SCHOOL HEALTH AND SAFETY AND ITS EFFECT ON TEACHING AND LEARNING IN PUBLIC SECONDARY SCHOOLS IN NAIROBI AND KAJIADO COUNTIES, KENYA

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DECLARATION

I declare that this thesis is my original work that has not been presented in any other institution for academic credit and that any work by another party contained herein has been duly acknowledged according to anti-plagiarism regulations.

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DEDICATION

I dedicate this thesis to my grandchildren (Denise Thami, Nathan Njau, Sean Mwangi, Ethan Murage, Sarah Wangechi, Noah Njau, Myrah Thami, Faith Wambui and Matthew Karimi).

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ABBREVIATION AND ACRONYMS

APRHC	African Population and Health Research Center
BQs	Bill of Quantities
CDC	Center for Disease Control
CDC&P	Center for Disease Control & Prevention
CDE	County Director of Education
CGA	Consumer Grassroots Association
COK	Constitution of Kenya
COVID-19	Coronavirus Disease 2019
CQASO	County Quality Assurance & Standards Officer
CSHP	Comprehensive School Health Programme
CWS	Church World Service
FGM	Female Genital Mutilation
GAO	General Accounting Office
HACCP	Hazard Analysis and Critical Control Point
HPS	Health Promoting Schools
HSG	Health Safety Guidelines
KSHP	Kenya School Health Policy
KUPPET	Kenya Union of Post Primary Education Teachers
MOEST	Ministry of Education Science and Technology
NEMA	National Environment Management Authority
NSHPSK	National School Health Policy for Schools in Kenya
NDC	Non-Communicable Disease
NLSP	National School Lunch Program
QASO	Quality Assurance and Standards Officer

SPSS	Statistical Package for Social Sciences
SHRP	School Health Reading Program
TIVET	Technical Industrial Vocational and Entrepreneurship Training
TRA/ TPB	Theory of Reasoned Action/ Theory of Planned Behavior
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nation International Children's Emergency Fund
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WASH	Water Sanitation and Hygiene
WHO	World Health Organization

ABSTRACT

Education attainment is important to all governments across the world. It is imperative for governments to ensure safe school environments to ascertain teaching and learning takes place. Governments, however, face challenges concerning safe school environments that interfere with teaching and learning. One of the areas of concern is the issue of school health and safety. The purpose of this study was to establish how health and safety affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties, Kenya. The study was guided by the following specific objectives: to establish how the status of school buildings affects teaching and learning; to determine how quality water affects teaching and learning; to establish how food safety practices affect teaching and learning; and to determine how waste management practices affect teaching and learning in public secondary schools in Nairobi and Kajiado counties. To facilitate teaching and learning, Learners should be safe from diseases and injuries. Kenyan schools have experienced health hazards which have seen students getting sick and some dropping out. Hence, this study sought to establish how health and safety regarding school buildings, water, food and waste management affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties. The study was guided by the Theory of Planned Behaviour (TPB) which upholds that the will, intent, attitude and perceived behavioral control influence how an individual behaves. The study adopted the mixed method approach whereby the convergent parallel design was applied. The study targeted 197 Public secondary schools, 197 principals, 8580 form two students, 884 class teachers and 2 County Quality Assurance & Standards Officers (CQASOs). Stratified random sampling was used to select a sample of 19 schools, 19 principals, 152 students and 76 class teachers from the sampled schools while 2 CQASOs were purposively sampled. Data were collected from the principals, teachers and students using questionnaires, while interview schedules were used to collect data from CQASOs. The validity of the research instruments was ascertained through pilot study and inputs from experts in the school of education were factored in. Reliability of research instruments was established through test retest. Qualitative data were analyzed thematically using content analysis presented in narratives and verbatim form while the quantitative data were analyzed descriptively with the help of Statistical Package for Social Sciences (SPSS) 28 and presented in frequencies and percentages. The study established that the classrooms, laboratories and libraries were clean, well-lit and well ventilated. The study also established that water was inadequate and not well treated. However, food was mostly well handled although cases of food poisoning were reported. Waste management was haphazardly handled with open sewers and open pits and burning of waste. It was therefore concluded that clean, well lit, well-ventilated premises make students attend, concentrate and remain in school, participate in practical lessons, develop a reading culture and remain disciplined. The study recommends that school health and safety policies should be disseminated and implemented accordingly.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter provides the background to the study, statement of the problem, purpose of the study, objectives of the study and research questions that guided the study, significance of the study, limitations, and delimitations of the study. The chapter also presents the theoretical and conceptual frameworks as well as operational definition of key terms.

1.2 Background of the Study

The World Health Organization (1948) defined health as a situation of physical, mental and social wellbeing and not just the absence of disease. Health and safety on the other hand refers to a situation where people are safe from accidents and injury. As such health and safety consists of measures, rules, regulations, guidelines, procedures that ensure the members in each institution remain safe and healthy. The purpose of health and safety is to create a harmless working atmosphere by decreasing accidents, injuries and mortalities in the given institution. School health and safety entails a situation where learners and the whole school community are safe from accidents and injuries while in school.

It is globally acknowledged that, the safety of learners is paramount to enhance teaching and learning. School safety is defined as institutions and institution-related events where learners are safe from violence, bullying, harassment, and substance use. Safety in schools is associated with enhanced learners' performance and school outcomes. Learners exposed to harassment or drugs will most likely miss school and

can even dropout altogether. This is according to the American National Center on Safe Supportive Learning Environments (NCSSLE, 2020).

According to UNICEF (2018) children spend most of their time in school, hence the need to ensure their surroundings are safe and clean. Schools should be able to provide safe drinking water, toilets, kitchens, classrooms, laboratories and other premises being used by the learners. School buildings should be well constructed to avoid accidents and all stakeholders in a school including school administration, teachers, students and parents should be ready to handle any school disasters to reduce the risk to the learners and entire school community. For health and safety to be achieved, governments develop policy guidelines which should be implemented by the school management and the whole school community.

According to the World Health Organization (WHO), global death rates and illnesses have shown that, there is need for health promotion, prevention and health care amenities among children. This is because over 1.7 million children aged between 2-19 who are mostly primary and secondary school going children died in 2016 due to issues such as road injury, self-harm or diarrheal diseases. These health issues could have been treated or prevented (WHO, 2021). WHO also opines that, the children in this cohort suffer from non-communicable diseases (NCDs) such as obesity which has increased from 1% in 1975 to around 6% among girls and 8% among boys worldwide. Other diseases are linked to unsafe water, sanitation and inadequate hygiene. To ensure the health of the learners, suitable actions should be taken through employing measures like health and safety guidelines to decrease and eradicate any risk to good health. This is in recognition that, it is in school that learners acquire knowledge, socioemotional skills which include self-regulation and

resilience and critical thinking which lays the basis of imminent good health. When health of learners is good it decreases dropout rates and improves education achievement and performance as well as productive employability (WHO, 2021).

According to WHO (2021) children are very vulnerable when exposed to toxic chemicals from e-waste as they absorb more pollutants and are not able to metabolize or get rid of them. Hence children whose schools are near e-waste recycling centres are exposed to toxic chemicals like lead and mercury that damage their intellectual abilities. Children exposed to e-waste have the risk of getting lung infections, DNA damage, impaired thyroid function and development of chronic diseases such as cancer and cardiovascular later in life. Such threats to children's health made the researcher carry out this study on health and safety and its effects on teaching and learning in Nairobi and Kajiado counties.

Teaching involves a teacher or instructor who passes knowledge to the learners and learning takes place when the knowledge delivered leaves a long-lasting impact to the learner (Ramna & Ashilesh, 2018). Teaching is more successful when done through experience and it is a continuous process which can be done formally or informally. Learning on the other hand brings about change noted by developing a skill, change of attitude or understanding a scientific law and it is also acquired through experience (Sequeirra, 2012). It is therefore expected that when teaching takes place learners become active participants and, in the process, they will not be absent and will also complete school. When teachers instruct on hygiene, drinking clean water, and eating healthily, the learners change their behaviour by keeping their environments clean, drinking clean water and observing what they eat. This study looked at how health safety in relation to school buildings, provision of

adequate clean safe water, food and waste management affects teaching and learning in public secondary schools in Nairobi and Kajiado counties, Kenya.

