source: Researcher (2023)

The question aimed to investigate the level of preparedness of schools involved in the study based on the perception and opinions of the students. Table 4.7 indicate that 26.3% (n=101) didn't know the rate of preparedness of their school's response to disasters. 54.16% (n=208) gave their rating as low; 16.15% suggests that rate was moderate while only 3.39% felt that the rate was high. This corresponds with the researcher's observation which indicated that many schools did not have clear communication strategies to use during an emergency. This was because they had no specific plans that outlined their key roles and

responsibilities during an emergency. Furthermore, some schools had no first aid kits, while others had a few basic first aid kits that were not well stocked with essential drugs, and some of the drugs expired. Therefore, they could not be used to help students suffering from minor injuries (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 public secondary schools of Nairobi County, Kenya

	Frequency	Percent
Yes	77	20.05
No	307	79.95
Total	384	100.0

Source: Researcher (2023)

The question aimed to investigate if schools involved in the study had plans in place for disaster emergency response. Findings indicates that 79.95% (n=307) of students revealed that schools lacked plans for disaster emergency response. While only 20.2% (n=77) argued there were plans in place disaster emergency response. Schools had few control measures in place in case of a disaster, such as pre-determined evacuation routes, clear definitions of evacuation areas, and pre-determined assembly points outside the school premises. Kukali (2013), noted that schools lacked clearly defined roles among teachers, students, and support staff during an emergency. The researcher noted that most of the

interviewed head teachers, teachers, board of management and parent's association did not have contacts of the 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 public secondary schools in Nairobi County, Kenya.

	Frequency	**Percent**
Very important	204	53.13
Important	103	26.82
Not important	22	5.73
I don't Know	55	14.32
Total	**384**	**100**

Source: Researcher, (2023)

The question aimed to determine how students perceive disaster planning in preparedness for disaster. Findings, indicates that 53.13% (n=204) suggests it is very important. 26.82% (n=103) agreed that disaster planning is important while 5.73% of the respondents felt that it was not important. 14.32% did not know whether disaster planning for safety in schools was important or not. Schools had few control measures in place in case of a disaster, such as pre-determined evacuation routes, clear definitions of evacuation areas, and predetermined assembly points outside the school premises. The study found that most students perceive disaster planning to be important in preparedness for disaster and ensuring safety standards.

Similarly, parents' association, board of management, head teachers and teachers shared the same sentiments when interviewed. According to Wanjala and Onyango (2018), educational planning heavily forms the basis for disaster awareness. It starts with a vision to bring change. Activities to be undertaken in the context of disaster risk management are identified to enable schools have proper disaster awareness hence managing the disaster risks better.

4.4 Chapter Summary

The study sought to determine the level of disaster preparedness among public secondary schools in Nairobi County. Noteworthy discoveries indicate that educational institutions demonstrate a marked vulnerability to fire-related occurrences when juxtaposed with other types of calamities. The participants recognized that their institutions had faced a significant crisis. The findings revealed that most educational institutions involved in the study have established an evacuation plan to ensure readiness for potential disasters. Emergency drills are frequently disregarded, students have not engaged in training concerning the utilization of fire safety equipment, and community awareness sessions are persistently ignored. While most respondents recognized the lack of disaster emergency response plans in educational settings, they also underscored the essential importance of disaster planning to guarantee safety within these institutions.

CHAPTER FIVE

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

5.1 Introduction

This chapter addresses objective two and it presents 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

	Frequency	Percent
High population	274	71.35
Low population	73	19.01
I don't know	37	9.64
Total	**384**	**100**

Source: Researcher, (2023)

Table 5.1 shows that majority of the respondents felt that the schools were highly populated. 19.01% of the students responded that the schools had a low population. The findings correspond with the researcher's observation. The researcher observed that the

classrooms and dormitories were majorly crowded. Some were filled to capacity giving rise to the need more capacity for the schools. The results correspond with those articulated by Gatua (2015), whose study on the safety conditions of physical infrastructure—including classrooms, dormitories, sanitation facilities, laboratories, and kitchens—in public secondary schools in the Nairobi West Region of Kenya revealed that safety measures were either inadequate or completely lacking in specific dormitories of the schools assessed. Furthermore, the fire extinguishers that were present were not positioned in readily accessible locations and were inoperative. Students articulating apprehensions regarding the safety of their dormitories highlighted deficiencies in facilities, overcrowding, water shortages, and unsanitary conditions in bathrooms and toilets.

5.3 Allocation of resources

The study sought to determine the impact of resource allocation on disaster preparedness and safety standards in public secondary schools in Nairobi County. Most of the head teachers decried inadequate resources in their efforts in ensuring disaster preparedness and response. Their statements corresponded with those of officials that responded to disasters in these schools. For instance, one of the Kenya red cross officials commented “most of the schools especially the low level public secondary school have inadequate resources and can barely afford the basic necessities to respond to emergencies.” Kimathi (2015), noted that lack of funds is one of the most important causes of the vulnerabilities of secondary school buildings. The lack of staff and funds limits the capacity of the institution to fully develop its facilities. There are no professionals who are trained to handle disasters.

Similarly, Kukali (2013) found that the causes of vulnerability mentioned include lack of funds, low level of participation, poor management, and inadequate infrastructure. The findings show that lack of funds, poor management, and inadequate infrastructure contribute to vulnerabilities. Most of these institutions rely on external sources for funding which cause delays in implementing development projects.

According to FEMA (2009), to avert the disaster, emphasis should be on the availability of funds, training staff on disaster preparedness and evacuation procedures, and taking cognizance of the factors that create vulnerability with a focus on school facilities.

5.4 Organization structure

In establishing if the school's organisation structure had a role to play in disaster preparedness and safety standards, the researcher observed that most schools did not have personnel appointed to be in charge of emergencies. Also, most of the schools lacked appointed teachers in charge of quality assurance and those who had, were insufficiently trained in that aspect. This could hinder the implementation of policies and achieving the standards for safety. Nyakundi (2012) also found the same result and argued that it because schools failed to incorporate clear policies on the level of security required for authorized access, including the roles and responsibilities of teachers, students, and support staff during an emergency.

