

Title

**SCHOOL- BASED FACTORS INFLUENCING FIRE SAFETY
PREPAREDNESS IN PUBLIC SECONDARY SCHOOLS IN LOWER
YATTA SUB-COUNTY, KENYA**

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**A Research report Submitted in Partial Fulfillment for the Requirement of
Degree of Master of Education in Education in Emergencies**

University of Nairobi

2016

DECLARATION

This research report is my original work and has not been submitted for a degree in any other university.

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E55/83758/2012

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DEDICATION

I wish to dedicate this report to my husband Morris Mugambi and son David Gitari.

ACKNOWLEDGEMENT

I am grateful to the Almighty God for His love, provision, protection and mercy. I would like to sincerely thank and recognize the assistance of Special thanks to the University of Nairobi management for providing me with a conducive environment which has enabled me to complete my course work successfully and to carry out the study. Thanks to my supervisors Dr. Ursulla Okoth and Dr. Loise Gichuhi who have gladly shared their expertise and experience and provided me with constant guidance during the working time. I highly appreciate all the help and support given.

I wish to thank the principals, teachers and students who participated in this study. I would also like to express my deepest gratitude to my friends and colleagues in EiE for their encouragement, support and advice. I would like to express my deep appreciation to my husband Morris Mugambi, mum Patricia Nzungwa and my siblings Betty, Mutiso, Kyalo and Stella for all the support they gave me.

May God Bless You All!

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ABBREVIATION AND ACRONYMS

CWS	Church World Service
FEMA	Federal Emergency Management Agency
FANDC	Fire Administration National Fire Data Centre
GOK	Government of Kenya
MOE	Ministry of Education
UNICEF	United Nations International Children's Education Fund
PTC	Primary Teacher Certificate

ABSTRACT

This study investigated school-based factors influencing fire safety preparedness in public secondary schools in lower Yatta sub-county, Kenya. It was guided by the following objectives; to determine how training staff and students influences fire safety preparedness in public secondary schools, to examine the influence of disaster management committees on fire safety preparedness in public secondary schools, to establish the influence of availability of fire fighting facilities on fire safety preparedness in public secondary schools and to examine the influence of the policy on school building construction on fire safety preparedness in public secondary schools in Lower Yatta Sub-County, Kenya. The research adopted a descriptive survey design. The study targeted a population which consisted of 26 public secondary schools, 26 principals, 115 secondary school teachers and 6,320 students. This study employed simple random sampling technique to obtain the sample population. The sample population consisted of all the 26 public secondary schools, 35 teachers, and 632 students. Stratified sampling technique was used to select the students that is, 316 boys and 316 girls. Data was collected by means of questionnaires administered to the principals, teachers and students of the sampled schools and an observation schedule and test re-test method was used in two schools and reliability co-efficient of principals, teachers and students questionnaire yielded 0.89, 0.86 and 0.82 respectively. Data collected from respondents was analyzed through descriptive statistics. The results were presented using frequency tables. The study findings indicated that most schools had not trained staff and students on fire disaster risk reduction, majority of schools that did not have disaster management committees and even those which had did not involve all the required stakeholders. The firefighting equipments in most schools were not enough contributing to fire safety unpreparedness. In relation to school buildings and fire safety, most schools had made some effort to improve fire disaster preparedness although majority of schools had no assembly points, windows had grills, some doors opened inwards and fire exits were obstructed. The recommendations were that all teachers, support staff and students be trained on fire disaster preparedness; schools constitute disaster management committees and that they should involve all the required stakeholders; the study also recommended that school management to consider adding the fire fighting equipments to make them adequate, also windows should not be grilled, exits should be cleared of obstructions, and doors should open outwards and that assembly points and exit routes be well labeled. Suggestions for further study were that, a study on the relationship between safety and academic performance, a comparative study on fire safety preparedness in the private and public schools in Kenya and a study to establish economic factors that influence fire safety preparedness in schools in Kenya.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Fire safety preparedness is a continuous process of planning, organizing, training, equipping, exercising, evaluating and improving strategies to ensure effective coordination and enhancement of capabilities to respond to fire disasters (FEMA, 2007). Incidents of fire in secondary schools have been happening worldwide, and many countries are been affected by fire disasters, though the magnitude and severity of fire disasters differ from one country to another and also the levels of awareness and preparedness levels differ (Arson Control Forum, 2006).

The Fire Administration National Data Centre (FANDC) reported that South America, Asia and Africa, have recorded large death tolls related to school fires due to lack of preparedness (FANDC, 2007). In July 2004, fire tragedy killed 90 learners in an Indian school because of lack of emergency doors and fire fighting equipments. The fire was blamed due to failure to implement safety norms. The school buildings in this case were overcrowded and had one or no exit. There were no emergency doors and firefighting facilities. Fire disasters in Indian schools are blamed on failure by authorities to enforce safety regulations. For instance, schools may stay for as long as three years without being inspected (Reuters, 2004).

A study on disaster risk assessment at the University of Ghana in Balme library found that the library annex had no balconies and had one exit for a three- stored building. The presence of balconies as a vital component in disaster response by acting as landing pads for trapped victims awaiting rescue was therefore overlooked, library staff had not been trained on disaster management. The library annex did not have fire extinguishers and most of the fire extinguishers available in the main library were not working (Adinku, 1999).

In 2008, a fire at Buddo Primary School, Uganda, left 19 girls and two adults dead. The affected lacked provisions for a house mother. The doors were locked from outside. Investigations revealed that classrooms had been converted into dormitories without consulting the district engineer and the health officers as required by the law (Hirano, 2009). After the tragedy, Uganda implemented the Safe School Contact as a remedy which strengthens the role of stakeholders such as teachers, learners and parents in disaster risk reduction.

In 1998, Bombolulu Girls Secondary School's fire where 27 girls died, overcrowding was one of the factors that contributed to these deaths. At the time of fire, the dormitory had housed 145 students against the optimal capacity of 100 students. The problem was even worse because the front door to dormitory was locked from outside and all the windows were grilled (Gicheru, 1998). In 2001, the Kyanguli Secondary School fire, the dormitory had 130 learners, above the required capacity of 80 learners (Rowan, 2001).

The report recommended that all the dormitories and hostels to have exit routes which should not to be locked from outside when students are inside.

According to Kukali (2009), lack of knowledge of fire safety issues or on how to react in event of fire tragedy has facilitated to the large number of casualties experienced. Basic fire emergency drills to teachers, support staff and students are in most cases taken for granted to the extent that in event of fire tragedy very few staff and students may know what to do. Ronoh and Kyalo (2009) found that most schools in Turkana district had not conducted fire drills. The study concluded that knowledge on effective use of a fire extinguisher and performance of fire drills was a sign of availability of training and awareness programmes in the schools. Based on the study, 87.5% (percent) of students in the school that performed fire drills knew how to effectively use a fire extinguisher as compared to 21.2% (percent) of the students in the schools which did not conduct fire drills.

Lucheli and Masese (2009) found that the high cost of firefighting facilities had made it difficult for schools to purchase and install them. In their study of north Rift schools, they found that majority of schools lacked fire extinguishers, smoke detectors, fire blankets, first aid kits among other essentials. Ngunjiri (2012) reported that fire reduced a dormitory at Giakanja Boys Secondary School to ashes and an adjacent dormitory was also destroyed in the process as students tried to salvage their personal belongings. Efforts to put off the fire were futile as the school lacked facilities to contain the

emergency and had to await the fire engine from Nyeri Municipality about 10 kilometres away.

Akali, Khabamba and Muyinga (2011) found that, there was minimal effort done to prepare secondary schools in Kenya to handle fire disasters. Only few secondary schools had fire fighting facilities in school buildings such as offices, laboratories, stores and kitchen. The available fire facilities were not regularly inspected and serviced. This also concurs with Njoroge (2008) school inspectors hardly perform safety inspection during routine checks in school and many schools have inadequate supply of water or lack hydrant points that would be effective in putting out fire.

The safety of the school depends largely on the measures taken to organize and manage such safety. In this respect, School Management Committee/Board of Governors, the head teacher, teachers, learners, parents and representative from area education office have significant duties to play in facilitating and enhancing safety in schools. Nonetheless the direct responsibility of overseeing school safety should follow within a specific School Safety Committee (MOE, 2008). Makhanu (2009) however, observes that fire and safety departments in most schools are not available or members are not trained or are ill equipped to fight a fire in a school.

Kitui County has also experienced fire disasters in its secondary schools. In 2008 students set a blaze three dormitories in St. Angelas Girls High School, Kitui County, property worth over 500m was lost. St. Ursula girls' secondary school in Kitui County also experienced a fire outbreak on 4th, September

2013 and a whole dormitory was reduced to ashes. On 6th, September, 2013 a dormitory at Kitui high school was razed down by fire, destroying school property and students' valuables worth thousands of money (DEO Kitui Central, 2015). In Lower Yatta Sub-County several public secondary schools have experienced fire tragedies (DEO Lower Yatta, 2015). In June 2014, a dormitory in Kanyangi Boys was burnt and property worth millions was destroyed. The boys had to go home to enable the school to have the dormitories reconstructed. A month later in June 2014, staffroom in St Lukes Yatta was burnt. In 2015 July a dormitory in Kyaithani Secondary was burnt (DEO, Lower Yatta Sub-County).