School health guidelines as per the Ministry of Health and Long-Term Care, Ontario, Canada, is a package which gives direction on set standards on how to prevent injury, infectious diseases, ensure health eating and food safety, healthy sexuality, road safety, promote oral health, mental health, physical activity, visual health and avoid sedentary life, violence, bullying and substance use (Ministry of Health and Long-Term Care, 2018). The Center for Disease Control (CDC) (2021) also highlights health safety guidelines to contain healthy eating, physical activities, school environments, school meals, mental health, partnering with parents and the wellness of school employees.

More guidelines were issued by CDC (2021) in relation to COVID-19 which included encouraging vaccination, use of masks, social distancing, washing hands with water and soap or using sanitizers, screening, contact tracing and keeping off from public when one is sick. School health guidelines, therefore, look at the aspect of prevention of disease, promotion and avoidance of anything that can harm students and hinder teaching and learning to. Guidelines are therefore developed to ascertain health and safety in learning institutions.

Gun violence in America is a health safety issue as it results to injury and sometimes death. The mental status of both the teachers and learners is affected due to fear of attack and this in turn affects teaching and learning (Federal Commission on School Safety, 2018). American learners also face other health challenges, 25% of children aged between 2-8 have chronic illnesses such as asthma, obesity, and 16% of, 7-10 have asthma, 4% have food allergies and 0.3% have diabetes (CDC, 2017). Other

challenges which affect students' health are related to school buildings brought about by leaking roofs, mold, rusty plumbing and broken heating and cooling systems, poor air quality and mold which bring about chest infections. Students and teachers got ill due to asbestos and lead contamination in the plumbing system, and this led to two schools being closed in late 2019 (Rossi, 2020). The report by Rossi (2020) highlighted that air quality, noise and temperature have great impact on the health and wellbeing of learners, teachers and staff. A learner who is not comfortable in school due to the structure of the buildings and ill health will not concentrate in class and hence affect teaching and learning.

According to Mortice (2020), the outbreak of COVID-19 brought into the limelight the deterioration of school buildings in the US which poses a health safety threat. Mortice (2020) further states that American schools were never safe places to learn especially where the poor and people of color live. These reports show problems of health and safety in relation to violence and non-communicable diseases. It was important to carry out this study to establish the health and safety issues in public secondary schools in Nairobi and Kajiado and how they affect teaching and learning.

Learners in the UK are faced with life threatening diseases like diabetes, epilepsy and asthma (Murphy, Chuma, Mathews, Steyn & Levit. 2017). Some of these diseases like asthma can be aggravated by unclean and polluted environments. Another problem affecting the health of primary and secondary learners is mental health with increased stress levels, anxiety, fear, depression, self-harm and eating disorders. Ninety-eight (98%) of teachers reported coming across learners who had mental health issues in the U.K. and mental health affected teaching and learning (Lister, Andrews, Buxton, Douce & Seale. 2023). These studies did not look at how

the school buildings, food, water and waste management could have led to increased non-communicable diseases and hence the need for this study.

Hunter, Risebro, Yen, Lefebvre, Hartemann, Longuet and Jaquenoud (2015) in a study to establish the relationship between provision of water and absenteeism in Cambodia, found out that provision of enough water reduced absenteeism. This meant that teaching and learning were affected when learners failed to attend class. Appiah-Brempong, Harris, Newton, Gulis. (2018) in a study to examine school-based hygiene facilities in Ghana established that schools lacked adequate water, and students shared towels for drying hands. Lack of adequate hygiene would lead to illness that could hinder learners from attending class and hence interfere with teaching and learning. These two studies looked only at water adequacy. However, this study focused not only on adequacy but also on the cleanliness and safety of the water.

The World Health Organization (2019) recommended that school children should have access to safe and reliable Water, Sanitation and Hygiene (WASH) to promote high quality education and health development of children. WHO also indicated that basic WASH provisions are not met in the Pan-European region and as a result the learning and wellbeing of students is affected. The Sustainable Development goal number 4 on quality education and goal 6 on clean water and sanitation requires all countries to provide clean safe school environments to promote teaching and learning. It was therefore important to carry out this study to establish whether public secondary schools in Nairobi and Kajiado counties had met these requirements in line with the water safety guidelines.

According to the WHO, Sustainable Development Goal 6.1 demands universal and equitable provision of safe drinking water for all, and the water should be free from feacal and chemical contaminants. By 2022, the people who enjoyed safe water stood at 6 billion and 2.2 could not access safe drinking water. The 2.2 billion people were therefore open to waterborne diseases since contaminated water and poor sanitation is associated with spread of diseases like cholera, diarrhea, dysentery, hepatitis A, typhoid and polio. Schoolchildren are part of the population that has no access to clean safe water. This is also an indicator that clean safe water is still a challenge to a big proportion of the world's population (WHO, 2023).

The COVID-19 pandemic affected the whole world, and the education sector was not spared. Schools were closed in different parts of the world and in order to ensure that the learners were not infected and continued learning, both face to face and online learning were adapted to allow less contact and keeping the required distance (Hodges, Moore, Lockee, Trust, & Bond, 2020; Smalley, 2020). It is noted that teaching and learning were greatly affected since not all children could access online classes. Indeed, schools were closed in most countries and in particular, schools in Uganda were closed for close to two years and about 15 million children were out of school whereas schools were closed for 74 weeks in Nepal and 73 weeks in Bolivia (Monitor, 2021). This study was important to establish how the observation of health safety helps to maintain good health and ensure teaching and learning takes place.

The intention of the Kenyan government is to ensure safety of all learners as prescribed in the Kenya Constitution and the Basic Education Act. The constitution of Kenya has provided for safe, serene and conducive school buildings to enhance teaching and learning (COK, 2010). This is because poorly constructed buildings

and poorly maintained school environment can lead to students getting hurt, the spread of illnesses and other challenges that can affect teaching and learning. As such it is expected that school buildings are kept clean, safe and well-maintained (MOE, 2008).

The Kenya government has issued various policy guidelines to be implemented by the school management, the teachers, students and the larger school community. Some of these policy guidelines include the Safety Standards Manual for Schools and the Kenya School Health Policy (2nd Ed.) 2018.

The school health policy (MOE & MOH, 2018) aims to fulfil the vision 2030 which states that better health of learners will play a key role in the attainment of the vision. The Kenyan Constitution, 2010 also pledges to ascertain that all learners receive highest standards of basic education, health, clean and healthy learning and sanitation facilities as well as getting enough food and clean safe water. The School Health Policy acknowledges that the school has the requisite structure for provision of health and nutritious services which will assist in preventing and controlling the spread of diseases. The policy is guided by the following objectives: Schools should have a sustainable health programme, there should be well-coordinated health interventions by the MOH, MOE. Non-State actors, learners and the community and schools should establish a health monitoring and evaluation system.

Schools are therefore expected to ensure the environment in schools is healthy and friendly for the learners and that the learners are taught life skills to enable them to cope with life's challenges. Some of the life skills include hand washing and hence, schools should provide hand washing facilities with soap which should be appropriately located near toilets and eating areas. The Board of Managements

(BOM's) should ensure proper management of solid and liquid waste and that food safety measures are observed. Building guidelines should be followed and sanitary facilities should be adequate, appropriately located and gender sensitive by ensuring that the girls' and boys' toilets are separated. All food provided in school should be safe and subjected to monitoring by the MOH and the water should be clean and safe to avoid contamination (MOE & MOH, 2018). Health and safety are important as they ensure students remain healthy and hence will attend school and enable teaching and learning to take place.

The safety standards manual and school health safety policy give direction on the safe manner of construction of classrooms, laboratories, libraries and eating areas and other school buildings. They guide schools on the issue of appropriate sanitation, clean and safe water as well as hygienic food storage. Guidance is also given on appropriate waste management for the purpose of ensuring the safety of learners. Despite these measures, challenges of health and safety are still an issue in schools.

Over time Kenyan schools have experienced issues that threaten the health safety of learners. This is noted amongst female students who suffer during menses due to inadequate sanitation facilities which also lack privacy (MOH, 2019-2030). There are also issues of poor infrastructure and a study carried out in public primary schools in Kakamega concluded that physical infrastructure was in deplorable conditions and recommended that schools should observe guidelines on minimum qualifications provided for in the Building and Public Health Act Cap 242 (Mwatumu, 2016).