Gichuru (2013) found that most school stakeholders lacked training on fire safety because there has never been a need for fire safety training and there were no materials to teach. The researcher went on to recommended that the management of schools should consider

increasing the firefighting equipment for them to be adequate and ensure that they are regularly inspected.

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 in public secondary schools in Nairobi County, Kenya

	Frequency	**Percent**
Yes	93	24.22
No	291	75.78
Total	**384**	**100**

Source: Researcher (2023)

When asked when asked whether they had training on disaster preparedness and safety standards, majority of the respondents (75.78%) lacked training. Only 24.22% of the students admitted to have been trained on disaster preparedness and safety standards.

This corresponds with Gatua's (2015) findings where most of the research participants lacked adequate knowledge on safety standard manual for schools and were yet to receive adequate training on disaster preparedness and safety. According to Ng'ang'a (2013), inadequate training of students on safety was a bad predictor of compliance with the safety standards manual by schools. She recommended that teachers be trained on safety with an aim of improving their capacity to teach learners on the same.

Ayonga (2016) in his study on "An Investigation of Fire Emergency Preparedness in Kenyan Schools: A Case Study of Public Secondary Schools in Nairobi" proposed that teaching staff, workers and students be trained in Fire Emergency response. This is after findings indicating that even though most schools had the Fire Fighting Equipment, they are not adequately prepared for Fire Emergencies due to lack of proper training of teachers, staff and students and inaccessibility of 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.

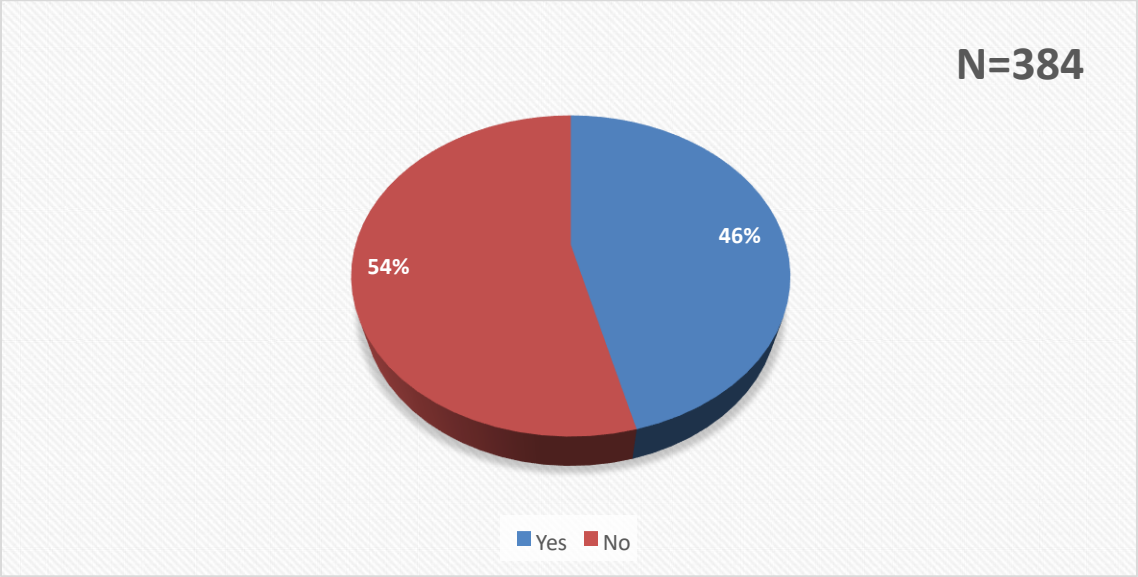

Figure 5.1 Availability of school dispensary in public secondary schools in Nairobi County, Kenya.

Source: Researcher (2023)

The findings show that only 46.02% of the schools had a school dispensary. 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. This means that majority of the schools lacked personnel trained to handle medical emergencies. Also, some did not have the necessary equipment to handle emergencies. One of the teachers suggested that the school should acquire appropriate medical equipment for them to be able to offer basic medical emergencies and treatment.

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 in public secondary schools in Nairobi County, Kenya

	Frequency	Percent
Yes	191	49.74
No	193	50.26
Total	**384**	**100**

Source: Researcher (2023)

Table 5.3 shows that 50.26% of the school buildings lack emergency exit routes. Only 49.74 of the buildings had emergency exit routes. In making observations on the existence of emergency exit routes, the researcher considered the escape of persons from building in the event of an emergency. It included checking for the presence of exit door/ corridor,

emergency escape route and labelled exit. With most of the school buildings lacking emergency exit routes, it hinders meaningful evacuation and response in case of a 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 in public secondary schools in Nairobi County, Kenya

	Frequency	Percent
Yes	183	47.66
No	201	52.34
Total	**384**	**100**

Source: Researcher (2023)

When asked on the availability of assembly points in case of an emergency, 47.66 of the students responded positively while 52.34% responded with a no. These findings are in table 6.4 This corresponded with the researcher's observation which was that most of the schools lacked well labeled assembly points. This implies that the students have no idea on where to go in case of an emergency.

Kihila (2017) found identical findings, demonstrating that a majority of educational facilities lacked apparent fire assembly points. Furthermore, the findings indicated that more than fifty percent of the participants were unable to operate the installed firefighting apparatus, and a considerable proportion had never had any instruction in firefighting and prevention. The findings indicate that higher education institutions are insufficiently

prepared for fire emergencies, highlighting the need for comprehensive measures to rectify this shortcoming.

5.9. Water and electrical facilities

Water and electricity were 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 in public secondary schools in Nairobi County, Kenya

	Frequency	Percent
Strongly agree	14	3.6
Agree	24	6.3
Undecided	49	12.8
Disagree	132	34.4
Strongly disagree	165	43
Total	**384**	**100**

Source: Researcher (2023)

The finding in Table 5.5 shows majority of the schools did not have water problems since the water was reliable since 165 (43.0%) strongly disagreed, 132 (34.4%) disagreed, 49 (12.8%) were undecided, 24 (6.3%) agreed while 14 (3.4%) strongly agreed that water was reliable. The principals informed the study during the interview that the school rely on Nairobi County water for supply where in some case they also face water rationing. Some heads were in agreement that in some cases they are forced to by water from water boozers in order to cater for the deficit. This was in agreement with all the FGDs who informed the study that some schools have been forced to dig boreholes just to ensure that schools have

water. When asked on water treatment most principals were skeptical and could not clearly indicate the frequency of water treatment.