Increased incidences of fires in schools have become a great concern because of loss of human life and injuries. The trauma accompanying such incidences is unimaginable especially to the already overwhelmed students. Property worth is destroyed and valuable time is wasted in the reconstruction process. The aforementioned cases are a pointer to how insecure schools have become. Nderitu (2009) notes, despite the stringent safety measures envisaged by the ministry of education fire disasters still occur. Otieno (2010) found that most schools in Kenya have no capacity to handle fire emergencies and are yet to implement the Safety Standards Manual produced in 2008 by the Ministry of Education. However it is the degree of preparedness of the schools entire system that makes the critical difference. Without fire preparedness, schools will continue to lose lives, property and learning time. It was therefore important to carry out a study on school-based factors influencing fire safety preparedness in secondary schools in Lower Yatta Sub-County, Kenya.

1.2 Statement of the Problem

The school environment should always be safe so as to enable all the learners who enroll in these schools complete their education in the right time without any interference. In public secondary schools, it is important to ensure that students learn in an environment that is free from disaster. Disasters deprive students' access to the basic fundamental human right to education over an extended period of time. Government of Kenya (2007). Akumu (2014) identified fire as one of the leading disasters in schools in his research on Disaster Awareness and Preparedness of Secondary Schools in Homa Bay County. Waweru (2015) found fire disaster preparedness in schools to be influenced by financial constraints and poor community-school relations. Documented reports do not reveal this area of study as having being researched in Kitui County. It was therefore imperative to carry out a study on school-based factors influencing fire safety preparedness in public secondary schools in Lower Yatta Sub- County, Kenya.

1.3 Purpose of Study

The purpose of the study was to investigate school-based factors influencing fire safety preparedness in public secondary schools in Lower Yatta district, Kenya.

1.4 Objectives of the study

The study was guided by the following objectives:

- i) To determine how training staff and students influences fire safety preparedness in public secondary schools in Lower Yatta Sub-County, Kenya.
- ii) To examine the influence of disaster management committees on fire safety preparedness in public secondary schools in Lower Yatta Sub-County, Kenya.
- iii) To establish the influence of availability of fire fighting facilities on fire safety preparedness in public secondary schools in Lower Yatta Sub-County, Kenya.
- iv) To examine the influence of the policy on school building construction on fire safety preparedness in public secondary schools in Lower Yatta Sub-County, Kenya.

1.5 Research questions

Basing on the above objectives the following research questions were addressed:

- i) To what extent does the training of staff and students influence fire safety preparedness in public secondary schools in Lower Yatta Sub-County, Kenya?
- ii) To what extent do disaster management committees influence fire safety preparedness in public secondary schools in Lower Yatta Sub-County, Kenya?

- iii) How does the availability of fire fighting facilities within school premises influence fire safety preparedness public secondary schools in Lower Yatta Sub-County, Kenya?
- iv) To what extent has the policy on school building construction influenced fire safety preparedness in public secondary schools Lower Yatta Sub-County, Kenya?

1.6 Significance of the study

The study findings may promote awareness among teachers and students on what may be done in case of fire tragedy so as minimize damage of property, injury or death. The finding of this study might also contribute to the literature and help principles to implement fire disaster risk reduction measures in public secondary schools in Lower Yatta Sub-County. Also, the study findings might lead to openings that could lead to more comprehensive policy implementation on safety in schools. Finally, the school board of management might be made aware of the level of fire disaster reduction measures in the schools and as a result they might see the need to improve it so as to save lives of innocent boys and girls in schools. The study findings may contribute to the general field of knowledge for future scholars.

1.7 Limitation of the study

Limitation is an aspect of research that may influence the results in undesired way, but over which, the researcher has no control (Mugenda & Mugenda, 2003). The respondents may not give genuine responses while all questionnaires may not be returned so the researcher used observation

schedule to provide further insight and use them for triangulation of information.

1.8 Delimitation of the study

The study was carried out only in Lower Yatta Sub-County of Kitui County therefore the findings from this study are not a reflection of the state of fire safety preparedness in Kitui County and the entire country. Private schools were not targeted in the study as their environment, parents/guardians motivation, socio-economic status of their members and management varies from that found in public secondary schools.

1.9 Assumptions of the study

The study assumed that relevant records were available and accessible both in schools and district education office.

1.10 Definition of significant terms

Definitions of significant terms within the context of the study are as follows:

Disaster refers to serious disruption of the functioning of a school involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected school to cope using its own resources.

Fire safety preparedness refers to a school's ability to be well prepared for, respond to, and reduce the harmful effects of a fire outbreak.

Fire fighting equipments refers to the tools for fighting fire like fire extinguishers and fire blankets.

Preparedness as used refers to the knowledge and capacities developed by schools to effectively anticipate for, respond to, and recover from, the impacts of fire disaster.

School-based factors refer to the unique impediments within a particular school which may hamper the ability of the school to prepare for, respond to and recover from a fire outbreak.

1.11 Organization of the study

The organization of the study is done has been done five chapters; the first chapter deals with the background information of the study, statement of the problem, purpose, objectives, significance, limitations, delimitations, assumptions and definition of significant terms as used in the study. Chapter two highlights literature review organized into the following themes: fire disaster preparedness and training of staff and students, fire disaster preparedness and disaster management committees, fire disaster preparedness and fire fighting facilities, fire disaster preparedness and compliance of school buildings to policy provisions. Theoretical and conceptual framework was provided. Chapter three focuses on research methodology that was used. This included research design, target population, sample size and sampling procedures, research instruments, validity of the instruments, reliability of the study, data collection procedures and data analysis techniques. Chapter four focuses on data analysis and interpretation of the study findings. Chapter five highlights the summary of findings, conclusions, recommendations and gave suggestions for areas of further study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter deals with the literature review under the following headings; the concept of fire safety preparedness, effect of training students and staff and fire safety preparedness, disaster management committees and fire safety preparedness, and adequacy of fire fighting facilities and fire safety preparedness, construction of school buildings and fire safety preparedness, summary of review of the literature, theoretical framework and conceptual framework.

2.2 The concept of fire safety preparedness

According to Makhanu (2009), schools around the country have failed to emphasize installation of fire fighting equipments, alarms and first aid kits. Vulnerability of schools to fire tragedy is usually attributed to some factors such as, construction materials may not be resistant to fire. Secondly, they may lack fire fighting equipments or the equipments may not be operational such as installed ventilators that are not operational, exits that are permanently locked or are blocked, grilled windows, lack of installed alarm systems, inadequate fire fighting facilities such as fire extinguishers, doors that open inwards, such that in case of an emergency majority of students pushing the door would jam it and eventually get caught up by fire.

Akali, Khabamba and Muyinga (2009), observed that minimal efforts has been done to prepare schools for fire disasters. Only a few schools have adequate

fire fighting facilities installed in buildings and most of them are not regularly serviced. School inspectors rarely perform safety inspection during routine checks in schools. Makhanu (2009) adds that firefighting facilities and other life saving devices should be clearly displayed where they can be easily spotted even when one has panicked. Teachers, learners and the support staff should be routinely trained on how to use them. Learning institutions should also install automatic sprinklers, alarm and smoke detectors. There should be promptness in notifying the fire department officials for external assistance in case attempt to extinguish the fire overwhelms staff and students. Installation and maintenance process, including continuous inspection should be done to ensure safety and good condition of firefighting equipment. Fire brigadiers could be invited for such exercises as well as giving fire drills. However, most of secondary schools in Kenya have not been carried out these activities, thus in case of a fire disaster, schools are still ill prepared.

2.3 Effect of training of students and staff and fire safety preparedness

No matter how much effort has been put up effective disaster plan, it will largely be ineffective if the teachers, support staff and students are not aware of it, or if it cannot be easily assessed during a disaster, (Patkus and Walpole, 2007). A study on disaster risk assessment at the University of Ghana in Balme library found that the library staff had not been trained on disaster management. (Adinku, 1999). Following 6 fire outbreaks which occurred at the Cleveland Clinic operating suites in 2010 all the operating room employees underwent training on surgical fire prevention and fire safety preparedness procedures. The staff was thereafter undertaking monthly fire

drills. These strategies were geared towards improving the workers' fire safety preparedness (Suchetka, 2010).

Nderitu (2009) found out that teachers, support staff and students and the school community at large were not trained on fire disaster management. Efforts must be done to educate and train staff and students on how to respond to fire emergency and evacuation procedures, otherwise in the event of a fire disaster, a period of panic and confusion may crop up before any action can be taken. Panic, can also be manifested in inexperienced, untrained rescuers as well as ill-equipped personnel.

2.4 Disaster management committees and fire safety preparedness

While school safety is the responsibility of the entire school community, without a managing body such as disaster management committee, it can be difficult to get everyone involved. The committee develops, adapts, implements, and updates the school disaster management plan. This will require the committee to convene several meetings at the beginning of each school year as well as regular meetings throughout the school year. Should disaster threaten school the committee should have special meetings to discuss emergency mitigation measures (UNESCO 2014).

According to Ministry of Education (2008) the functions of this committee are to identify the specific safety needs of the school with the aim of taking the necessary action; mobilize resources required by the school for adequate fire fighting facilities so as to ensure a safe, secure and caring environment for students, staff and the school community; monitor and evaluate the various aspects of School Safety with a view to enhancing school safety; form

sustainable networks with all stakeholders to foster and sustain School Safety; keep learners, staff, parents and other stakeholders informed about School Safety policies and implementation activities; seek the support of parents and stakeholders and ensure their participation in activities relating to School Safety and constantly review issues of child safety in and around the school. Each staff member should be made aware of his or her responsibilities, and the lines of authority should be known and written at strategic places. Thus the absence of this sub-committee means that school administrations have failed in responsibilities to promote disaster awareness and preparedness.