Kenyan secondary schools also have a problem of overcrowding which resulted from the 2018 government policy on 100% transition to secondary schools. Overcrowding raises safety concerns where by in an emergency occurrence, evacuation becomes difficult and overcrowding can also lead to high rates of spread of diseases like tuberculosis and pneumonia (APHRC, 2020) The health safety guidelines stipulate on class sizes for conducive learning environment and hence the need to carry out this study to establish how assuring of health safety standards as far as class size is concerned would affect teaching and learning.

Udali (2020) in a study based in Trans-Zoia, Kenya, established that both students and staff were not trained on safety issues as per the Ministry of Education Safety Standards Manual. Reports by Koech (2017) indicated that 200 students from a Rift Valley school had been treated for food poisoning (Nation News 20/9/2017). Illés, Dunay, Serrem,L, Atubukha, Serrem,K. (2021) in a study on food safety and implementation impasse amongst Kenyan high school learners, established that food handlers may not have adequate training on safety and hence the need for government to develop and implement food health safety guidelines. These studies and reports indicate that there is a problem in health and safety amongst learners and hence the need for this study to further find out how the health and safety issues affect teaching and learning in public secondary schools in Nairobi and Kajiado counties.

Odongo, Wakhungu and Omuterema (2017) in a study found out that students were affected by communicable diseases such as diarrhea, typhoid, intestinal parasite infections, trachoma and schistosomiasis (bilharzia) and these infections keep learners out of school. Most of these illnesses are either food or waterborne. These

diseases and others like diabetes, malaria and cardiovascular disease affect the learners all over the country (Aroko, 2018). For this, Aroko (2018) states that learners should start watching what they eat to avoid non-communicable diseases.

Watatua (2020) on effects of poverty and disease on education (SDG4.5) brings into focus the fact that learners are under nourished, and this has increased with the COVID-19 outbreak and the closure of schools. Students also suffer from mental health and according to Mbwayo, Mathai, Khasakhala, Kuria and Stoep (2019) teachers reported having come across students with mental health issues such as learning difficulties, learners internalizing problems, strange behaviour and substance use. The teachers reported they lacked the skills and the time to handle issues of mental health.

African Population and Health Research Center (APHRC) (2019) acknowledge that mental health is largely not detected in developing countries Kenya included, however cases of depression, anxiety, conduct disorders are common among adolescents. Mental health could be because of learning environments and this area has not been exhaustively looked at and hence the need to carry out this study to establish how the attainment of health safety standards affects teaching and learning in public secondary schools in Nairobi and Kajiado counties.

Kipngeno (2018) in a study on whether schools in Turkana County, Kenya, had ways of ensuring safety in school buildings established that schools had poor buildings and that school' environmental and architectural designs did not adequately enhance school safety.

While carrying out a study on how Covid-19 pandemic has impacted on education in Kenya, Kathula (2020) revealed that Covid-19 had seriously affected learning

among students in Kenya. The study established that teachers lost their jobs, children were out of school for long periods and most students could not access online learning. The fear of ill health is a threat to teaching and learning and hence the need for this study.

A report by citizen digital of 28th March 2023 indicated that about 500 students from Sacred Heart Mukumu girls in Kakamega county were taken ill because of food poisoning caused by salmonella typhi. The Director of public health in the ministry of health reported that faecal matter was detected in the water used in the school. Three students and one teacher died because of this infection and 72 were admitted to hospital. The school was also closed, and this meant that students could not take part in the learning process. Around the same time. Butere Boys was also closed following a similar infection like that of Mukumu (Nation Newspaper 4/4/2023). The Citizen digital of 19/7/2023 reported that 148 students from Ikonge PAG Girls developed severe stomach pain and were admitted in hospital after drinking contaminated water. This still shows the threat to health and safety in schools and hence the need for this study.

Nairobi and Kajiado counties are part of the larger Nairobi metropolis and both counties share some commonalities such as inadequate water, they don't grow much of the food consumed and they have a challenge in handling both liquid and solid waste. They also experience high populations in some of the zones, making the facilities scarce. A study in Kajiado by Mokaya (2013) indicated that construction of school buildings such as classrooms, libraries laboratories and dormitories did not follow the laid down guidelines and toilets were not adequate with a ratio of 1:50 instead of 1:30. This study was carried out in 2013 and it is prudent to carry out

another study to establish whether after 7 years schools have observed the health safety sanitation issues and the effects on teaching and learning.

A study by Kang'aru, Kimosop and Mbugua (2022) on school related factors of school completion in Kajiado North sub-county of Kajiado county established that sanitation facilities and school infrastructure contributed to school drop out of primary school learners in the sub-county. The study concluded that schools should have proper sanitation and learning facilities to enhance school completion. This study was carried out in the primary schools whereas this study looked at the situation in public secondary schools.

Atemi (2018) giving a report on the status of toilets in Nairobi schools during the commemoration of the world toilet day, showed that most schools in the slums did not have basic sanitation facilities and hence children faced a difficult time. It was also reported from the Ministry of Education that the ratio of the toilets stood at 34 boys per toilet and 29 girls per toilet instead of 30:1 for boys and 25:1 for girls (UNICEF, 2018). There is therefore a need for this study to establish whether the observation of health and safety standards has been attained for effective teaching and learning.

A study by Wakapisi (2017) established that there were poor school buildings, poor drainage and inadequate facilities in Kasarani subcounty of Nairobi County and that poor infrastructure led to accidents and injuries among learners. Oyugi (2019) on the other hand reported that the death of eight and injury of sixty-nine learners at the Precious Talent academy in Nairobi showed that several schools in Kenya do not meet the building structural safety. In March 2023, there was a health scare in Upper Hill school where students exhibited cholera symptoms after eating food in the

school. This led to parents flocking to the school to ascertain the safety of their children (Kimuyu, 2023). These reports called for a study to establish the health safety status of students and how it affects teaching and learning in Nairobi and Kajiado counties.

The MOE assessment reports on school infrastructure and safety in schools indicated that a few school buildings were not safe and that the school health and safety was inadequate. The unsafe situation endangered the lives of the learners and led to injury and at times death. As a result of this, 26 schools in Kajiado and 219 schools in Nairobi were closed in late 2019 and early 2020 (before the COVID-19 outbreak) due to non-adherence to set safety standards such as poorly constructed buildings, unhygienic conditions, small classrooms with poor lighting and poor sanitation (MOE, 2019). There was therefore a need to carry out this study to establish whether schools have complied with the health and safety issues raised during the assessments and the closures.

The two counties under study lack adequate water with Kajiado being semi-arid and having little service water, whereas some parts of Nairobi, especially the unplanned settlements lack running water and food is also sold in open markets and it is difficult to determine the source. Poorly constructed classrooms as indicated by the many closures of schools and lack of regulations on waste management also pose health and safety issues. Malnutrition is a big health problem in Kajiado county with stunting levels standing at 25.2%, wasting at 5% and underweight at 8,1% (Nutritional International, 2021). All these aspects affect teaching and learning and hence the need for this study.

1.3 Statement of the Problem

The provision of safe spaces free from injury and disease is a basic human right which should be provided by governments and learning institutions. School health and safety improves the physical and mental health of learners and bring about positive behavioural and academic attainment. Learners who are threatened with injury and ill health on the other hand, cannot concentrate in class. Inadequate health and safety has negative outcomes to teaching and learning by increasing absenteeism and indiscipline, and reduce attendance and completion rates.

Schools have experienced challenges related to inadequate health and safety measures. In Kenya, cases of collapsing buildings, outbreak of waterborne and food borne illness have been reported in schools resulting in illness and sometimes loss of life of learners. Poor infrastructure and un safe health and safety conditions led to the closure of 26 and 219 schools in Kajiado and Nairobi counties respectively in 2019. This is despite the existence of the Kenyan Constitution (2010), the Safety Standards Manual for Schools, Kenya (2008), the Basic Education Act (2013) and the Kenya School Health Policy (2nd Ed.2018) all highlighting the need of ensuring health and safety of learners. The outbreak of Covid-19 was an indicator of the importance of health and safety in schools. Schools were closed and students remained at home for long periods.

A study by Mokaya (2013) looked at the implementation of general safety guidelines in Kajiado county whereas, Wakapisi (2017) looked at the adequacy of school buildings in Nairobi County. A few studies looked at the implementation of safety standards guidelines and the adequacy of the school buildings. The studies did not link the implementation of the safety guidelines and the adequacy of school buildings to teaching and learning. This study therefore sought to address the

knowledge gap linking the health and health status of the school buildings, the water quality, the food practices and waste management practices to teaching and learning in Nairobi and Kajiado counties.