On electrical facilities and if they are the cause of fires in schools the responses were as shown in figure 5.2.

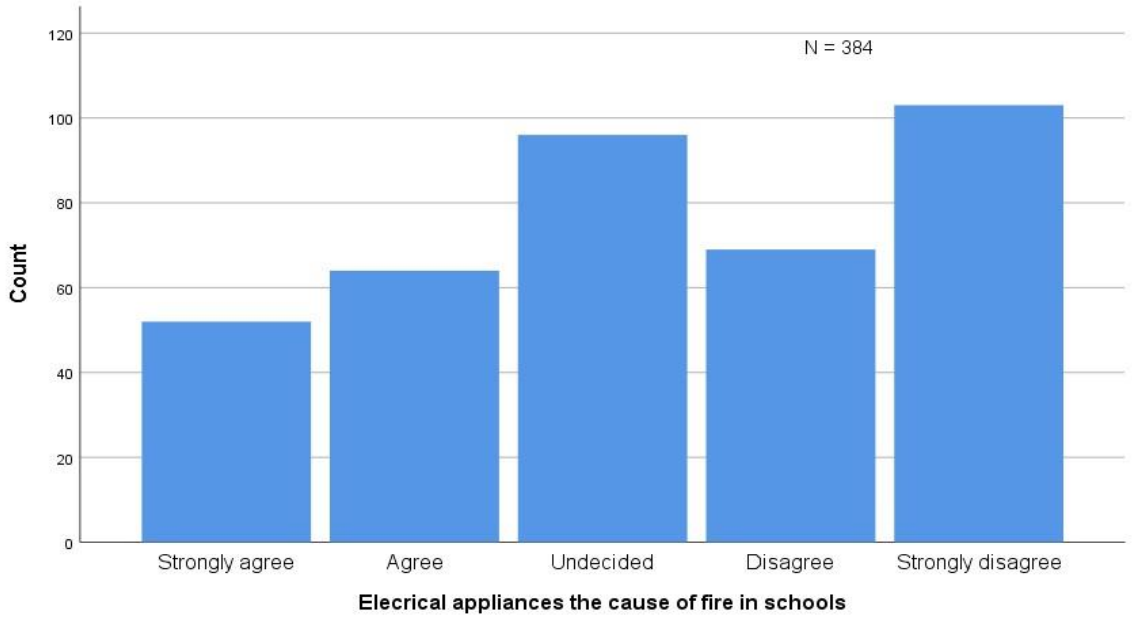

Figure 5.2: Electrical appliances and installations are the causes of fires in in public secondary schools in Nairobi County, Kenya

Source: Researcher (2023)

The finding in Figure 5.2 shows that majority of the respondents 103(26.8%) disagreed that electrical appliances and installations are the cause of fires in schools, 69 (18.0%) disagreed, 96 (25.0%) were undecided, 64 (16.7%) were in agreement while 52 (13.5%) strongly agreed. This was in agreement with the interview schedules. From the interviews, the study was informed that most school fires were not caused by electrical installations

and appliances. However, while visiting one of the classes the study established that electrical switches in some classes near the door were exposing students to dangers since they were not well fixed. See plates 5.1 and 5.2 electrical switches at the door of the classes.

Plates 5.1: Electrical switch in a class

Plate 5.2: Electrical switch in a class

Source: Researcher, (2023)

5.10. Emergency facilities in the dormitories and classes

Classes and dormitories are the major places where students spend most of their time in school. Therefore, the study sought to establish if the classes and dormitories have emergency facilities for students in case of a disaster. On observation the study noted that dormitories and classes had doors they open outside. On emergency doors the study noted that the dormitories had extra doors but they are permanently closed. The study sought to establish if the respondents had ever used the extra doors in their dormitories and the responses captured are as shown in figure 5.3.

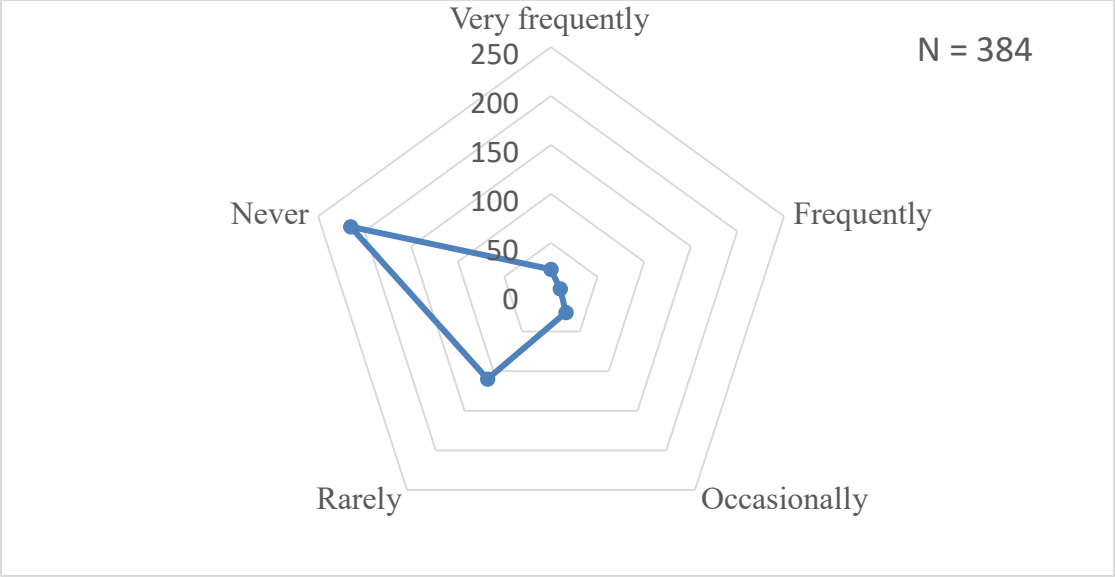

Figure 5.3: The usage of emergency doors in the dormitories by students in public secondary schools in Nairobi County, Kenya.