2.5 Adequacy of fire fighting facilities and fire safety preparedness

In a learning institution, disaster protection systems are of primary concern. Nderitu (2009) reported that most schools did not have adequate fire fighting facilities nor reliable alarm systems. Fire safety equipments in schools and other public places should be installed and operational in preparation for disasters. These equipments include fire extinguishers, fire blanket, alarms, sand, reliable supply of water and water hoses. Smoke detectors can also be used to sense and warn people in cases of fires thus mitigating destruction. These equipments must be properly installed and marked with appropriate signs and be placed in visible and accessible points of buildings; they should be in good working condition achieved through regular inspection. An emergency kit is important and it should contain first aid supplies, flash lights, batteries, whistles, radios. The kit should be checked regularly and maintained

to ensure that its components are there, also the blueprints of school buildings should be placed in visible areas.

In USA, a study done by Ahrens (Ahrens, 2008) found that hotels with sprinklers did not incur fire- induced deaths between the years 2003-2007, and material losses were 73% lower than in hotels which were not equipped with sprinklers. This emphasized the importance of installing sprinklers in any building to manage and control fires. Ians (2010) on a study in India there were as many as 1,200 schools in the national capital, including some top private institutions, flouted fire safety regulations. He reported that most schools seemed more interested in admitting large number learners instead of providing them with a safe learning environment. He further reported that many schools started operating with a “temporary” no objection certificate (NOC) on the promise that they would install the necessary equipment within one year. However, many learning institutions never went back to the fire department to get a permanent NOC, thus they did not install fire equipments. While many government schools did not have necessary fire-fighting equipment, many private institutions had got their facilities certified from the fire department.

Mwenga (2008) found that there was no adequate firefighting equipment in the schools in Kyuso District. In addition, the number of firefighting equipments, fire assembly points and first aid kits were un-proportional to the size of the schools and the number of learners hence most schools were not able to effectively to deal with fire disaster. In most schools in Nyandarua

South District, fire fighting equipments were not adequate, (Mwangi, 2014). This implies that most secondary schools are not well prepared to fight fire.

2.6 Construction of school buildings and fire safety preparedness

Fire safety preparedness measures in buildings should be provided. According to Ministry of Education (2008) windows in school buildings must not be grilled, doors should be open outward, properly lit and ventilated. Dormitories should have a door at each end and an additional emergency exit at the middle which is be clearly labeled “Emergency Exit.” Dormitory doors should be locked at all times when students are not in. The keys to the doors should be kept by the Dormitory Master/Mistress or the Dormitory Prefect. Dormitory windows should not be grilled and should be easy to open outwards. Fire fighting equipment should be functioning and placed in easily accessible points at each exit.

According to UNICEF (2009), school infrastructure issue remains a challenge in many schools. In 1995, the US Government Accounting Office released a report indicating that more than half of US schools had infrastructural deficiencies that adversely affected indoor air quality (Lyons, 2001). Interviews and focus groups with head teachers and parents in South Africa and Nicaragua indicate that many schools struggle with the maintenance of school buildings (Baltas, 2004).

A study on disaster risk assessment at the University of Ghana in Balme library found that the library annex had no balconies and had only one exit for a three- storeyed building. The presence of balconies as a vital component in

disaster response by acting as landing pads for trapped victims awaiting rescue was therefore overlooked (Adinku, 1999).

There are laws in Kenya that articulate the reasonable standards for school infrastructure. These laws constitute a code of safety expectations for all schools in Kenya. In the construction of structures, all learning institutions in Kenya must comply with the regulations of the Education Act Cap 211, Public Health Act Cap 242, Ministry of Public Works, the Children Act (2001), Circular No. G9/1/169 Republic of Kenya (2001), the Occupational Safety and Health Act (2007) and the Safety Standards Manual for Schools in Kenya (2008) (Wanyama, 2011). All school buildings should be constructed or occupied with consultation with and approval of the relevant institutions such as Ministry of Public Works and the Ministry of Health (MOE, 2008).

According to Makhanu (2009) vulnerability of schools to fire disasters is usually attributed to a number of factors. Building materials may not be fire-resistant; emergency exits that are permanently locked or windows which are grilled; doors that open inwards instead of outwards, such that in the event of an emergency so many learners pushing towards the door would jam it and eventually get caught up as escape would not be easy. Also fire equipments such as fire extinguishers and fire blankets may be inaccessible. Such a state is dangerous and a recipe for fire disaster.

2.7 Summary of the literature review

Gichuru (2013) carried out study on fire disaster preparedness strategies in secondary schools in Githunguri and the study found out that majority of

learning institutions had no capacity to handle emergencies such as fire disasters and are yet to comply with the safety standards manual produced in 2008 by the Ministry of Education. The study revealed that fire fighting equipments in most schools were inadequate and rarely inspected. In relation to building and fire safety most schools had made effort to improve fire disaster preparedness but their preparedness is still poor and needs to be improved. Mwangi (2014) in his study also revealed that firefighting equipment in most schools was not enough and that in most schools there were no evacuation plans and also most secondary schools had not trained the stakeholders on fire disaster preparedness.

Considering the studies carried out by Gichuru (2013), Mwangi (2014) and this study, there is a clear indication that secondary schools are not yet prepared for fire disaster risk reduction. The three studies clearly show that firefighting equipment are inadequate, principals, teachers and students are not trained on fire disaster risk reduction, some building policies have not been adhered to since this study revealed that some classrooms doors were still opening inwards and windows are grilled. This study also revealed that in most schools there were no disaster management committees and most secondary schools had no well labeled assembly points and emergency exits. This study compare with the other two in that no public secondary school was found to have had sufficient fire safety preparation. This study therefore concurs with other studies that were carried out there before.

This shows that despite the government of Kenya putting in place various policies governing compliance with fire disaster risk reduction, total compliance by most secondary school is yet to be realized meaning that there is still a knowledge gap as far as fire disaster risk reduction is concerned. It is therefore important that education stakeholders are keen to ensure and enforce compliance with fire disaster risk reduction measures.

2.8 Theoretical framework

This study is based on Abraham Maslow's Hierarchy of Needs Theory (1943). Abraham Maslow presented a hierarchy of needs model using the terms physiological, safety, social, esteem and self-actualization to analyze the pattern that human motivations generally move through. Physiological and safety needs are considered lower carder while social, esteem and self-actualization are said to be the high carder needs. He believed that human beings possess a set of motivation systems that are not related to rewards or unconscious desires.

According to Maslow, individuals are motivated by the unsatisfied needs in each level. The human psychological needs are arranged with the understanding that people are incapable of attaining higher level needs when lower level needs are not met. Once the lower needs are met individuals are motivated to fulfill the upper needs. The lower level needs include food, shelter, clothing, shelter and safety. With their physical needs relatively satisfied, the individual's safety needs take precedence and dominate behavior. Absence of safety may be caused by war, natural or artifitual disaster. The

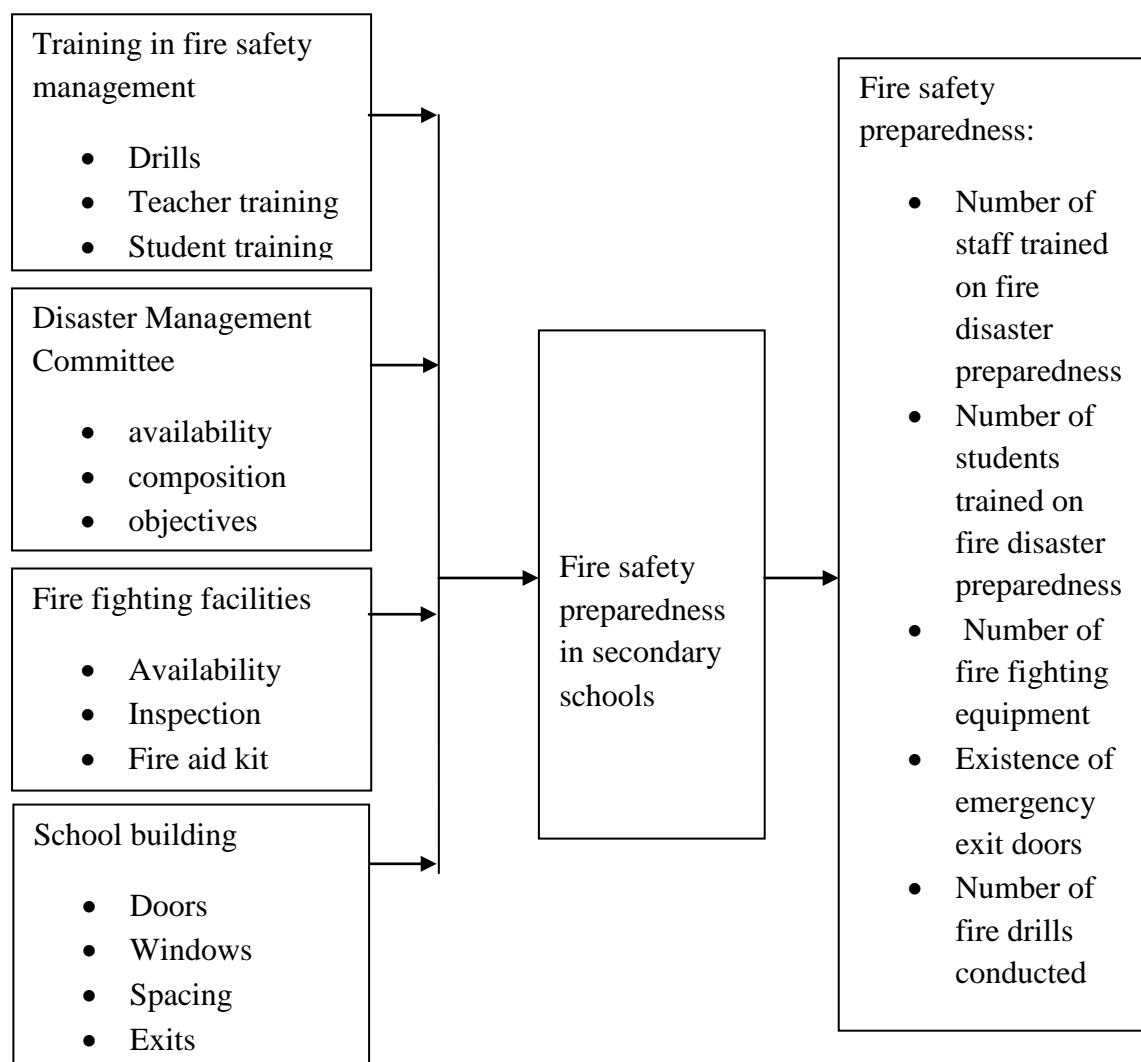
safety needs are protection from elements, security, order, limits and stability financial security, health and well-being of an individual.