1.4 Purpose of the Study

The purpose of this study was to establish how the status of health and safety affects teaching and learning regarding school buildings, water, food safety and waste management in public secondary schools in Nairobi and Kajiado Counties, Kenya.

1.5 Objectives of the Study

1. To establish the status of school buildings and how it affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.
2. To determine how the quality of water affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.
3. To establish how food safety practices affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties.
4. To determine how waste management practices affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

1.6 Research Questions

1. How does the health and safety status of classrooms affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties?
2. In what ways does the health and safety status of other school physical infrastructure affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties?
3. How does the provision of adequate and clean water affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties?

4. Has the school provided appropriate sanitation facilities in public secondary schools in Nairobi and Kajiado Counties?
5. How does the implementation of food hygiene practices affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties?
6. In what ways do solid and liquid waste management practices affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties?

1.7 Significance of the Study

The study is of importance to: The Ministry of Education (MOE) in that, the findings may help the ministry in identifying gaps in the existing policy guidelines. The policy makers may also utilize the findings and recommendations to collaborate with the ministries in charge of Public Works, Water, Environment, Health and the county governments to come up with relevant guidelines regarding school buildings and environment, water provision, food safety and waste management. The findings may be of importance to the school boards of management and the school principals who may utilize the findings to enforce compliance of the health safety policy guidelines by the school community.

Teachers may utilize the findings during regular classroom teaching and during co-curricular activities and influence learners to maintain health and safety practices. The study may also be of significance to the support staff who may take their support services seriously since the role they play on students' welfare plays a big role in enhancing teaching and learning. Learners may be encouraged through the study to comply with the health and safety practices to keep off risky behaviours that can lead to harm and illnesses which in turn keep them out of class.

1.8 Limitations of the Study

1. There was a limitation of accessibility due to poor infrastructure in the slum areas and the vast Kajiado county. The researcher had to seek a guide to help access some of the difficult areas.
2. The tight school schedules of the principals were a limitation since the data was collected during form one admission period and there was a limitation of time for the principals. The researcher had to visit some of the schools twice after requesting several appointments.
3. The researcher had to traverse the large Kajiado county which borders Nairobi to the north, Narok to the west and Tanzania to the south. The distances covered were long and some of the roads were rough and dusty. The researcher looked for an appropriate vehicle to access the difficult areas.

1.9 Delimitations of the study

1. Although health and safety are of concern to all learning institutions, the researcher delimited to public secondary schools in Nairobi and Kajiado Counties, and this was because public schools hold majority of the school learners.
2. Teaching and learning has many variables, the researcher delimited to learners participation in the learning process by attending, completing school cycle and maintaining discipline.
3. Health safety has many aspects, however, the researcher delimited to the safety in school buildings, food, water and waste management because these are the areas and aspects that students are mostly engaged in each day.

4. It is notable that all stakeholders in the sector of education and other related sectors have valuable information regarding health and safety in schools. However, the study delimited itself to principals who are in charge of policy interpretation and implementation, class teachers who are concerned with student's welfare, form two students who have understood the school policy and may have more time as respondents and the County Quality Assurance and Standards Officers who are the overseers of school policy implementation.

1.10 Theoretical Framework

This study was guided by the Theory of Planned Behavior (TPB) which was advanced by Ajzen in 1991 as an extension of the theory of reasoned action. The theory of reasoned action states that, the will, intent and attitude influence behaviour. However, it was noted that behavioral intention by itself cannot lead to tangible behaviour. So, the component of perceived control was added to the theory. Perceived control refers to the level to which an individual believes he can perform a behaviour successfully. Hence the theory of planned behaviour proposes that people are more likely to perform a certain behaviour if they succeed. A crucial factor in this theory is the anticipation that one will succeed if they perform a certain behaviour Ajzen and Fishbein (1980). A pivotal aspect in the theory of planned behaviour is the intent of an individual that influences the behaviour. So, if the intention is strong then there is a likelihood of good performance Ajzen (1991) The theory of planned behaviour therefore envisages that people will perform a certain behaviour when they feel they will succeed (Ahmed, Li Cai, Khan Qalati, Naz, Rana. 2020). This means that people could improve on performing the behaviour

because they have the capability and the chance to act or not act accordingly (Staats, 2001).

This theory is used to foresee human behaviour. health promotion, Psychology, environmental conservation and marketing fields. Apart from predicting human behaviour it can also be used to design interventions to change behaviour. (Theory hub 2024). The theory also has limitations in that it may not comprehensively capture human behaviours. It also assumes that people can plan and control their behaviour which may not be the case. The theory also assumes that resources and opportunities to perform a behaviour are available which again may not be the case (RHIhub 2024).

This theory is applicable in this study in that the intent of ensuring health and safety in school for the purpose of effective teaching and learning will influence the principals, teachers, students and the whole school community to maintain good hygiene in school. The attitude of the principal on the issue of school health is the prerequisite to ensuring there is health and safety in school. This will make the principal come up with measures to ensure health and safety in all aspects of the school from the buildings, water. food and the entire school environment. The attitude of the teachers is also crucial as they will influence the students to maintain hygiene and keep the school premises clean. The attitude of the learners will determine whether they keep the environment clean, drink safe water and manage waste appropriately so that they can learn better in clean premises and remain healthy.

The provision of health safety policy guidelines brings in the issue of perceived control which requires the school community to implement the guidelines for

effective teaching and learning. This is due to the belief that by following the guidelines they will maintain school health and safety. The need to adhere to safety guidelines would enable schools to come up with implementable health and safety programmes. It has been argued that health safety has a positive effect on teaching and learning therefore, ensuring health safety programmes are implemented is a motivator to all the school community and more so the students to maintain and sustain school health and safety.

1.11 Conceptual Framework

The conceptual framework was developed based on the main theoretical constructs identified from the theory of planned behaviour. The theory illustrates that the will, attitude and perceived control enables a person to perform a certain behaviour. Hence learners will ensure they maintain good hygiene to improve school health and safety for effective teaching and learning. Reviewed literature on healthy safety guidelines has also been considered in the development of this conceptual Framework. The conceptual framework of the study is portrayed in Figure 1.1.