Source: Researcher (2023)

From the findings in figure 5.2, majority of the students 215 (56.0%) indicated that they had never used the emergency door, 110 (28.6%) indicated rarely, 26 (6.8%) occasionally, 23 (6.0%) very frequently while 10 (6.0%) indicated frequently. For those that indicated never said that they had never seen those doors being opened. When asked why the emergency doors are never opened some of the boarding teachers informed the study that this was to control theft cases in the dorm areas while others said that they don't know.

The study also observed that some classes had grills on windows which is against the set safety standards in schools. Plate 5.2 shows a window with a broken glass and a grill that makes students vulnerable in case of an emergency.

Plate 5.3: Showing a window with a grill and a broken glass in one of the in public secondary schools in Nairobi County, Kenya.

Source: Researcher (2023)

5.11. Security personnel in the school

The study established that all the schools had security personnel where some schools had procured from security companies while others were just hired by the school. The study sought to establish the competence of the security personnel in emergency management and if they had undertaken a course in emergency response or management. The study established that none of the schools had security personnel who was competent in handling emergency. On doing a spot check in the schools in Nairobi County the study established an emergency control room where one could get contacts for fire brigades or ambulance services. None of the security personnel had the contacts for fire brigades or ambulance 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 kuna kitu sisi hupigia tuu mwalimu wa boarding simu ama deputi ama headmaster.*

'We have never been given the contact details for the fire fighters and ambulance. Our work is to guard the school. If there is an issue, we usually call the boarding master, deputy headteacher or the headteacher.' (FGD respondent, 2023)

5.15. Chapter summary

The study's second objective was to determine the causes of vulnerability to disasters in public secondary schools in Nairobi County. Most Students felt their schools were highly populated hence dormitories were not safe citing, inadequate facilities overcrowding, water scarcity, dirty bathrooms and toilets. The lack of staff and funds limits the capacity of the institution to fully develop its facilities. There are no professionals who are trained to handle disasters. Majority of the schools are not adequately prepared for emergencies due to lack of proper training of teachers, staff and students and inaccessibility of these equipment. With most of the schools lacking emergency exit routes, it hinders meaningful evacuation and response in case of a disaster. The findings showed majority of the schools did have water problems since the water was not reliable since 165 (43.0%) strongly agreed. The treat of the water was also an issue that was so difficult to establish since school did not have records to show the treatment schedule of water especially borehole water. The findings show that majority of the respondents 103(26.8%) disagreed that electrical appliances and installations are the cause of fires in schools. However, we had some schools where the electrical switches were not well fixed and were exposing student to dangers. Majority of the students 215 (56.0%) indicated that they had never used the emergency door and the doors were permanently closed. Also, most of the schools lacked well labeled assembly points implying that the students have no idea on where to go in case of an emergency. The study also established that schools do not have well trained security personnel.

CHAPTER SIX

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

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.

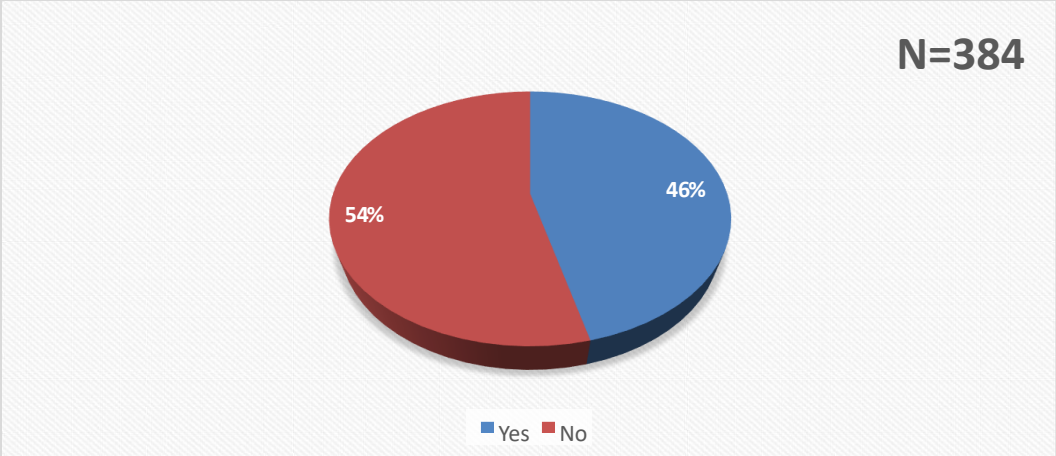

Figure 6.1. Availability of school dispensary in public secondary schools in Nairobi County, Kenya.

Source: Researcher (2023)

The findings show that only 46.0% (n=384) 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 in public secondary schools in Nairobi County, Kenya

	Frequency	Percent
Very good	20	11.3
Good	25	14.1
Acceptable	66	37.3
Poor	54	30.5
Very poor	12	6.8
Total	**177**	**100**

Source: Researcher, (2023)

The findings show that for those schools that had dispensaries 66 (37.3%) were in acceptable condition, 54 (30.5%) the condition was poor, 20 (14.1%) good, 20 (11.3%) very good while 12 (6.8) very poor. For those that had a dispensary, the researcher observed that they had only one medic and were not well equipped. This means that majority of the schools lacked personnel trained to handle medical emergencies. Also, some did not have the necessary equipment to handle emergencies. One of the teachers suggested that the school should acquire appropriate medical equipment for them to be able to offer basic medical emergencies and treatment. For the available dispensary to pass as safe, in needs to have proper equipment for emergencies and have personnel competent to handle or respond to the emergencies. These statements were echoed by a number of parents' association members.

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 in public secondary schools in Nairobi County, Kenya

	Frequency	Percent
Yes	107	28.08
No	277	71.92
Total	384	100

Source: Researcher (2023)

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 study also sought the functionality of the alarm systems and fire detectors and the findings are a shown in the Figure 6.2.