The theory explains that humans prefer a safe, organized and peaceful world. They avoid physical harm and chaos and in cases of threats, safety needs take the first stage. Maslow supposed that all people strive to attain the highest levels of their abilities and that everyone has the ability and the desire to attain esteem needs and self-actualization levels.

The theory has been critiqued for its little evidence to bear its hierarchical aspect. For example in some cultures, communal needs are placed before any personal needs. There is also little proof that humans are motivated to satisfy only one level of need at a time (Babayusi, 2011). This theory is relevant to this study because it gives importance to safety as a primary human need. In regard to this study, for a school to attain its education objective it is important to make learners feel safe and secure. Denying learners of a safe and secure learning environment is simply depriving them their fundamental human right.

2.9 Conceptual Framework

A conceptual framework is a research tool used to develop awareness and understanding of a study. It helps the researcher to communicate how independent and dependent variables relate to each other using arrow directed diagrams (Riechel & Ramey, 1987). The relationship between the variables of the study is shown in figure 2.1



2.1: Relationship of school-based factors influencing fire safety preparedness

Figure 2.1 Conceptual framework focuses on assessing the outcome fire safety preparedness (dependent variable) and the factors that influence it (independent variables). The independent variables are training on fire safety management, disaster management committees, availability of fire fighting facilities and construction of school buildings. Fire safety preparedness depends on timely satisfaction of given preconditions like preparedness to involve training of staff and students on how to handle fire disasters, having disaster management committees, putting in place firefighting equipment and following of the set rules and regulations in putting up of the school buildings.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses research design, target population, sample size and sampling techniques, research instruments, validity and reliability of instrument, data collection procedures and data analysis techniques.

3.2 Research Design

The study adopted a descriptive survey design to find out the factors influencing the fire safety preparedness strategies in public secondary schools in Lower yatta Sub-County, Kitui County. According to Orodho (2005), a descriptive survey is a method of collecting data by the way of administering of a questionnaire from a specified sample. It is commonly used to collect information about people's attitudes, opinions, habits or any variety of social issues. This design was deemed appropriate for the study because it enabled the researcher to collect, analyze and report data as it was in the field without the interfering with the variables under study, and also was an effective way of collecting data from a large number of population relatively cheap and within a short period time.

3.3 Target Population

According to Krawthwohl (2004) target population refer to the total number of subjects or the total environment of interest to the researcher. The target

population was 26 public secondary schools, 26 principals, 115 secondary school teachers and 6,320 students.

3.4 Sample Size and Sampling Techniques

According to Gray & Airasian (2003) and Babbie (2005), propose that a sample size for descriptive studies is 10-20% of the population. The researcher purposively selected all the 26 public secondary schools and the 26 principals giving a sample size of 26 principals, using simple random sampling technique 30% of 115 teachers were selected giving a sample size of 35 teachers, 10% of 6320 students were selected giving a sample size of 632 students. Stratified sampling technique was used to select the students. This technique identifies sub groups in the population and sorts from each sub group proportionately. It aims at a proportionate representation with a view of taking care of the differences in sub-group behaviours (Oso & Onen, 2005). Thus out of a sample size 632 students, 316 girls and 316 boys were used.

3.5 Research Instruments

The data was collected using questionnaires and an observation schedule. The **questionnaires** comprised of open ended and closed ended questions which were sub-divided into five sections; section A which consisted of demographic data; section B consisted training of staff and students and fire safety preparedness; section C consisted disaster management and fire safety preparedness; section D consisted of firefighting equipment and fire safety preparedness and section E consisted construction of buildings and fire safety preparedness. The questionnaires were administered to the principals, teachers

and learners of the sampled schools. Questionnaires were selected for collecting data because their wordings and sequence don't change and is identical to all respondents. This has the merits of obtaining standard responses to items in the questionnaire, making it possible to compare between sets of data. According to Orodho (2010), questionnaires can reach a big number of respondents who are able to read and write independently. On the other hand, **observation schedule** is appropriate for this study because it complements the questionnaires and thus enhanced the quality of data. The data collected can be highly reliable as the researcher was able to observe the elements being studied for example the number of fire fighting facilities (Ary, 2006).

3.6 Validity of Instrument

Content validity of a measuring instrument is the extent to which it provides adequate coverage of the investigative questions guiding the study (Mugenda & Mugenda, 2003). Content validity was established by consulting the expertise of the supervisors. These experts examined every item in the questionnaire and did analysis to ensure that the items answered the research objectives. Recommendations from the experts were taken into consideration in order to modify the instruments. Instruments were also pre tested in two schools involving 2 principals, 6 teachers (3 from each School) and 10 students (5 from each school) and any ambiguous question was detected and corrected.

3.7 Reliability of Instrument

According to Denscombe (2007) reliability refers to the constituency of a particular measuring instrument yielding a similar result over a number of repeated times. The researcher used tests re-test method in two schools. The scores from both tests were correlated to indicate the reliability of the instruments. The correlation was determined using Pearson's Product Moment Correlation Co-Efficient. The reliability co-efficient (r) of Principals, teachers and students questionnaire yielded 0.89, 0.86 and 0.82 respectively which indicated the instruments were reliable.

3.8 Data Collection Procedures

A permit to authorize data collection was applied for from the National Council for Science and Technology. A copy of the permit was submitted to the Sub-County Education Officer, Lower Yatta Sub-County as required. The researcher visited the sampled schools to get permission from the principals and arranged for the appropriate days for data collection. During data collection, the questionnaires were filled in by the respondents and completed questionnaires were then collected immediately.

3.9 Data Analysis Techniques

According to Mugenda and Mugenda (1999) data analysis is the process of organizing and interpreting raw data collected. Responses were coded, processed and entered in the computer using the Statistical Package for Social Science (SPSS). Descriptive statistics such as frequency distribution and percentages were used to analyze the data collected. Tables were constructed

to indicate responses from each item used. Qualitative data generated from the questions was organized into themes, patterns and categories pertinent to the study. It was presented thematically in line with the study objectives, that is, putting it into major topics or subjects using frequency distribution tables and percentages.

3.10 Ethical Consideration

Ethical issues in research are guidelines followed to ensure that the integrity and privacy of the participants studied are not violated. During data collection the researcher respected the confidentiality and anonymity of research respondents, this was done by assuring the respondents that their names were not to be disclosed, the researcher obtained informed consent from the subjects to be used in the study and also requested that participants participated voluntarily. This was done during the pre-visit day.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter consists of data analysis, interpretation and presentation. It covers; introduction, questionnaire return rate, demographic data of respondents, training on fire safety, availability of disaster management committees, availability of fire fighting equipments and school buildings and fire safety.

4.2 Questionnaire return rate

The sample population had 26 principals, 35 teachers and 632 students. All of them returned filled questionnaires. The response was therefore 100.0 percent.

4.3 Demographic data of respondents

The principals, teachers and students were required to give some demographic information which they gave as follows. The principals and teachers were required to state their gender and highest level of training. Principals were asked to state for how long they had been principals while teachers were required to state for how long they had been teaching. The students were required to state their gender, class and age bracket. The respondents gave the information as follows.

4.3.1 Demographic information on the gender of principals and teachers

The principals and teachers were required to indicate their gender. Their responses were as indicated in the Table 4.1.

Table 4.1: Distribution of principals and teachers by gender

	Principals		Teachers	
	Frequency	Percentage	Frequency	Percentage
Male	18	69.2	22	62.9
Female	8	30.8	13	37.1
Total	26	100.0	35	100.0

As shown in table 4.1 majority of the schools (69.2 percent) are headed by male principals while 8 percent of the schools are headed by female principals. Male teachers also comprised majority (62.9 per cent) of those sampled against 37.1 percent of the females who took part in the study.

4.3.2 Demographic information on the highest level of training of principals and teachers

Information about principals' and teachers' highest academic qualifications was sought and the results are as indicated in Table 4.2

Table 4.2: Principals' and teachers' highest level of training

	Principals		Teachers	
	Frequency	Percentage	Frequency	Percentage
PTC	0	0	1	2.9
Diploma	2	7.7	3	8.6
Degree	18	69.2	27	77.1
Masters	6	23.1	4	11.4
Total	26	100.0	35	100.0

As referenced in Table 4.2, none of the principals had Primary Teacher Certificate (PTC). Only 7.7 per cent had diploma, majority (69.2 percent) reported that they had attained a bachelor's degree while the other 23.1 percent had master's degree. One teacher (2.9 percent) reported to have Primary Teacher Certificate, 8.6 percent had diploma, 77.1 percent had bachelor's degree while the remaining 11.4 percent had a master's degree. This shows that majority of those who took part in the study are highly educated hence could understand fire disaster preparedness well.

4.3.3 Demographic information on principals' length of service in the position of a principal and teachers' length of service

The researcher sought information principals' experience and teachers' length of service. Their responses are shown in Table 4.3.