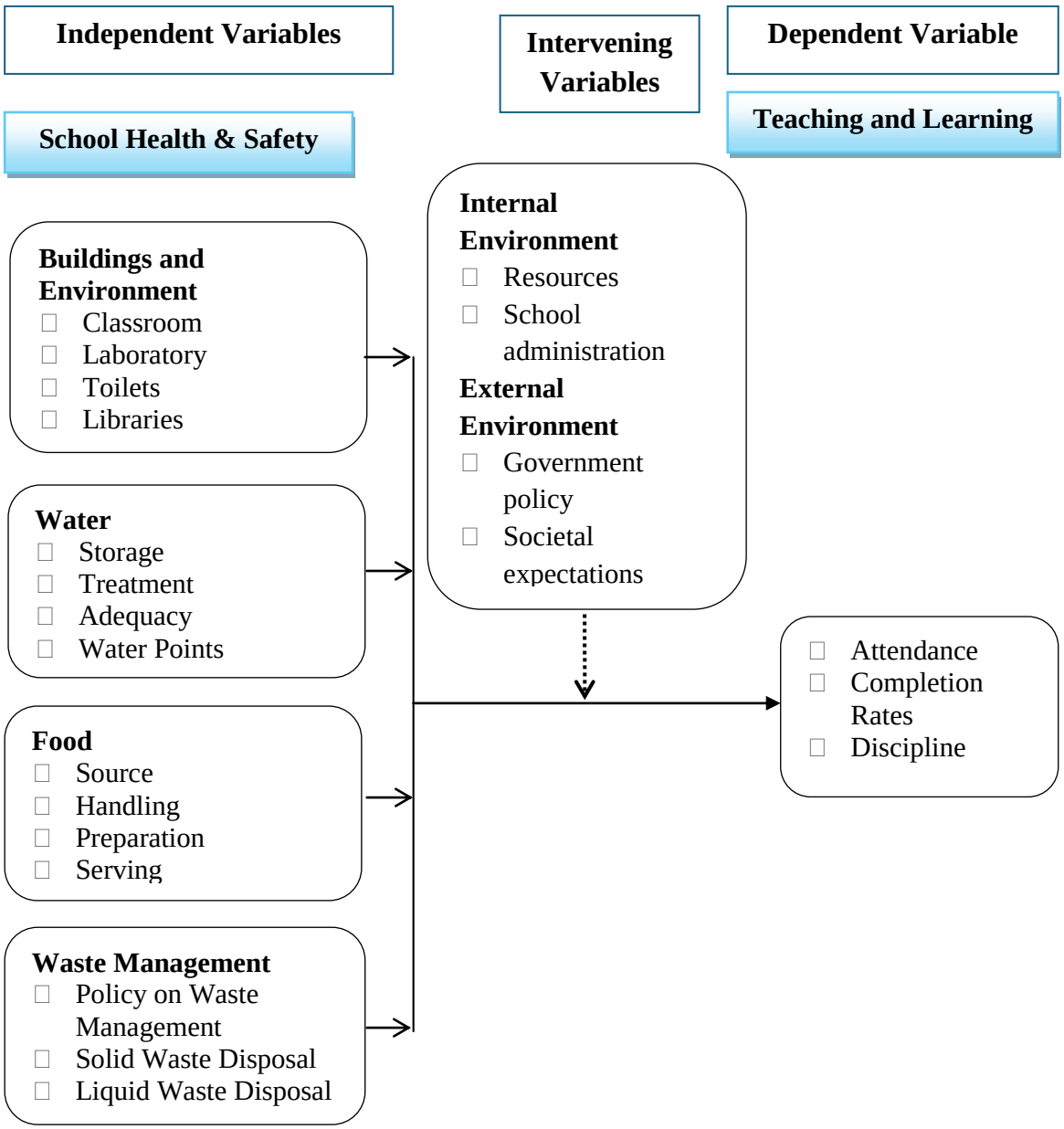

Figure 1.1: Conceptual Framework

Health and safety-In this study, health and safety has been conceptualized as the status of ensuring proper hygiene of school buildings, water, food and waste management in order to ensure that the whole school community is free from injury, contamination and diseases.

School Buildings: School buildings have been conceptualized as classrooms, libraries, laboratories, kitchen, dining areas and toilets. Schools should have adequate classrooms for learners and the classrooms should be at least 1.22 square meters per student. The doorways should be adequate, and doors open outwards. Any stairways should be wide enough to allow learners to pass each other without touching. The classrooms and corridors should be well lit and well ventilated. To ensure easy escape, the windows should not have grilles. The classrooms and all learning areas should have floors that are level with no potholes and fire extinguishers should be provided and located in appropriate areas. Sanitation facilities like toilets should be built according to set standards and boys and girls toilets should be built in separate areas in case of mixed schools. Pit latrines and septic tanks should be at least 15 meters from the borehole. Dining halls and kitchens should be appropriately located, spacious, clean and with an adequate water supply. Food stores for perishable and nonperishable foods should be located near the kitchens and food should be stored in stacks and above the ground. Libraries should be in a quiet area, spacious. well-lit and the alleys should be wide enough, and bookshelves should be strong enough to avoid accidents. Laboratories should be spacious and well lit. Chemicals should be stored in safe rooms which should be under lock and key. Safety guidelines should be provided to the learners.

Water-Water safety is an important aspect if the health of learners is to be guaranteed. Therefore, its source, storage, treatment, adequacy and well distribution of water points have been conceptualized as a key variable. Schools should provide at least 5 litres of water for students in a day school and 15 litres of water for students in a boarding school. Washing areas should be adequate and appropriately

located near the toilets and dining areas. Schools should also ensure the safety of water from vandalism and drinking water should be treated.

Food-Food safety is important to enhance teaching and learning. This has been conceptualized in terms of source, handling, preparation and serving. Food should be sourced in safe areas and once in school it should be appropriately stored. The food handlers should have health certificates and should always maintain hygiene. The kitchen areas should be thoroughly clean where liquid and solid waste from the kitchen should be properly disposed of to avoid food contamination.

Waste Management-The disposal of waste generated as either solid or liquid waste affects the environment in which people live in. Waste like papers, sanitary towels for female students should be properly disposed to avoid clogging of drains. On the other hand, liquid waste from the kitchens, dormitories, laboratories should be well managed to avoid contamination. A school community will be affected by lack of proper disposal of waste which can lead to exposure to germs or contamination and hence illness. Waste disposal is not only a challenge to the schools but to the country as a whole and hence the lack of following guidelines would lead to infections thus affecting teaching and learning.

Organizational environment: A school as a social organization does not exist in isolation and its operations are always affected by external and contextual factors, situational factors and context**.** The environment, either external or internal in which the learners are exposed to play a role in the learning process. The internal environment comprises school administration, parents, resources, and stakeholders' attitude. The external environment on the other hand includes political landscape, societal influence and government policies. Both internal and external environments

though not considered in the study have an impact on health safety and its effects on teaching and learning.

The study envisages that if health and safety are maintained in schools, teaching and learning results such as attendance, completion rates and discipline will be achieved. The assumption is that when schools have standard buildings, adequate clean water and learners can access safe food then they are able to attend classes and complete school and will maintain discipline.

1.12 Operational Definition of Key Terms

TERM	DEFINITION
Boys Boarding schools	Refers to schools with only male learners who lodge in school dormitories
County	For this study, County refers to a devolved administrative unit under a Governor.
Girls Boarding schools	Refers to schools with only female learners who lodge in school dormitories
Health and safety:	For this study Health and safety refers to a situation where learners and the school community are safe from accidents and injury.
Hygiene:	This is a state where an individual in a school maintains high level of cleanliness to prevent illness.

Mixed Day schools Refers to schools with both male and female learners who are day scholars and go back to their homes after school

Other physical Infrastructure Refers to other school premises like laboratories. libraries, dining areas, kitchens and food stores

Public Secondary Schools: These are government owned secondary schools registered under the Ministry of Education. Such schools are the focus of this study and are categorized as Boys Boarding, Girls Boarding and Mixed Day Schools.

School Buildings: Refers to classrooms, laboratories, dining area, libraries and toilets

Teaching and learning Refer to learning outcomes of attendance, completion rates and discipline

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The purpose of this study was to establish how health and safety affects teaching and learning regarding school buildings, water, food safety and waste management in public secondary schools in Nairobi and Kajiado Counties, Kenya. This chapter therefore provides review of related literature on school health and safety and its effect on teaching and learning in public secondary schools. The review of related literature was presented in line with research objectives of determining how health safety regarding the status of school buildings, water safety, food safety and waste management practices) affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

2.2 School Health Safety and Teaching and Learning

Health and safety are one of the wider safety issues that is important to every learner in any learning institution. Therefore, health and safety in schools is crucial to create a conducive, safe and healthy learning environment for both learners and staff. Research has shown that health and safety bring about improved performance, reduces absenteeism and ascertains that mental and physical health are maintained (Mubita, Milupi & Kalimaposo, 2023). According to the Ministry of education safety guidelines, when learners are healthy, they can get maximum teaching and learning benefits. Therefore, schools have the responsibility of providing safe sanitation and a healthy environment to ensure effective teaching and learning takes place (MOE, 2008).

2.3 Health Safety Status of School Buildings

School buildings are the premises in which teaching and learning take place. Therefore, school structures should be spacious, where the users are comfortable and safe. Fisher (2016) states that school buildings need to be designed and constructed appropriately to support the learning process that helps increase attainment of educational goals through enhancement of various learning processes. A study by Beckmann (2018) on how school buildings affect students' health and performance, advanced that, young people spend most of their time in school buildings, yet these facilities are in deplorable condition and requiring repair or reconstruction.

Beckmann (2018) further indicates that the state of school buildings has a huge impact on how students perform compared to the home, social and economic factors combined. A study by Barret, Treves, Shimis, Ambaze& Ustinova (2019) on a review of various studies looking at how school buildings affect learning concludes that, schools with good conditions such as lighting, air quality, temperature control, acoustics, age-appropriate learning spaces contribute to pupils' progress in learning. There is evidence from research that there is a relationship between the ability of students to learn and the nature of their school environment and therefore, the conditions of the school buildings should be of concern if the gap of learning achievements will be closed (K-12 Dive, 2020).