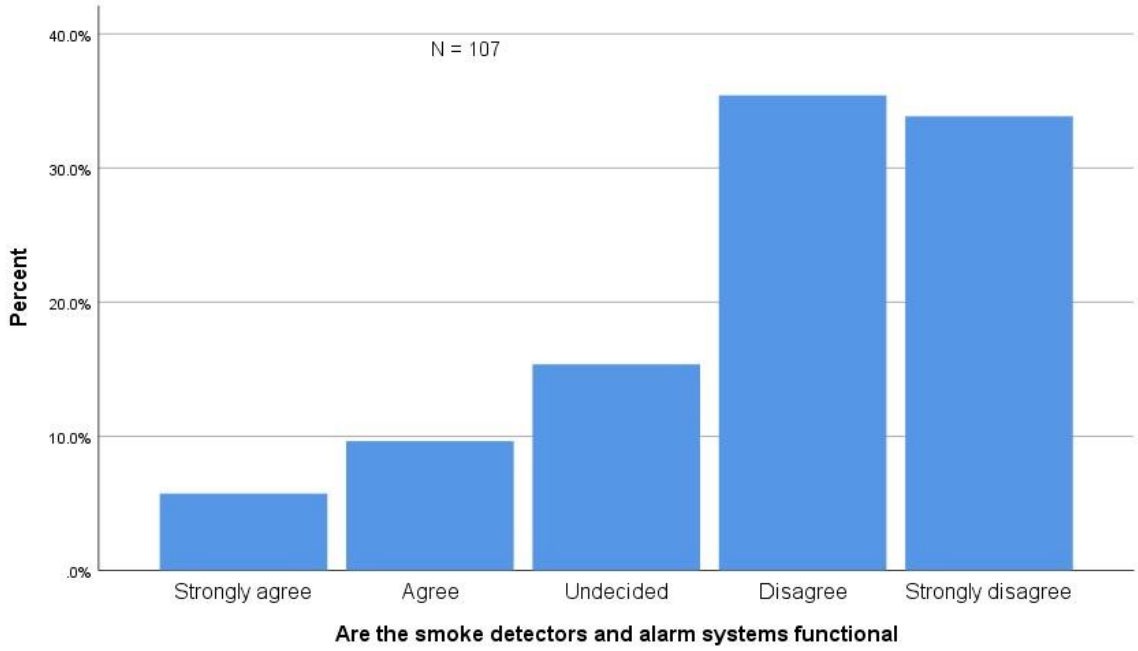

Figure 6.2: The functionality of the smoke detectors and alarm systems in public secondary schools in Nairobi County, Kenya.

Source: Researcher, (2023)

From figure 6.2 majority of the respondents disagreed that smoke detector and alarm system were functional while less than 10% strongly agreed that they were functional. The researcher noted that some schools had them but were poorly maintained and barely

functioning. According to Muthwii *et al*, (2015) in their survey of disaster preparedness and safety standards in secondary schools in Kenya, the education minister gave a directive that all provincial secondary boarding schools be given funds to purchase and install fire - fighting equipment. This would enable them prepare against fire - related disasters. To assess the safety of physical infrastructure in schools, the fire safety facilities need to be well installed and the students effectively trained on how to use them. Also, the available fire extinguishers were not placed at easily accessible points and were not functioning.

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 in public secondary schools in Nairobi County, Kenya

	Frequency	Percent
Yes	157	40.89
No	227	59.11
Total	384	100

Source: Researcher, (2023)

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.

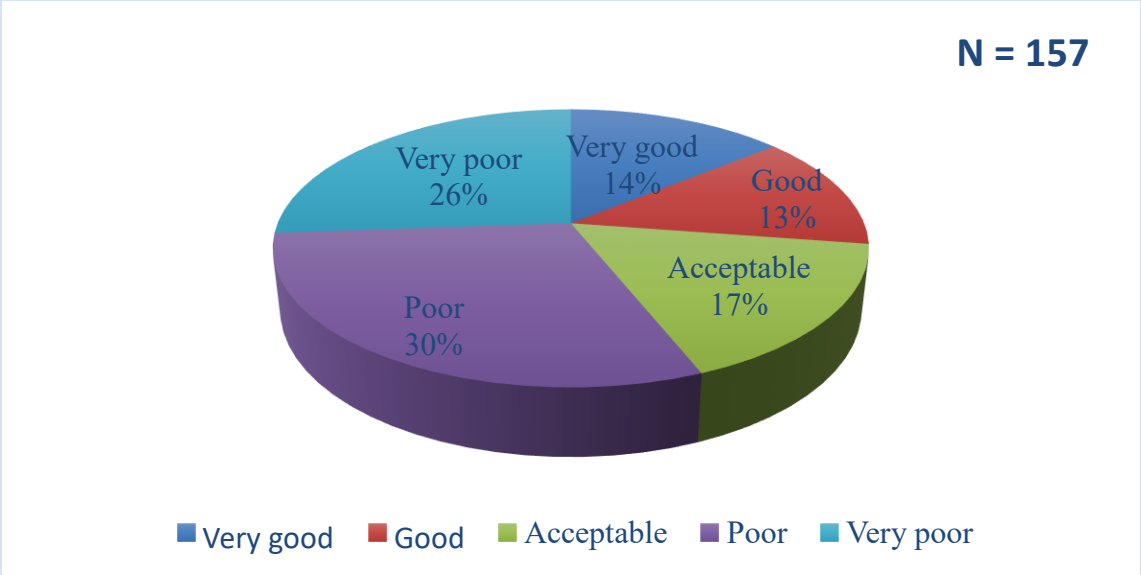

Figure 6.3: The condition of the school van in terms of usage for emergency response in public secondary schools in Nairobi County, Kenya.

Source: Researcher, (2023)

The findings in Figure 6.3 shows that 30% of the respondents noted that the vans were in poor condition, 26% very poor, 17% acceptable condition, 14% very good while 13 % good. To ensure safety of the van users, the van need to be in good condition and the driver be competent. The researcher observed that most of the available school vans were poorly maintained. During discussions, some students admitted that when in school vans or on school trips, they did not follow that laid out road safety measures such as safety belts and not overloading. This made them vulnerable to road accidents. Having a school van would indicate that the school's movements in times of emergencies, especially when responding to emergencies. The school heads also noted that they do not have sufficient funds in employing drivers so sometimes they resort to using teacher's vehicles in case of an emergency. 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 hasitoshi na wazazi hawalipi kwa wakati, I tell you it is difficult.