Table 4.3: Principals length of service in the position of a principal and teachers responses on experience

	Principals		Teachers	
	Frequency	Percentage (%)	Frequency	Percentage (%)
0-5 years	8	30.8	15	42.9
6-10 years	11	42.3	10	28.6
11-14 years	6	23.1	7	20.0
15 and above	1	3.8	3	8.6
Total	26	100.0	35	100.0

As shown in Table 4.3, 30.8 percent of the principals had served in the position of a principal for not more than five years, majority (42.3 percent) had been principals for 6-10 years, 23.1 percent had been principals for 11-14 years while one of those sampled (3.8 percent) had more than 15 years experience as principals. This implies that most principals have served for some time and may have information on safety issues.

Table 4.3, 42.9 percent of the teachers sampled had been in service for not more than five years, 28.6 percent had been teaching for 6-10 years, 20.0 percent had taught for 11-14 years while only 8.6 percent had been teaching for more than 15 years. Majority of them are new to the service and do not have adequate information on fire safety preparedness.

4.3.4 Demographic information on the students' gender

The researcher sought to establish students' gender. Their responses were shown in Table 4.4.

Table 4.4: Distribution of students by gender

Gender	Frequency	Percentage
Male	323	51.1
Female	309	48.9
Total	632	100.0

From Table 4.4, 51.1 percent of boys took part in the study while the girls were 48.9 percent. This gives a fair representation of both gender.

4.3.5 Demographic information on the classes (form) of students

This researcher sought to establish the classes of all the respondents as shown in Table 4.5.

Table 4.5: Distribution of students by class

Form	Frequency	Percentage
1	156	24.7
2	208	32.9
3	156	24.7
4	112	17.7
Total	632	100.0

Students in form one and form three each comprised 24.7 percent, form two students comprised 32.9 percent while form fours comprised 17.7 percent. There are many newly-established schools in the area of study that do not have form four and three classes, which accounts for the skewed representation.

4.3.6 Demographic information on the age bracket of students

This researcher sought to establish the age brackets of the students who took part in the study as shown in Table 4.6.

Table 4.6: Distribution of students by age

Age bracket(years)	Frequency	Percentage
13 and below	19	3.1
14 to 16	345	54.9
17 and 18	224	35.4
19 and above	44	6.96
Total	632	100.0

A very small number of respondents was aged below 14 years (3.1 percent), majority of the students were between 14 and 16 years (54.9 percent), a good number was aged 17 and 18 years (35.4 percent) and the rest (6.9 percent) were 19 years or older. This implies that majority of the respondents were old enough to comprehend and respond to safety related issues.

4.4 Training of staff on fire safety preparedness

In order to establish whether secondary schools train teachers, workers and students on appropriate responses in case of fire, several indicators were used as follows.

4.4.1 Training on fire safety

Principals, teachers and students were asked whether they have been trained on fire safety preparedness. Their responses are shown in Table 4.7.

Table 4.7: Principals', teachers' and students' responses on training

Response	Principals		Teachers		Students	
	f	%	F	%	f	%
True	22	84.6	3	8.5	158	25.0
False	4	15.4	32	91.4	474	75.0
Total	26	100.0	35	99.9	625	100.0

As shown in Table 4.7, majority of principals that is, 84.6 % said that training on fire safety had been done while 15.4 % said that training on fire safety preparedness had not been done.

This is in contrary to teachers and students responses where; majority of teachers that is, 91.4% said that they had not been trained on fire preparedness with only 8.5% of teachers with indicating that they had underwent training on fire safety preparedness.

Most students, that is 75% of students said that they had not been trained on fire safety preparedness while 25% of students they had undergone training on fire preparedness. This implies that most schools are not well prepared for fire emergencies since they are not trained on how to handle fire emergencies. The findings also concur with Mwangi (2014) that most members of staff and all students have not been trained in fire disaster risk reduction.

4.4.2 Personnel who trains on fire safety preparedness

Principals, teachers and students were asked to state who trains them on fire safety preparedness. Their responses are as shown in Table 4.8.

Table 4.8 Table showing principals, teachers and students responses on the personnel who train the on fire safety

Responses	Principals		Teachers		Students	
	Frequency	percent	frequency	percent	frequency	Percent
Fire brigadiers	21	80.8	2	5.7	132	20.8
Community members	1	3.8	1	2.8	0	0
Teachers	0	0	0	0	1	4.2
Others	4	15.4	32	91.4	474	75
Total	26	100	35	100	632	100

As referenced in Table 4.8, majority of principals, 80.8 % indicated that they had been trained on fire preparedness by fire brigadiers, 3.8% of principals said that training on fire safety preparedness was done by community members with 15.4 % of principal said that they had not engaged anyone to train them on fire safety preparedness.

Most teachers that is 91.4% indicated that they had not engaged anyone to train them on fire safety preparedness while 5.7% of teachers said that training on fire safety preparedness was done by fire brigadiers and 2.8% of teachers said that training on fire disaster preparedness was done by community members, this implies that in most schools training on fire safety preparedness has not been conducted by the right personnel.

Majority of students that is 75% indicated that that they had not engaged anyone to train them on fire safety preparedness, 4.2% of students said that they had been trained on fire safety preparedness by their teachers while 20.8% of students said that they had been trained by fire brigadiers. Their responses concur with that of teachers that most schools have not engaged the right personnel to train them on fire safety this implies lack fire safety preparedness in most schools.

4.4.3 Usefulness of training on fire safety preparedness

Principals, teachers and students were asked to state whether training enhances fire safety preparedness. Their responses are as shown in Table 4.9

Table 4.9 Table showing principals, teachers and students responses on usefulness of training on fire safety

Response	Principals		Teachers		Students	
	f	%	f	%	f	%
Strongly agree	6	23.1	14	40	263	41.7
Agree	20	76.9	21	60	211	33.3
Neutral	0	0	0	0	158	25
Total	26	100	35	100	632	100

As referenced in Table 4.9, few principals 23.1%, strongly agreed that training enhances fire disaster preparedness, 76.9% of principals agreed that training enhances fire disaster preparedness, this shows that majority of principals acknowledge that training enhances fire safety preparedness.

A significant number of teachers, 40% strongly agreed that training on fire safety enhances fire safety preparedness while majority of teachers, 60% agreed that training on fire safety enhances fire safety preparedness. This shows that most teachers acknowledge that training enhances fire safety preparedness.

On the other hand a significant number of students, 41.7% strongly agreed that training enhances fire safety preparedness, 33.3% of students agreed that training enhances fire safety preparedness, minority of students, 25% were neutral on whether training enhances fire disaster preparedness showing that they did not understand the importance of training in response to fire disaster preparedness.

4.5 Influence of disaster management committee on fire safety preparedness

The researcher sought to examine the influence of disaster management committee on fire safety preparedness. In an attempt to meet this objective, several indicators were used as follows.

4.5.1 Availability of disaster management committee

Principals and teachers were asked whether disaster management committee is available in their schools. Their responses were as shown in Table 4.10.

Table 4.10 Table showing principals and teachers responses on availability of disaster management committee

Responses	Principals		Teachers	
	Frequency	percent	frequency	Percent
Yes	9	34.6	9	25.7
No	17	65.4	26	74.3
Total	26	100	35	100

As referenced in Table 4.10, majority of principals (65.4%) said that disaster management committees were not available in their schools while, minority of principals (35.6%) said that disaster management committees were available in their schools while. This implies that most schools do not have disaster management committees.

Majority of teachers that is 74.3% said that disaster management committees were not available in their respective schools with 25.7% indicated that

disaster management committees were available. According to ministry of education (2008), schools should have disaster management committee which has outlined duties to play in facilitating and enhancing safety in schools. A bigger percentage of principals and teachers indicated that schools did not have disaster management committees; this implies that in these schools school safety and disaster preparedness is an obligation of no one in particular.

4.5.2 Membership of disaster management committees

Principals and teachers were asked to indicate the membership of disaster management committee. Their responses were as manifested in Table 4.11.

Table 4.11: Principals and teachers responses on the membership of disaster management committees.

Responses	Principals		Teachers	
	frequency	Percentage	frequency	Percentage
Principal	9	100	11	100
Deputy principal	6	66.7	7	63.6
Teachers	7	77.8	9	81.8

As shown in Table 4.11, all the principals, 100% indicated that principals were members of disaster management committee with 66.7% indicating that deputy principals were members of disaster management committees while 77.8% of the principals said that teachers were members of disaster management committees. All the principals in schools which had disaster

management committees did not involve a representative of B.O.M and area education office.

From the teachers in who took part in the study, 100% indicated that principals were members of disaster management committees, 63.6% said that deputy principals were members of disaster management committees and 81.8% indicated that teachers were members of disaster management committees. None of the teachers indicated that a representative from B.O.M and area education office were included in disaster management committees. This implies that the B.O.M members and representative of area education have been completely excluded in school safety and disaster matters. This shows all the stakeholders have not been involved in school safety, which is a sign of fire safety unpreparedness.

4.5.3 When disaster management committee meet.

When asked how regularly the disaster management committees meet, principals and teachers responded as shown in Table 4.12.

Table 4.12: Principals and teachers responses on the frequency of disaster management committees' meeting.

Response	Principals		Teachers	
	frequency	percentage	Frequency	percentage
Annually	2	22.2	2	18.2
After disaster	7	77.8	9	81.8
Total	9	100	11	100

Table 4.12 indicated that, majority of principals, 77.8% said that the committees met after a disaster while minority of principals (22.2%) said that disaster management committees met annually after a disaster.

Of the teachers who took part in the study, majority of teachers 81.8% indicated that disaster management committees met annually with 18.2% indicated that disaster management committees met annually while majority of teachers,. Failure of disaster management committees to meet regularly implies that most schools have not adequately identified possible security loopholes hence they are not well prepared in case of a fire disaster.