A survey carried out by the US Department of Education established that about 14 million American children were attending run down schools. Two thirds of the schools had problems with paint peeling off, inadequate lighting, falling plaster, broken toilets, lack of adequate ventilation and poor heating and cooling system (K-12 Dive, 2020). This report also showed that students' ability to concentrate was

affected by the quality of air and pollutants found in old schools. These studies were based on schools in temperate climate and therefore their safety requirements are different from the schools under study which are in the tropics. The researcher, therefore, wished to establish if safety of school buildings in the tropics would also affect teaching and learning in secondary schools in Nairobi and Kajiado Counties. Unlike the review and survey, the researcher used a mixed method approach and applied the convergent parallel design in the research.

A report from Chan (2017) showed that exposure to mold, poor ventilation, poor lighting intolerable temperatures, and noise negatively interfered with school programs. Summer and Nilong (2024) indicated that when learners are exposed to blue light from the sun during the day, they get more energy and concentrate better. However, if the students are exposed to artificial blue light at night, it produces melatonin, the hormone that suppresses sleep. This means the children do not sleep well and this affects their concentration in class work. Fisk (2017) in an article on the ventilation problem in schools also indicated that there was a close association of improved performance with good ventilation.

Andrews (2019) on a study on how schools improve a child's school experience said that regardless of the country, good school facilities help students succeed and the teachers also are effective while teaching. He further says that due to tight budgets, school facilities are not given priority, but parents are concerned with examination rates. According to Alexander and Lewis (2014), more than half of U.S. public schools had building-quality issues, with poor lighting, acoustics, temperature regulation, or air quality as well as poor plumbing. These studies identified lack of funding to poor quality provisions and hence the need for this study to establish

whether there are issues of funding related to provision of school buildings as per the set guidelines which could affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

A growing body of scientific work has revealed learning is affected by the physical school environment. According to Guardino and Antia (2012) the structural features of classrooms like noise and lighting can enable teaching and learning to take place. Therefore, there is a need for policy makers to take into consideration the issue of adequacy and safety in the classrooms to ensure teaching and learning is effective. Christie (2012) looking at the impact of school buildings on learning indicates that students attending schools with poorly constructed buildings score lower grades than students who attend schools with newer and better buildings.

Christie (2012) further argues that educators in the USA have ignored a critical element of physical facilities and put the pressure of performance to teachers and students. These studies show that the lack of performance is blamed on the teachers and students, and it is therefore prudent to carry out the study to see whether the status of school buildings affects teaching and learning or only the teachers and students are to blame.

Hopland (2013) in a study conducted on school building conditions and students' achievement noted that normal teaching and learning will effectively take place when the health safety guidelines for class size, lighting, acoustics and the right temperature were met. In a separate study looking at school facilities and achievement of students from developed countries, Hopland (2013) opined that when health and safety in school facilities are assured, it increases the morale of the

teaching and non-teaching staff, and the result will be reduction of absenteeism and turnover and effective teaching and learning is attained.

Several studies all over the world (Beckmann, 2018; Fisher, 2016; Hopland, 2015) have revealed that many school organizations, mainly those in municipalities and high-poverty areas, are beset by crumbling structures that impend the health, safety, and learning chances of students. Student performance is therefore positively influenced by good school facilities, hence the importance of the intended study. It is noted that lack of maintenance of school buildings is an issue which needs to be looked at to establish whether public secondary schools in Nairobi and Kajiado Counties maintain the school buildings as per the set guidelines.

Kamsari (2015) conducted a study in Malaysia on unsafe school buildings and concluded that the health of learners and teachers was based on where a school was located as well as the designs and method of construction, facilities put, the school policies in place and how the policies are implemented. Further, Everett and Smith (2012) assert that due to lack of assessment systems by the school management there were no follow ups on how systems worked. This created a gap in ensuring whether the facilities like air conditioning, fans, chairs, tables and lighting were functioning. The study recommended that schools should update records on the various facilities and that repair and maintenance should follow the set guidelines. The intended study was to establish the role of supervisors in following up recommendations of health safety issues raised in schools to improve teaching and learning.

In an article titled “Reimagining the modern classroom,” Carol Burris (2019) stated that, students and teachers require clean, spacious and well-ventilated classrooms for effective teaching and learning. It was emphasized that dirty, poorly ventilated and

shady premises give a bad impression to both parents and students. As such, dirty classrooms will highly affect students' achievement. It is noted that schools fail to keep school building records on the status of school buildings and hence the need to carry out this study to find out whether public secondary schools in Nairobi and Kajiado Counties can account on the status of the school buildings and if it affects teaching and learning.

A study by Qaiser and Ishtiaq (2014) on how academic achievement scores of secondary school students in Kohat Division, Pakistan, were affected by the classroom and physical environment, found out that poor school buildings was a result of of poor construction and lack of maintenance which in turn negatively affected teaching and learning. Quiser and Ishtiaq (2014) further opined that health and safe school environment has a significant positive effect on teaching and learning and helps as a catalyst in achieving objectives of a school. The study also established that when the physical environment is not good for teaching and learning, the students get tired and lose interest in learning and it therefore becomes difficult for teaching students who have switched off. The study recommended that more studies be carried out in various parts of the world on health and safety of school structures and how they interfere with learning and hence the need for this study.

A qualitative study conducted in Iran to establish the effect of school design on student performance found out that the nature and design of school buildings influence student performance. A well-designed learning space motivates learners to make positive improvements and that both indoor and outdoor learning areas such as well-kept walkways, paths, lighting and the school surroundings enable students to

improve teaching and learning processes (Ariani & Mirdad, 2016). This was a qualitative study whereas the current study used the mixed method design.

Olugbenga (2019) carried out a descriptive survey in Kaduna state, Nigeria, The purpose of the study was to establish the impact of school facilities on academic performance of secondary school students. The study established that well constructed school facilities, offer tangible learning which ensures an improvement in academic performance and also makes the students punctual in class attendance. Good facilities also help to improve students discipline. This study by Olugbenga (2019) also showed that schools that did not have proper school facilities have problems with proper lesson delivery. The study also exposed that schools without good facilities, brought about indiscipline and unending truancy. This study used descriptive survey design whereas the curent study used a mixed method study design.

Promise, Nonso, Oguchukwu & Ndubueze (2022) in a study based in Aba education zone of Abia state, Nigeria esablished that the school library as one of the school buildings has a great impact on academic performance. The study also indicated that a well constructed and equiped library encourages students to learn by themselves and can also use various modes of learning including group work and this helps to avoid conflict among the learners. The study which also looked at ICT as a physical facility, showed that ICT has positive effects on the learners as it helps learners to learn on their own and at their pace as well as getting clear pictures of what they are learning and develop inquisitve thinking.

Danson, Alorwu and Owusu (2012) carried out a study to find out weaknesses of secondary school structures in Ghana. The study aimed at establishing how each school complied with set health and safety standards. The study revealed that little repair on classrooms, management offices, libraries, canteens, toilets, and laboratories was done. Poor lighting in classrooms, corridors and dormitories led to learners straining to study and move about hence leading to poor teaching and learning. This study established that there was a gap in the maintenance of school buildings and hence the need to establish whether secondary schools in Nairobi and Kajiado Counties maintain the school buildings as per the set guidelines.

Baafi (2020) in a descriptive survey research study to establish the relationship between the schools phyisical environmet and the academic achievements in senior high school students in Ghana concluded that students in better physical environments performed better than those whose environment was not favourableand therefore good adequate school premises provide a condusive environment for student learning. This study used a descriptie survey design and looked at the general physical facilitie whereas the current study used a mixed method design and looked at the health safety and how it affects teaching and learning in Nairobi and Kajiado counties.

The findings of a study in South Africa, to find out the influence of cleanliness on learners learning capabilities and academic performance established that there is a relationship between security and cleanliness. It was also established that cleanliness boosts learners' learning abilities and as such academic performance is improved. This study called for learners to be taught personal hygiene and cleanliness should

be enhanced in schools (Uleanya, 2020). While this study looked at the aspect of cleanliness of the physical facilities, the current study looked at other aspects like ventilation and lighting as well as effects of safe food, safe clean water and waste management and how they affect teaching and learning in Nairobi and Kajiado Counties.

A study looking at the effect of hydration on cognitive performance and impact of health education on their drinking behaviour showed that hydrated students performed better than dehydrated learners in cognitive function tests. The concentration of urine which depended on the amount of water taken was significantly linked with negative mean scores of intellectual function test of (visual attention, forward number recall and line tracing) (Ibrahim, 2020). In this study, Ibrahim (2020) concluded that most children are dehydrated, and this has a negative effect on their intellectual capacity. As such schools should provide clean adequate water and encourage learners to drink enough water. This study is important in order to establish the status of water in public secondary schools in Nairobi and Kajiado Counties and how it affects teaching and learning.