'*We do not have funds to employ a driver and maintain the van. Should we be paying employees or purchase food and books for the students? Our government doesn't provide enough fund and they are usually disbursed late, the school fees is no and the parents do not pay in time' (Interview schedule, 2023)*

6.5 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 in public secondary schools in Nairobi County, Kenya

	Frequency	Percent
Yes	183	47.66
No	201	52.43
Total	384	100

Source: Researcher, (2023)

When asked on the availability of assembly points in case of an emergency, 47.66 of the students responded positively while 52.34% responded with a no. These findings are in table 6.4 This corresponded with the researcher's observation which was that most of the schools lacked well labeled assembly points. This implies that the students have no idea on where to go in case of an emergency.

Kihila (2017) had similar findings where most learning institutions had no identifiable fire assembly points; Further results indicated that more than half of the respondents were

unable to operate the installed firefighting facilities and a higher number had never received any firefighting and prevention training. These results let to the conclusion that higher learning institutions are not well prepared to manage fire outbreaks hence recommending plans to rectify the situation.

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 in public secondary schools in Nairobi County, Kenya

	Frequency	**Percent**
Yes	191	49.74
No	193	50.26
Total	**384**	**100**

Source: Researcher, (2023)

Table 6.5 shows that 50.26% of the school buildings lack emergency exit routes. Only 49.74 of the buildings had emergency exit routes. In making observations on the existence of emergency exit routes, the researcher considered the escape of persons from building in the event of an emergency. The study further sought to establish if the respondents were satisfied with the condition of the escape route in classes and dormitories in case of an emergency. The findings were as shown in Figure 6.4.

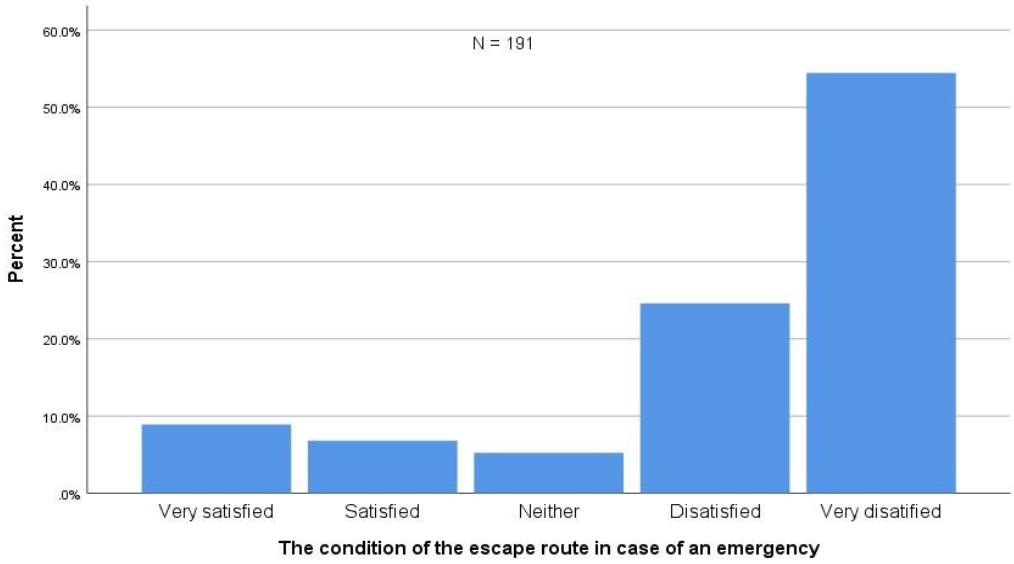

Figure 6.4: The condition of the escape route in case of an emergency in buildings in public secondary schools in Nairobi County, Kenya.

Source: Researcher, (2023)

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 in public secondary schools in Nairobi County, Kenya

	Frequency	Percent
Yes	185	48.18
No	199	51.82
Total	**384**	**100**

Source: Researcher, (2023)

As shown in Table 6.6, majority (51.82%) of the students' felts that their schools playing field was unsafe. Only 48.18% expressed that the playing fields were safe. The researcher observed several safety concerns, notably the presence of overgrown grass in the fields. The implementation of safety standards and guidelines for school grounds demonstrates a statistically significant correlation with the safety of students. The school management must prioritize the inspection and supervision of the school grounds, ensuring strict adherence to the established Safety Standards and Guidelines for School Grounds. For example, it would be prudent to label trees that have the potential to be toxic. (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 in public secondary schools in Nairobi County, Kenya

	Frequency	Percent
Yes	183	47.66
No	201	52.34
Total	**384**	**100**

Source: Researcher, (2023)

The findings reveal that most (52.34) of the students felt 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.

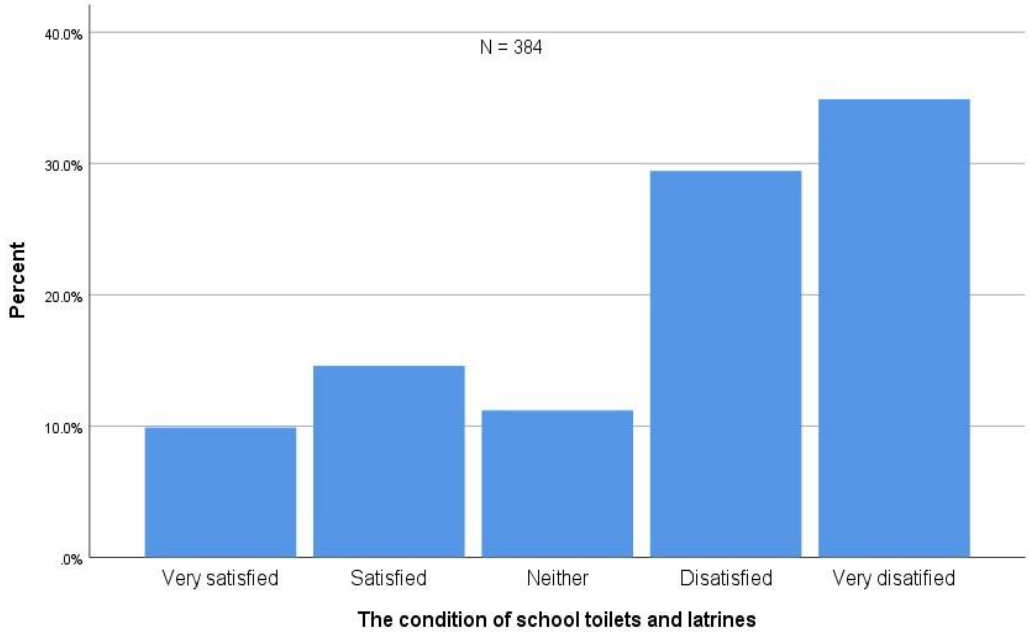

Figure 6.5: The condition of the school toilets and latrines in public secondary schools in Nairobi County, Kenya.