4.5.4 Duties of disaster management committees

Most principals and teachers said that duties of disaster management committees were to educate members on how to use firefighting equipments, procurement of required firefighting equipments and assessing whether the firefighting equipment are in the right condition. This shows that most principals and teachers do not adequately understand the roles of disaster management committees.

4.6 Availability of fire fighting equipments within the school premises.

The researcher sought to establish the adequacy of the fire fighting facilities for fire safety preparedness; several indicators were used as follows.

4.6.1 Adequacy of firefighting equipment

Fire fighting equipments are of paramount importance. Secondary schools must have enough of these equipments so as to prepare for the disaster risk reduction. The respondents were asked whether the firefighting equipment in their schools were adequate and they responded as indicated in Table 4.13, 4.14 and 4.15.

Table 4.13: Principals response on adequacy of fire fighting equipments

Response	frequency	percentage
Adequate	9	34.6
Inadequate	17	65.4
Total	26	100

As shown in Table 4.13, most principals 65.4% said that fire fighting equipments were not adequate. This meant that most schools did not have enough fire fighting equipments to fight fire in case of a fire disaster, therefore, indicating that schools are not adequately prepared to handle fire disasters. 34.6 % felt that there was enough fire fighting equipments within the school premises fight fire in case of a fire disaster.

Table 4.14: Teachers' responses on the level of adequacy of firefighting equipments.

Equipment		Adequate	Not Adequate	Not Available	Total
Fire hydrants	f	5	6	24	35
	%	14.3	17.1	68.6	100
Fire extinguishers	f	15	20	0	35
	%	42.9	57.1	0	100
Fire blankets	f	12	7	16	35
	%	34.3	20	45.7	100
Fire alarms	f	3	0	32	35
	%	8.5	0	91.4	100
Smoke detectors	f	0	3	32	35
	%	0	8.5	91.4	100
Sand buckets	f	3	26	6	35
	%	3.5	74.3	17.1	100
Fire hose & nozzles	f	0	6	29	35
	%	0	17.1	82.9	100
Fire escape ladder	f	0	0	35	35
	%	0	0	100	100
Reliable water supply	f	20	15	0	35
	%	57.1	42.9	0	100

As shown in the Table 4.14, most of the teachers rated the specific firefighting equipment as either inadequate or not available. 57.1% indicated water was

adequate. Most of the teachers, 74.3% indicated that sand buckets were not adequate while fire hydrants, fire alarms, smoke detectors, fire hose and nozzles and escape ladder were not available in most schools. A good number of teachers 42.9% also rated fire extinguishers adequate and 34.3% rated fire blankets as adequate this concurs with observation schedule where fire extinguishers were found to be available in many schools. This implies that in case of fire most of the schools can't fight fire effectively because the most of the firefighting equipments are unavailable thus implying fire safety unprepared.

Table 4.15. Students' responses on adequacy of firefighting equipment

Equipment		Adequate	Not adequate	Not available	Total
Fire hydrants	f	0	211	421	632
	%	0	33.4	66.6	100
Fire extinguisher	f	342	290	0	632
	%	54	46	0	100
Fire blankets	f	26	211	395	632
	%	4	33	63	100
Fire alarms	f	0	105	537	632
	%	0	17	83	100
Smoke detectors	f	0	53	579	632
	%	0	8.4	91.6	100
Sand buckets	f	0	53	579	632
	%	0	8.4	91.6	100
Fire hose & nozzles	f	0	26	606	632
	%	0	4	96	100
Reliable water supply	f	422	210	0	632
	%	66.8	33.2	0	100

According to Table 4.15, most students 66.8% and 54% reported that water supply and fire extinguisher respectively were adequate. 53% of the students reported sand buckets were not adequate while most students indicated that fire hydrants, fire blankets, fire alarms, smoke detectors, sand bucket and fire and nozzles were not available in their schools. This indicates that most schools were not fully equipped to handle fire disaster. This is lack of fire safety preparedness. This study concurs with a study carried out by Gichuru (2013), that firefighting equipment are not adequate in most public secondary schools.

4.6.2 Inspection of fire fighting equipments

When asked how regularly fire fighting equipments are inspected, the principals and teachers responded as shown in Table 4.16 and 4.17.

Table 4.16: Principals’ responses on inspection of firefighting equipment

Response	frequency	Percentage
Termly	2	7.7
Yearly	10	38.5
Biannually	9	34.6
After a disaster	5	19.2
Total	26	100

According to Table 4.16, most principals indicated that firefighting equipments were inspected at most once per year. There were also a

significant number of principals who indicated that the fire fighting equipments were inspected after a disaster. This shows that in case of a fire disaster, even the principals might not know whether the fire fighting equipments were functional or not. This showed lack of preparedness in case of fire disaster.

Table 4.17: Teachers’ responses on inspection of firefighting equipment

Response	frequency	percentage
Termly	22	62.9
Yearly	6	17.1
Never	7	20
Total	35	100

According to Table 4.17, majority of the teachers (62.9 %) indicated that fire fighting equipments are inspected once per term, while 17.1 % teachers said that they are inspected once per year and 20% said that they were inspected after a disaster. This implies that the teachers responses were contrary to the principals as teachers indicated that the firefighting equipment were inspected more often.

4.6.3 Adequacy of first aid supplies

Principal were asked to tell when first aid supplies were supplied, their responses are as shown in Table 4.18 and table 4.19.

Table 4.18: Principals' responses on supply of first aid supplies

Response	frequency	percentage
Termly	4	15.4
Yearly	13	50
After a disaster	9	34.6
Total	26	100

As referenced in Table 4.18, 15.4% of the principals indicated that first aid supplies were availed every term, while 50% of principals indicated that first aid supplies were provided yearly. A significant number, 34.6% indicated that they were supplied after a disaster. This implies that some schools may not adequately offer first aid in case of fire disaster due to lack of first aid supplies, this shows lack of fire safety preparedness.

Table 4.19: Teachers responses on adequacy of first aid supplies

Response	frequency	frequency
Yes	14	40
No	21	60
Total	35	100

Table 4:19 shows that, majority of teachers 60% indicated that first aid supplies were inadequate while 21% of teachers said that first aid supplies were adequate. This report is in line with observation schedule where first aid supplies were found to be inadequate in most schools. This implies that majority of the schools cannot adequately offer first aid services in case of fire emergency since the supplies are inadequate.

4.7 School buildings and fire safety

In order to establish whether school buildings are constructed in relation to policy provisions pertaining to fire disaster risk reduction, several indicators were used as follows.

4.7.1 Aspects of school buildings in relation to fire safety

The principals, teachers and students were asked to indicate their level of agreement in relation to different areas of school buildings and their fire safety. The responses are summarized in Tables 4.20, 4.21, 4.22, 4.23, 4.24 and 4.25.

Table 4.20: Principals response on area of school buildings and fire safety

School		Strongly	Agree	Neutral	Disagree	Strongly	Total
building		Agree				disagree	
Windows not	f	2	21	3	0	0	26
Grilled	%	7.7	80.8	11.5	0	0	100
Doors open	f	8	18	0	0	0	26
outward	%	30.8	69.2	0	0	0	100
Dormitories	f	26	0	0	0	0	26
two doors	%	100	0	0	0	0	100
Classrooms are	f	10	16	0	0	0	26
not congested	%	38.5	61.5	0	0	0	100
Laboratories	f	15	11	0	0	0	25
have two doors	%	57.7	42.3	0	0	0	100
Laboratories	f	8	18	0	0	0	26
chemicals	%	30.8	69.2	0	0	0	100
properly stored							
Assembly	f	10	0	14	2	0	26
points well	%	38.5	0	53.8	7.7	0	100
labeled							
Exit routes are	f	6	0	20	0	0	26
well labeled	%	23.1	0	76.9	0	0	100

According to Table 4.20, most principals that is, 80.8% indicated that windows in the school have not been grilled, 69.2% said that exit doors in buildings in the school open outwards, all the principals said that dormitories and laboratories have two doors, 61.5% said that classrooms are not congested and 69.2% indicated that laboratory chemicals are properly stored, this implies that occupants can easily escape in case of fire emergency, hence showing fire safety preparedness. However, 53.8% and 76.9% were of the opinion that assembly points and exit routes were not well labeled. This shows that schools' level of fire disaster preparedness were on the lower side.

Table 4.21: Teachers' responses on the area of school buildings and fire safety.

School buildings		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Windows not	f	0	23	0	9	3	35
Grilled	%	0	65.7	0	25.7	8.5	100
Halls have	f	15	9	2	6	3	35
emergency exits	%	42.9	25.7	5.6	17.1	8.5	100
Doors open	f	9	9	2	6	9	35
outwards	%	25.7	25.7	5.6	17.1	25.7	100
Assembly points	f	9	6	3	5	12	35
well labeled	%	25.7	17.1	8.5	14.3	34.3	100

As reflected in the Table 4.21, majority of teachers (65.7%) agreed windows were not grilled and 42.9% strongly agreed that halls have emergency exits, this concurs with observation schedule report where most windows were not grilled, doors were found to be opening outwards and emergency exits were available in most buildings. All these indicate that schools are well prepared for fire disasters. However, 25.7% of teachers indicated doors were designed to lock in occupants and 34.3% indicated that assembly points are not well labeled. This still means that schools are not fully prepared in case of fire disaster. A study carried out by Gichuru (2013) on fire safety in public secondary schools in Nyeri Central and another one by Makhanu (2009), found that fire and safety departments in most schools do not exist. All these studies as is the case in this study show that most public secondary schools do not have well labeled assembly points. This means that the students do not know where to go in case of a fire disaster.

Table 4.22: Students responses on school buildings.