An experimental study on the impact of school water, sanitation and hygiene improvements on infectious disease in Mali established that, in schools that had WASH interventions, intestinal disease was lower than the schools that did not have WASH interventions. It was evident that schools with good water, sanitation and hygiene practices had fewer students who had diarrhea and as such this study supported WASH practices in schools to avoid infections which lead to non-performance in school (Chard, Garn, Chang, Classen, Mathew 2019). This study looked at the status of water in terms of adequacy, cleanliness and safety and how it

affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties. The current study used a mixed method study design whereas the study by Chard et al. (2019) used the experimental study design.

Gatua (2013) in a study based in Nairobi, indicated that learners have continuously experienced unsafe situations in school which could have lasting negative health and hygiene effects in their lives. Makau, Murungi, and Mutwiri (2018) carried out a study on physical facilities and strategies used by teachers to improve pupils' performance in social studies in Makueni County. The study indicated that most classrooms lacked important facilities. Some students lacked desks and in other instances, chairs and desks were broken, making the situation uncomfortable and less conducive for learning. The study also established that very few schools had playing fields and those available were substandard. This interfered with learners' health and holistic development. Although this study was looking at the issue of school buildings, its concern was performance in social studies. This study, however looked at the health safety issues of school buildings and its effects on teaching and learning by ensuring that students attend and complete the school cycle.

While carrying out a study to find out whether school buildings affect school discipline in Makueni County, Maingi and Maithya (2017) concluded that availability of safe and healthy school buildings improves teaching and learning and brings about good behaviour among learners. Sugut (2020) in a study based in Nandi North sub-County, Kenya, to determine the existence of safety standards and the level of adherence by principals and teachers established that well-constructed school infrastructures improve school safety. It also established that the involvement of the principals and the school community as well as the training of teachers

enhances school safety. This study used the descriptive survey study design whereas this study used the mixed method approach.

A study conducted in Nyeri and Nairobi public secondary schools established that schools did not have adequate toilets. This meant that all students were not able to use the toilets during break time and this led some to visit toilets during class time. This meant that some students could miss class activities when they visited the toilets while others were learning, and their movement could also interfere with the other learner's concentration (Wanderi, 2018). It was also noted that, in mixed schools the girls' and boys' toilets were too close, and this made especially the female students shy off from using the toilets during the break time and for privacy they visited the toilets during class time. Further, the study by Wanderi (2018) stated that dormitories in some schools in Nairobi County had charred floors, leaking roofs, were congested, unclean and were poorly maintained. Hygiene was compromised due to poor supervision of the guideline's implementation. This study by Wanderi (2018) was concerned with general school safety whereas, the intended study looked at the health safety and the effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

Muthiani (2016) carrying out a study on aspects prompting Schools' Compliance to rules on safety standards in public secondary schools in Kitui Central Sub County, Kitui County, indicated that in most schools, school structures such as classrooms, laboratories, dormitories, toilets, dining halls and kitchens had not complied to health safety guidelines. This study by Muthiani (2016) looked at factors influencing the implementation of safety guidelines in Kitui County. On the other hand, the

intended study wished to establish how health and safety affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

Kang'aru and Kimosop (2018) carried out a study to establish factors that influence school completion in public primary schools in Kajiado North Sub-County, Kajiado County. This study concluded that school dropout rates were influenced by lack of hygiene in the school buildings. The study recommended that school management and other stakeholders should ensure health safety rules are operationalized to enable actualization of pupil 100% completion rates in primary schools. In their study, Kanga'ru and Kimosop (2018) concentrated on primary schools and in only one sub-County that is Kajiado North, it was therefore important to conduct a study to ascertain how health safety affected teaching and learning in public secondary schools in Kajiado and Nairobi Counties.

2.4 Health Safety in Relation to Water

According to the World Health Organization (2023), about two billion people cannot easily access water. Due to lack of clean water, people consume dirty water which leads to infections and about 3.5 billion incidents of diarrhea are reported annually. Eighty percent (80%) of these infections are found in children aged five years and below and about two million people die from these infections. Children spend most of their time in school and it is therefore prudent for schools to offer fresh safe drinking water. Reporting for CFK Africa, Kungu and Bain (2022) said that two schools out of five globally did not have access to hand washing services such as water and soap. This scenario was noted more in informal settlements. This means that unclean water can lead to contamination threatening students' health, disrupting students' attendance due to sickness.

A report from a water crisis in Flint, Michigan indicated that water had been contaminated with lead. A follow-up study to show how children were affected showed that the number of children who had lead in the blood beyond the acceptable threshold had doubled from 2.5% to 5%. The study also indicated that there was a decrease of 0.14% in Mathematic achievement in school age children. There was also an 9% increase of children with special needs in comparison to other areas of Michigan. In a study by Trejo, Yeomans-Maldanados, Lacob, & Owusu (2022), that followed water contamination in the pipes, it found out that learners' achievements and health were affected which led to some children becoming learners with special needs. With children having special needs could greatly affect the learning process of these learners and hence the need of this study to establish how water safety affects teaching and learning in Nairobi and Kajiado Counties.

Reports from several studies show that students who are provided with enough clean water and keep hydrated will show a noticeable improved performance and will actively take part in the learning activities. Learners, who are not irritable because of dehydration concentrate, comprehend and participate more in learning (Shaw, Jankowska, Claro.2013). Whereas these studies have looked at the adequacy of water, the issue of adherence to health safety guidelines in relation to the provision of water is not addressed and hence the need of this study to establish how the public secondary schools in Nairobi and Kajiado ensure water safety and the effects in teaching and learning.

Sarkar (2013) while carrying out a study among primary school children in Kolkata, India found out that one of the main challenges met by school children are infections. These infections were caused by dirty water, deprived sanitation and poor

hygienic practices. When people do not maintain good hygiene and sanitation is deprived, diseases are easily transmitted. Chronic infections lead to retardation and poor physical development. Ill health affects children's presence and performance and can also lead to death (Sarkar, 2013). This study was carried out among primary school children and hence the need to carry out this study among secondary school students and establish whether the results were similar.

Masento, Golightly, Field, Butler, Van Reecum. (2014) in a study to find out the effects of hydration status on cognitive performance and mood concluded that hydration state of learners affects cognitive ability and mood. The study also indicated that severe hydration brings about short-term memory, visual inability and mood disorder.

Hunter, Risebro, Lefebvre, Hartemann, Longuet, and Jaquenoud (2015), looking at the effects of access to safe drinking water on school absentee rates in Cambodia indicated that although education is an important driver out of poverty, absenteeism rates were still high. This absenteeism was associated with access to safe drinking water whereby an experiment concluded that 4 schools out of 8 that received clean water reduced absenteeism. Another study by UN Habitat in metropolis Brazil and Peru concluded that infection was connected to diarrhea pathogens (UN Habitat 2013). Although the study did not establish a straight connection with access to water and sanitation and children's mental capability, the study however, established that water quantity was of importance than quality. Whereas the quality of the water may matter to the health of three-year-old and below, the quantity of water to children above three is more critical. This is so because with inadequate water, it is difficult to maintain proper sanitation in the schools which then leads to endemic

disease which can lead to death and repeated illnesses that keep children out of school. The researcher wished to establish whether water adequacy in Nairobi and Kajiado Counties affects teaching and learning as well.

A cross-sectional survey study in Napal on water quality, sanitation and hygiene conditions in both schools and homes indicated that most of the water consumed was contaminated with pathogens from the source. The contamination was accelerated by animals roaming the homesteads. The study recommended enhancement of WASH conditions in schools and homes and the entire community (Shrestha, Sharma, Gerold, Erishann, Saga. Kiju, Schindler, Odermatt, Utzine & Cisse. 2017). Whereas the Shrestha et al study (2017) looked at the schools and household level the current study looked at public secondary schools in Nairobi and Kajiado Counties.

An Ex post facto study looking at effects of water, sanitation, and hygiene on school absenteeism of basic level students in Napal indicated that schools with enhanced WASH services were likely to attend school at 80.5% than those without at 58%. The study also established that there was a relationship between absenteeism and students grades as well as students being confident. Hence availability of WASH facilities led to better school performance (Sharma & Adhikari, 2022). The study used Ex post facto design method whereas the current study used a mixed method research approach.