Source: Researcher, (2023)

The findings from the responds indicates that 134 (34.9%) of the respondents were very dissatisfied with the condition of the school toilets and latrines, 113 (29.4%) were dissatisfied, 56 (14.6%) were satisfied while 38 (9.9%) were very satisfied. This was in agreement with the student FGDs which informed the study that most of the school toilets are not in good conditions and were not safe for use. These findings are similar to those of

Gatua (2015) whose study on assessment of safety status of physical infrastructure (classrooms, dormitories, sanitation facilities, laboratories and kitchen) in public secondary schools in Nairobi West Region, Kenya revealed that safety items were either inadequate or lacking in some of the schools' dormitories. 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. The researcher noted that the facilities were seldomly inspected for compliance with the safety standards. According to UNDP (2007), the government also needed to strengthen its inspection mechanisms and intensify capacity building for effective 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 in public secondary schools in Nairobi County, Kenya

	Frequency	**Percent**
Yes	187	48.7
No	197	51.3
Total	**384**	**100**

Source: Researcher, (2023)

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.

Source: Researcher, (2023)

Research indicates that hand washing with only water can safeguard against diarrhea and hand infections. Moreover, observations of hand washing indicated that soap was not consistently accessible for hand washing in all intervention schools during each visit; consequently, this lack of availability diminished the probability that all pupils sampled from intervention schools had the opportunity to wash their hands with soap (Saboori et al., 2013).

The further sought to establish the safety of drinking water and if the respondents are satisfied with the safety of the water. The findings were as shown in Figure 6.6.

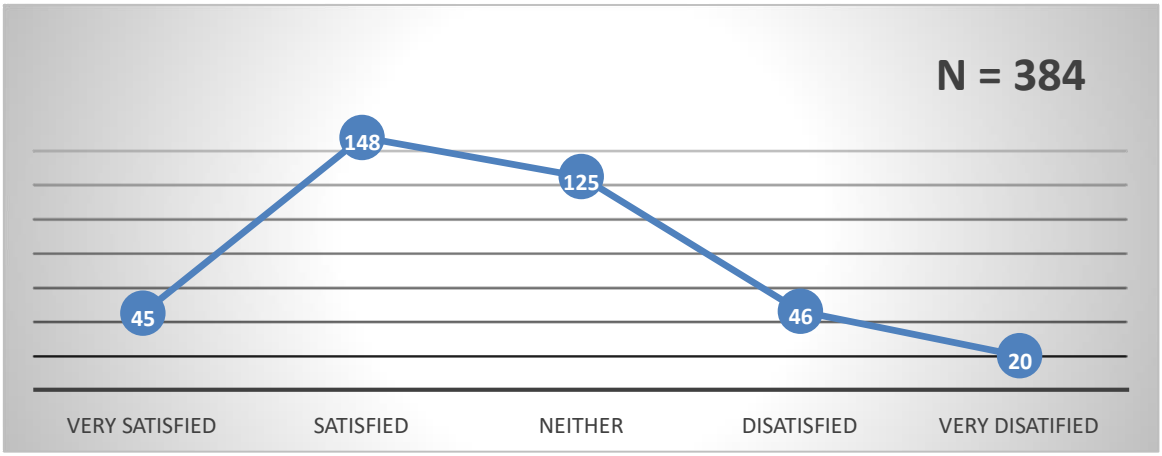

Figure 6.6: Satisfaction of the respondents on the quality of water in schools in public secondary schools in Nairobi County, Kenya.

Source: Researcher, (2023)

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 of the findings

The study sought to assess disaster preparedness and safety standards in public secondary schools of Nairobi County, Kenya. It had 429 respondents which included students, teachers and officials from the Kenya Red cross, St Johns ambulance, fire department and department of disaster management. Data was collected from the respondents and analyzed.

In an aim to establish the level of disaster preparedness in public secondary schools in Nairobi County. The study found that most schools did not have site plans that included building layouts and evacuation routes to be used in case a disaster occurs. Findings show that many schools still were not adequately prepared in the event of a natural disaster. Lack of funds and clear school policies was sighted as a reason for the inadequate preparedness in schools. To determine the causes of vulnerability to disasters in public secondary schools in Nairobi County, the respondents also sighted lack of funds and staff as the cause of vulnerability. Low level of participation, poor management, and inadequate infrastructure

are among other causes of the schools' vulnerability to disasters. Relying on external sources for funding resulted in delays in implementing projects.

The study's second objective was to determine the causes of vulnerability to disasters in public secondary schools in Nairobi County. Most Students felt their schools were highly populated hence dormitories were not safe citing, inadequate facilities overcrowding, water scarcity, dirty bathrooms and toilets. The lack of staff and funds limits the capacity of the institution to fully develop its facilities. There are no professionals who are trained to handle disasters. Majority of the schools are not adequately prepared for emergencies due to lack of proper training of teachers, staff and students and inaccessibility of these equipment. With most of the schools lacking emergency exit routes, it hinders meaningful evacuation and response in case of a disaster.

The findings showed majority of the schools did have water problems since the water was not reliable since 165 (43.0%) strongly agreed. The treatment of the water was also an issue that was so difficult to establish since school did not have records to show the treatment schedule of water especially borehole water. The findings show that majority of the respondents 103(26.8%) disagreed that electrical appliances and installations are the cause of fires in schools. However, we had some schools where the electrical switches were not well fixed and were exposing student to dangers. Majority of the students 215 (56.0%) indicated that they had never used the emergency door and the doors were permanently closed. Also, most of the schools lacked well labeled assembly points implying that the students have no idea on where to go in case of an emergency. The study also established that schools do not have well trained security personnel.