Area of school buildings		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Exits are well	f	26	104	26	238	238	632
Labeled	%	4	16.5	4	37.7	37.7	100
Emergency door	f	26	52	0	238	316	632
well labeled	%	4	8.4	0	37.7	50	100
Assembly points	f	26	52	0	238	316	632
well labeled	%	4	8.4	0	37.7	50	100
Exits are clear of	f	26	79	52	238	238	632
Obstructions	%	4	12.5	8.4	37.7	37.7	100

According to Table 4.23, 50% of students indicated that emergency doors and fire assembly points were not well labeled, a report which concurs with observation schedule where fire assembly points were not well labeled and direction post was not available in most schools, also 37.7% of students reported that fire exits are not well labeled and were not clear of obstructions at all times. The implication is that even though there are fire exits in the

buildings, in case of fire disaster people in school may still suffer because they cannot access them. This shows lack of preparedness.

Table 4.23: Students’ responses on presence of emergency exits in buildings

SA=strongly agree, A=agree, N=neutral, D=disagree, SD=strongly disagree

Buildings		SA	A	N	D	SD	TOTAL
Classes	f	211	105	211	52	53	632
	%	33	17	33	8.4	8.6	100
Dormitories	f	158	290	26	105	53	632
	%	25	46	4	17	8	100
Halls	f	131	238	79	184	0	632
	%	20.7	37.7	12.5	29.1	0	100
Laboratories	f	131	343	0	158	0	632
	%	20.7	54.3	0	25	0	100

As reflected in Table 4.23, 54.3% of students reported that laboratories had emergency exits, 46% indicated that dormitories had emergency exits and 37.7% and 33% stated that halls and classes respectively had emergency exits. This shows high level of fire safety preparedness in majority of the school.

Table 4.24: Students responses on how doors in school buildings open

Doors	Frequency	Percentage
Open outwards	421	67
Open inwards	211	33
Total	632	100

As reflected in Table 4.24, 67% of students indicated that doors in school buildings open outwards this implies that occupants can easily escape in case of fire emergency although a significant number (33%) indicated that doors in school buildings open inwards which shows that there are low levels of fire preparedness.

Table 4.25: Students responses on whether exit doors are always locked

Exit doors locked	Frequency	Percentage
Yes	211	33
No	421	67
Total	632	100

Table 4.25 indicates that, majority of students (67%) reported that exit doors are always locked; while few students (33%) reported that exit doors were not always locked. This implies that in case of a fire disaster, the occupants cannot easily escape since exit doors are not easily accessible which shows that most schools are not well prepared.

4.7.2 Inspection of school physical infrastructure

In order to achieve this, principals were asked to give how often inspect school physical infrastructure. Their responses are shown in Table 4.26

Table 4.26: Principals responses on inspection of school infrastructure

Response	Frequency	Percentage
Regularly	20	79.9
Irregularly	2	7.7
After a disaster	4	15.4
Total	26	100

As shown in Table 4.26, majority of the principals (76.9%) indicated that they inspected school buildings regularly this shows high levels of fire safety preparedness since through regular inspection security loopholes can be identified in time and necessary measures taken.

4.7.3 Ways of improving school buildings to enhance fire disaster risk reduction

The principals, teachers and students suggested the following ways to improve fire disaster risk reduction in relation to school buildings. Windows should not be grilled, exits should be cleared of obstructions, fire extinguishers should be increased, and doors should open outwards, indicate exit routes and ensure compliance with electrical code to prevent fault, overheating and ignition.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary, conclusions and recommendations of the study as well as suggestion for further study.

5.2 Summary of the study

The study sought to establish school-based factors influencing fire safety preparedness in public secondary schools in Lower Yatta Sub-County, Kenya. The study was guided by the following objectives; to determine the extent to which training staff and students has influenced fire safety preparedness in secondary schools, to examine the influence of disaster management committees on fire safety preparedness in secondary schools, to establish the availability of fire fighting facilities on fire safety preparedness in secondary schools, to examine the influence of the policy on school building construction on fire safety preparedness in secondary school and to determine how school buildings are built in accordance with policy provisions pertaining fire safety preparedness.

The research adopted a descriptive survey. The target population for this study consisted of 26 public secondary schools in Lower Yatta Sub-County with 26 principals, 115 teachers and 6320 students. This study employed purposive sampling technique to obtain the sample population of 26 principals, simple random sampling to obtain the sample population of 56 teachers and stratified sampling technique to obtain a sample population of 632 students. Data was

collected using questionnaires administered to the principals, teachers and students. An observation schedule was also used. Collected data was analyzed into frequencies and percentages and presented in tables and the findings are as discussed in the following paragraphs.

5.3 Findings of the study

This study sought to investigate factors influencing implementation of fire risk reduction. The study findings were based on the objectives of the study. They are as indicated in the following four paragraphs.

5.3.1 Training of staff and students on fire safety preparedness

Findings showed that most members of staff and students that is, 75% of students and 91.5% of teachers have had not been trained on fire safety. This shows that school stakeholders lack the necessary skills of fire disaster risk reduction hence in case of fire disaster; most of them may not know what to do. This is lack of fire safety preparedness.

5.3.2 Disaster management committee and fire safety preparedness

According to the findings of the second objective which was to examine the influence of disaster management committee on fire preparedness, majority of the principals and teachers that is, 65.4% of principals and 74.3% of teachers reported that disaster management committees were not available in their schools and even the few schools which had the committees did not have all the members required. Also majority of these committees, met after a disaster and most respondents did not understand the roles of the disaster management

committees. Absence of disaster management committees implies that there is no specific body which oversees school safety and identifies safety loopholes in the school. This shows fire safety unpreparedness.

5.3.3 Availability of fire fighting equipments and fire safety preparedness

According to the findings of the third objective which was to establish the adequacy of fire fighting equipments within the school, majority of the principals, teachers and students reported that the equipments are not enough. The equipments mostly found in the schools were water supply and fire extinguishers. This is evidenced by the majority of teachers 57.1 % who acknowledged that there was reliable water supply in their schools. 54 % of the students evidenced that there were adequate fire extinguishers.

These are not enough in case of fire disaster. This shows that most schools have inadequate firefighting equipment which will help fight fire in case it occurred. In addition, the fire fighting equipments are not proportional to the teachers and students population evidenced by the observation schedule. This shows lack of fire safety preparedness. The findings show that firefighting facilities were inspected regularly. This shows preparedness since regular inspection ensures that firefighting facilities are in good condition.

5.3.4 Policy of construction of school buildings and fire safety preparedness

It was found that most schools have removed grills from the windows, doors opened outwards, dormitories and laboratories had two doors and classrooms

were not congested. This is true because 67 percent of students agreed that windows are not grilled. 57.7 percent of principals strongly agreed that laboratories had two doors. Another 76.9 percent of principals reported that they inspected school infrastructure regularly. This shows a sign of fire disaster risk preparedness. Most respondents reported that fire exits are not clear of obstructions all the time and that the exits are locked which means in case of fire they might not help. Majority of respondents reported that assembly points and fire exits are not well labeled. This shows that in case of fire disaster most occupants may not know where to assemble and which way to escape from. This is a sign of fire safety unpreparedness.

5.4 Conclusion of the study

The study conclusions were based on the objectives of the study which guided the researcher to investigate school-based factors influencing fire safety preparedness.

Schools are not well prepared for fire safety because in most school staff and students are not trained on fire safety preparedness.

Most of the schools did not have disaster management committees but those who had constituted the disaster management committees did not involve representatives of all major stakeholders.

The firefighting facilities adequate in most schools were extinguishers and water supply. The other fire fighting facilities are not enough and the principals, teachers and students suggested that they should be added. It can

therefore be concluded that in most schools fire fighting facilities are inadequate.

In most schools, windows are not grilled, doors open outward, dormitories and laboratories have two doors and classrooms are not congested. It can therefore be concluded that schools have made effort to improve fire disaster risk reduction preparedness but this still needs a lot of improvement.

5.5 Recommendations from the study

The study makes the following recommendations based on the findings and conclusions;

- i) Disaster management committee should organize to train teachers, support staff and students on fire safety and regular fire drills conducted in the schools. Fire brigadiers should be invited to train them on how to use fire fighting facilities, evacuation procedures and also conduct fire drills to all school stakeholders on fire safety preparedness.
- ii) Principals are supposed to form disaster management committees and they should involve representatives of all stakeholders so that they function effectively so as to ensure that there is a specific body which oversees school security.
- iii) Board of Management should consider increasing the firefighting facilities like fire hydrants, fire extinguishers, fire blankets, fire alarms, fire/smoke detectors and fire hose and nozzles so that they become

adequate and be in proportion to the number of school buildings and staff and students in the learning institutions .

- iv) County directors should consider inspecting fire fighting facilities during their visit to schools and also inspect school buildings to ensure that they are constructed in line with policy provisions.
- v) School-based factors directly influence fire safety preparedness for instant adequate fire fighting facilities in schools will enable schools to effectively put off fire.

5.6 Suggestions for further study

The researcher suggests that;

- i) A study on the relationship between safety and academic performance should be carried out.
- ii) There should be a comparative study on fire safety preparedness in the private and public schools in Kenya.
- iii) A study to establish economic factors that influence fire safety preparedness in schools in Kenya should also be carried out.

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APPENDICES

APPENDIX 1

INTRODUCTION LETTER

University of Nairobi,
Department of Educational Administration & Planning,
P.OBOX 92, Kikuyu.

Date _____

The Principal,
_____ Secondary School.

Dear sir/madam,

RE: **REQUEST TO CONDUCT A RESEARCH**

I am a master of education student at the University of Nairobi department of Educational Administration and Planning, undertaking a research study on the factors that influence fire safety preparedness in public secondary schools in Lower Yatta Sub-County. Your school has been selected to participate. Kindly fill in the questionnaire honestly. The information will be used for academic purpose only and your identity will be kept confidential. Your co-operation will be highly appreciated.

Yours faithfully,

Esther Mueni Mutua.

APPENDIX 2

QUESTIONNAIRE FOR PRINCIPALS

This questionnaire is intended to help in an investigation into school based factors influencing fire safety preparedness in secondary schools. All information given will be treated with confidentiality and information collected will be used for the purpose of this study only. Kindly respond to all questions.

Part A: Demographic data

1. What is your gender? Male[] Female[]
2. What is your highest level of training attained?
Untrained [] PTC [] Diploma [] Degree [] Masters []
3. For how long have you been in this station?
0-5 years [] 6-10[] 11-14[] Above 15 []

Part B: Training of staff and students and fire safety preparedness

4. Has your staff been trained to fight fire? Yes [] No []
5. Has your students been trained to fight fire? Yes [] No []
6. Training of staff enhances fire disaster preparedness.
Strongly agree [] Agree []
Neutral [] Disagree []
Strongly disagree []

7. Who trains your staff and students on fire safety preparedness
Fire brigadiers [] community members []
Teachers [] Any other, specify _____

Part C: Disaster management committee and fire safety preparedness

8. Does the school have a disaster management committee?
Yes [] No []

9. If yes in question 8 above, how is the membership of the committee constituted? (Tick all that apply).

Principal [] Deputy Principal [] B.O.M member []
Teachers [] A member from A.E.Os office []

10. How often does the committee meet?
Annually [] after two years []
after a disaster [] never []

11. A functional disaster management committee enhances fire preparedness Strongly agree [] Agree []
Neutral [] Disagree [] Strongly disagree []

12. State three duties of disaster management committee in your school?

i _____

ii _____

iii _____

Part D: Fire fighting equipment and fire safety preparedness

13. How would you rate fire fighting equipment in your school?
Adequate [] Inadequate [] Not available []

14. How often are firefighting equipments inspected?
 After two years [] Other times, specify_____

15. How often does your school provide adequate first aid supplies?
 Always [] Termly []
 After a disaster [] Never []

Part E: Construction of school buildings and fire safety preparedness

16. Kindly indicate your level of agreement to the following statements in relation to school buildings and fire safety where:
 Strongly Agree = SA, Agree = A, Neutral=N, Disagree = D and
 Strongly Disagree = SD

	SA	A	N	D	SD
All windows in the school buildings have no grills					
Doors in the school buildings open outwards					
Dormitories have two doors					
Classrooms are not congested					
Laboratories have two doors					
All laboratory chemicals are properly stores					
Assembly points are well labeled					
All exit routes are well labeled					

17. How often do you check on the condition of the school physical infrastructure?
 Regularly [] Irregularly []

After a disaster [] Other times, specify _____

18. Suggest three ways in which the school buildings can be improved to ensure fire safety.

i _____

ii _____

iii _____

Thank you for your participation

APPENDIX 3

QUESTIONNAIRE FOR TEACHERS

This questionnaire is intended to help in an investigation into school based factors influencing fire safety preparedness in secondary schools. All information given will be treated with confidentiality and information collected will be used for the purpose of this study only. Kindly respond to all questions.

Part A: Demographic data

1. What is your gender? Male[] Female[]
2. What is your highest level of training attained?
Untrained [] PTC [] Diploma [] Degree [] Masters []
3. For how long have you been teaching?
0-5 years [] 6-10 years [] 11-14 years [] Above 15 years []

Part B: Training of staff and fire safety preparedness

4. Does your school undertake training on fire safety preparedness?
Yes [] No []
5. Who trains you on fire safety preparedness?
Fire brigadiers [] community members []
Teachers [] any other, specify_____

6. Training enhances fire disaster preparedness.
- Strongly agree [] Agree []
- Neutral [] Disagree []
- Strongly disagree []

Part C: Disaster management committee and fire safety preparedness

7. The school has a disaster management committee? Yes [] No []

8. If yes in question 7 above, what do the members of the committee constitute of? Tick all that apply.

Principal [] Deputy Principal []

Teachers []

A member from A.E.Os office [] B.O.M member []

9. How often is the school disaster and emergency plan reviewed and updated by the committee?

Annually [] after two years []

Never [] after a disaster []

10. What are some the duties of disaster management committee in your school?

i) _____

ii) _____

iii) _____

Part D: Fire fighting equipment and fire safety preparedness

11. Kindly indicate the level of adequacy of the following fire equipments in your school

Fire fighting equipment	Adequate	Not adequate	Not available
Fire hydrants			
Fire extinguisher			
Fire blankets			
Fire alarm			
Heat/ smoke detectors			
Fire sand buckets			
Fire hose and nozzles			
Fire escape ladder			
Reliable water supply			

12. Kindly indicate fire fighting equipment needed to improve fire preparedness.

i _____

ii _____

iii _____

iv _____

v _____

13. How periodically are the fire fighting equipment inspected?

Termly [] Yearly []

after two years [] other times, specify _____

14. Does your school has adequate first aid supplies? Yes [] No []

Part D: Construction of school buildings and fire safety preparedness

15. Kindly indicate level of agreement to the following statements in relation to school buildings and fire safety where: Strongly Agree=SA, Agree=A, Neutral=N, Disagree=D and Strongly Disagree=SD

Statement	SA	A	N	D	SD
Windows in school have no grills					
Halls have emergency doors					
Doors in school open outwards					
There are well labeled assembly points					

16. Suggest ways in which the school buildings can be improved as a strategy for ensuring fire safety.

Thank you for your participation

APPENDIX 4

QUESTIONNAIRE FOR STUDENTS

This questionnaire is intended to help in an investigation into school based factors influencing fire safety preparedness in secondary schools. All information given will be treated with confidentiality and information collected will be used for the purpose of this study only. Kindly respond to all questions.

Part A: Demographic information

1. What is your gender? Male [] Female []
2. In which form are you? Tick appropriately.
1 [] 2 [] 3 [] 4 []
3. In which category does your age fit?
13 years and below [] 14-16 years [] 17-18 years []
19 years and above []
4. Students in our school undergo trainings on fire related disasters.
True [] False []
5. Who trains you on fire safety preparedness?
Fire brigadiers [] community members []
Teachers [] any other, specify_____
6. Skills acquired during fire drills are useful in handling fire disasters in schools.
Strongly agree [] Agree []
Neutral [] Disagree []
Strongly disagree []

7. In case of fire disaster students cannot effectively use fire fighting facilities

Strongly agree [] Agree []

Neutral [] Disagree []

Strongly disagree []

8. To what extent do you agree that the following have emergency exits where:

Strongly Agree=SA, Agree=A, N=Neutral, Disagree=D and Strongly Disagree=SD

Building	SA	A	N	D	SD
Classes					
Dormitories					
Halls					
Laboratory					

9. Kindly indicate level of agreement to the following statements where:

Strongly Agree=SA, Agree=A, N=Neutral, Disagree=D and Strongly Disagree=SD

Statement	SA	A	N	D	SD
Exit doors are well labeled					
Emergency doors are well labeled					
Fire assembly points are well labeled					
Fire exits are clear of obstructions all times					

10. How do doors in the school buildings open?

Outwards [] inwards []

11. The exit doors are always locked.

Yes [] No []

12. Kindly indicate the level of adequacy of the following fire equipments in your school

Fire fighting equipment	Adequate	Not adequate	Not available
Fire hydrants			
Fire extinguisher			
Fire blankets			
Fire alarm			
Heat/ smoke detectors			
Fire sand buckets			
Fire hose and nozzles			
Reliable water supply			

Thank you for your participation

APPENDIX 5

OBSERVATION SCHEDULE

The researcher will observe the following school physical facilities.

Particulars	Presence		Condition Good Fair Poor
	Yes	No	
fire extinguisher			
Sand buckets			
Emergency exit doors			
Doors opening outward			
Windows without grills			
First aid kit			
Fire assembly zones			
Direction sign post			
Site plan			
Spacing in classroom			
Spacing in the dormitories			
Fire hose and nozzle			

APPENDIX 6

AUTHORIZATION LETTER



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,
2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. NACOSTI/P/16/17922/12046

Date:
6th July, 2016


Esther Mueni Mutua
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“School-based factors influencing fire safety preparedness in public secondary schools in lower Yatta Sub-County, Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Kitui County** for the period ending **5th July, 2017.**

You are advised to report to **the County Commissioner and the County Director of Education, Kitui County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.


BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kitui County.

The County Director of Education
Kitui County.

APPENDIX 8
AUTHORIZATION LETTER

MINISTRY OF EDUCATION, SCIENCE & TECHNOLOGY
State Department for Education

Telegrams "EDUCATION"
Kitui
Telephone: Kitui 22759
Fax :04444-22103
E-Mail :
cde.kitui@gmail.com



COUNTY EDUCATION OFFICE
KITUI COUNTY
P.O BOX 1557-90200
KITUI

When replying please quote;

Ref. No: KTIC/ED/RES/22/196

Date.13/10/2016

Esther Mueni Mutua
University of Nairobi
P.O.BOX 30197-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to conduct a research on **"School Based Factors Influencing Fire Safety Preparedness In Public Secondary Schools in Lower Yatta Sub County, in Kitui County, Kenya"** I am pleased to inform you that permission has been granted.

You are advised to liaise with the respective Sub County Director of Education before embarking on the exercise.

Regards,



P.M. WAMBUA
COUNTY DIRECTOR OF EDUCATION
KITUI COUNTY.

COUNTY DIRECTOR OF EDUCATION
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