In assessing the physical infrastructure safety in public secondary schools in Nairobi County, the findings showed that the physical infrastructure in majority of the surveyed schools is unsafe. Some schools were found to have no security guards and roofs without coverings. Most of the switchboards were also discovered to be faulty. Only one school perimeter boundary wall had a net.

7.3 Conclusions

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.

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

The findings showed that secondary schools in Nairobi County were not sufficiently prepared to handle disasters that may occur. This conclusion is informed by the fact that the schools that were surveyed had no contingency plans to mitigate disasters like floods, fire outbreak, terrorist attacks, wind, among others. Schools had few control measures in place in case of a disaster, such as pre-determined evacuation routes, clear definitions of evacuation areas, and pre-determined assembly points outside the school premises.

Many schools did not have specific plans to deal with unauthorized access of staff and students during an emergency. This was because they failed to incorporate clear policies

on the level of security required for authorized access, including the roles and responsibilities of teachers, students, and support staff when an emergency occurs.

Less than half the number had developed emergency plans for dealing with emergencies, such as a pandemic or terrorist threat; Some of the schools had no first aid kits, while others had a few basic first aid kits that were not well stocked with essential drugs and some of the drugs were not fit for use. There was also the issue of lacking clear communication strategies to use during an emergency. The schools had no specific plans that outlined key roles and responsibilities during an emergency response.

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

In determining the causes of vulnerability to disasters in public secondary schools in Nairobi County, the study concluded that factors causing the schools to be vulnerable included: high population density, inadequate resources, organization structure, lack of training on disaster preparedness and safety and lack of or inadequate facilities necessary for emergency response. Inadequate funds and lack of clear policies in the schools were sighted as some of the reasons for the unpreparedness. To avert the disaster, emphasis should be on the availability of funds, training staff on disaster preparedness and evacuation procedures, and taking cognizance of the factors that create vulnerability with a focus on school facilities. The lack of staff and funds limits the capacity of the institution to fully develop its facilities. Most of these institutions rely on external sources for funding which cause delays in implementing development projects.

Allocation of funds to the schools to create more disaster-durable structures, quality training for school staff and students, and systematic management from the governing authorities should be put in place to avoid poor administration, which is another important cause for vulnerabilities. The study concludes by urging authorities to create policies that will promote vulnerable areas such as schools because this helps support development in the communities.

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

According to the findings, the physical infrastructure in most the surveyed schools was unsafe, and there's a need for more interventions to ensure their safety. The infrastructures including playing fields, School vans, buildings, toilets and latrines were poorly maintained. Dormitories and classes were overcrowded. The study's findings also pointed out that some schools are well-maintained.

Physical infrastructure assessment included a review of each school's building and surrounding environment, followed by observation of the classes, evaluation of of conditions of the dormitories, school van, hand washing points, toilets and latrines, playing fields, fire detection and alarm systems and the school dispensary. Security assessment included rating the quality of fencing around school buildings (inner and outer), gates used to access the premises, gate security arrangements, etc.

7.4 Recommendations

i. It is ideal for schools to have qualified personnel carrying standards assessment and ensure the availability of resources for effective disaster preparedness.

Movements such as scouting and girl guides association should be effectively trained on safety and disaster preparedness and be allowed to regularly engage other students on the same.

ii. The researcher also recommended that the stakeholders should put in to consideration the capacity and ability of the schools in terms of resources, demographics etc. when establishing and implementing disaster preparedness programs and safety standards. Different schools have different capacity and ability hence having the same programs and standards for all will be ineffective in achieving the objectives.

iii. This study recommended that the physical infrastructures in schools should be regularly inspected to ensure safety and compliance with the standards manual. There is also need to strengthen its inspection mechanisms and intensify capacity building for effective 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.

i. A study that is specific to the institutions that have experienced significant disasters in each county should be conducted. A study of this nature would illuminate the specific causes of these disasters, and a comparative analysis would assist in determining whether the causes are analogous. Furthermore, the study aims to identify the most effective strategies to address this critical issue affecting students.

ii. There is a necessity for action research, particularly in rural schools, by the key stakeholders in education, focusing on the vulnerability of Kenyan schools to disaster preparedness. This is essential for implementing the recommendations generated by the study.

iii. To further understand why private schools do not have as many instances of catastrophe preparedness, a comprehensive study comparing public and private schools is necessary.

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APPENDICES

Appendix I:

Introductory Letter for Data collection on disaster preparedness and safety standards in public secondary schools in Nairobi County, Kenya.

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, Kenya.

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 thatyour 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.....

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

7. 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: .....

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

   Yes ( ) No ( )

Specify…….

9. 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

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

    a) High population [ ]

    b) Low population [ ]

    c) I don't know [ ]

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

    If Yes, specify.....

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

13. Does your school buildings have emergency exit/Escape routes?

    YES [ ] NO [ ]

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

15. Does your school have functional fire detectors and alarm systems?

    YES [ ] NO [ ]

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

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

18. In your own opinion, are your school's toilets and latrines safe?

    YES [ ] NO[ ]

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

Appendix III:

Interview schedule for Education officials, Headteachers and Teachers on disaster preparedness and safety standards in public secondary schools in Nairobi County, Kenya.

Focus Area	**Questions**
Level of Disaster preparedness	a) How do you gage 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 on disaster preparedness and safety standards in public secondary schools in Nairobi County, Kenya.

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 on disaster preparedness and safety standards in public secondary schools in Nairobi County, Kenya.

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 gage 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, Kenya.

1. How do you gage 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 for approval of proposal on disaster preparedness and safety standards in public secondary schools of Nairobi County, Kenya.

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

Tel: 056-30870
Fax: 056-30153
E-mail: directordps@mmust.ac.ke
Website: www.mmust.ac.ke

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,

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY DIRECTORATE OF POSTGRADUATE STUDIES P.O. BOX 190 - 50100, KAKAMEGA (K)

Date..... Sign.....

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

Appendix VIII:

NACOSTI Permit to conduct research on disaster preparedness and safety standards in public secondary schools of Nairobi County, Kenya.

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 376966

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

376966

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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See overleaf for conditions

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