Chard, Trines, Edmonds, Sogore & Freeman (2019) in a trial study to establish the impact of water intake on hydration and cognition among school children in Mali established that, water intake increased hydration. However, there was no proof that

hydration had any relationship to cognitive improvement. Whereas this was a trial study the current study used the mixed method study design.

Dodzi (2020) in a study to examine the effects of WASH in basic education pupils in Volta region, established that most of the pupils said that they had water and sanitation facilities in their schools and that the availability of water enabled them to take part in academic activities and in teaching and learning activities. The pupils also indicated they performed better than previously and had become more active in class. This study wanted to establish whether the availability of water also had the same effects of promoting teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

An article looking at the Water Crisis: Education in Africa (Water Project 2007-2024) highlighted that lack of clean water has a lot of negative implications on student's academic performance and attendance. This is because while fetching water students miss school and when they consume dirty water even the best of the students will lose momentum due to stomach pains and diarrhea. Trinies, Chard, Mateo, and Freeman (2016) established that mental abilities can be negatively affected by dehydration. Hence the provision of adequate water can lead to better performance through improving alertness, attentiveness and retention. This study wished to establish whether provision of water could influence teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

A quantitative study looking at school-based hygiene in a Ghanaian municipality showed that only 16% of the schools had working water facilities and hence most students shared hand washing bowls. The study concluded that there is need for financial support to provide adequate water in schools in order to facilitate proper

hygiene among the learners Appiah- Brempong, Harris, Newton, Gulis. (2018). The study used a quantitative study design, and the study locale was based on a municipality whereas this study used a mixed method approach and applied the convergent parallel design. Unlike the Appiah-Brempong (2018) study which was carried out in a municipality, the current study's locale looked at both municipality and rural settings.

A study carried out in five rural schools of the Chipata district, Eastern Province, Zambia, established that, providing adequate water reduced dehydration in a school day and that dehydration greatly increased with inadequate drinking water. Although there was insufficient connection between access to water or dehydration status and mental test score, there was a significant association between both water access and better scores on tests of visual attention. This study was intended to find out whether there is a relationship between provision of adequate water and teaching and learning.

A study by Jasper, Thant-Tam, Bartram. (2012) on water sanitation in schools, disclosed that where more water was provided there was increased water consumption. It was also reported that girls absented themselves from school during menstruation due to insufficient sanitation facilities. There was also a reduction of infections with diarrhea and gastrointestinal illnesses with improved provision of water in schools. Therefore, providing adequate water and concealed hygienic lavatories assists in improving the health of children. The study recommended that other studies that scrutinize the association between access to sanitation facilities in schools and the effect of water and sanitation on educational attainments be carried out, hence the need for the study.

A study conducted by Asante (2015) on improved academic performance in relation to provision of water in Ghana, established that, drilling of three boreholes in the Sirigu Senior high school had a lot of changes in the lives of students, staff and the academic performance. This was attributed to the fact that students no longer went to search for water and had more time to study. The issue of water adequacy has been shown to contribute to students' performance. This study however sought to find out whether water safety affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

Reporting for CFK Africa, Kungu and Bain (2022) said that two schools out of five globally did not have access to hand washing services such as water and soap. This scenario was noted more in informal settlements. This means that unclean water can lead to contamination threatening students' health and this disrupts students' attendance due to sickness.

According to the Kenya National School Health Strategy Implementation Plan (2011-2015), provision of water, general cleanliness is vital in producing better learning atmosphere in a school. Once cleanliness, and adequate water are availed, then learners do not suffer from illness and the result is that they are present, alert and concentrate in their class work. This allows both female and male learners as well as those living with disability move from one grade to another without health challenges. The aim for improving school Water, Sanitation and Hygiene (WASH) is bringing down water borne infections such as cholera, diarrhea, vermin infestation and skin diseases among others (Republic of Kenya, 2015). WASH (2016) highlighted that there is an international agreement that providing water in schools affects the health status of learners, the education achievement and reduces

inequalities amongst the learners. A descriptive research study carried out in Muhoroni sub- county, Kenya, established that provision of safe drinking water lowers water borne diseases and obtainability of sanitary facilities affect learners academic attainment (Jepkoech, Aminga & Omuse)

A study was carried out by Patel, Harris, Juliao, Nygren, Were, Kola, Sadumah, Faith, Otieno, Obure, Hoekstra, Quick, (2012) on effect of hygiene curriculum and availing of simple hand washing facilities in rural Kenya primary schools whereby safe water and hand washing points were provided for half of the schools. After one year the experiment was given to the remaining schools and it was established that there was a reduction in the average percentage of students with severe breathing sickness among students exposed to the program and there was no reduction on severe diarrhea noted. The safety guidelines require teachers to impart health safety measures while teaching and hence the need for the study to establish whether the operationalization of health safety in respect to water reduces illnesses and how in turn it affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

A descriptive survey study was carried out to find out how WASH programmes could influence performance amongst pupils of Maseno, division in Kisumu County, Kenya. The study established that treating drinking water reduced absenteeism by 30% and by the use of clean latrines absenteeism was reduced by 42%. On the other hand, washing after visiting the toilet reduced absenteeism by 41%. The study concluded that by training learners on maintenance of hygiene then there is improvement in academic performance. Whereas this study by Ochieng (2013) used descriptive survey and reached a conclusion of a relationship between WASH

facilities and academic performance, the current study used a mixed method study design, and it also wished to establish whether there was any relationship between water adequacy, safety and teaching and learning.

A study carried out by Rono (2013) on how secondary schools in Kajiado County accessed water established that schools used a large amount of water for drinking, restrooms, laboratories and other uses. The study by Rono (2013) further stated that some schools did not have adequate and reliable water conservation resources and approaches which further strained availability of clean water in the schools. The study called for more study on the availability of adequate and clean water in the schools. The current study was committed to gathering this information through responses given in the research questions.

2.5 Health Safety in Relation to Food

Availability of food is essential to the survival of every human being. To avoid foodborne illnesses, food must not be contaminated. Issues of food poisoning greatly affect school going children and hence the need to establish whether the execution of health safety rules impact on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

According to WHO (2021), the access to enough and nutritious food is fundamental to sustaining life and ensuring good health. When food is safe it means it is nt contaminated with harmful bacteria, viruses, toxins and chemicals. It is possible for food to be contaminated at the production, transportation, storage and preparation therefore, for safety of food to be achieved, the transportation of food, the storage, cooking and serving must be done in a very clean manner. Therefore, the school administration should be informed about the need of those handling food to have

health examination, that food should be handled in a clean environment and food handlers should have protective clothing. Another study carried out in south Korea to find out the factors that influence hygiene practices in a day care centre established that dirty hands carried disease carrying microorganisms. Hence the schools that had been registered by the government and had food handlers who had served for long influenced the hygiene practices in the school kitchens (Lee 2018). This study wished to establish how food handling affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

Food and drinks served to students are sourced from diverse places, not necessarily the school kitchen. The consumers eat in faith that the food was prepared in a clean environment, yet this may not be the case. There are possibilities that the food was contaminated due to lack of untrained food handlers, poor storage, poor cooking and heating. School food service facilities have become relevant in the issue of food safety because of food borne illnesses. Ismail & Abdullahi. (2013) postulated that approximately 45% of disease outbreaks in schools are attributable to food borne transmission and food borne illnesses. These concerns inspired the researcher to carry out a study on health and safety and its effects on teaching and learning in Public Secondary schools in Nairobi and Kajiado Counties.

Venuto and Garcia (2015) reporting on school foodborne outbreaks, indicated that most of the illnesses were because of food safety errors. This report showed that the cause of illness was due to contamination of food due to poor food handling. Most illnesses were related to Norovirus and food service worker practices. The results called for food safety education programs to ensure food safety and prevent foodborne diseases. Any illness among learners makes them stay out of class or lack

concentration due to pain. This report influenced the researcher to carry out this study on health safety and its effect on teaching and learning in Nairobi and Kajiado Counties.

A study looking at why age-specific food safety training was important amongst high school students in Ontario, Canada established that students need to learn about food safety to be prepared for their future needs in employment and to deal with their feeling invulnerability. At their age students may feel like they cannot be affected by unsafe food. Hence the study concluded that there is need to prepare high school students on safe food handling (Diplock, 2018). By learning how to handle food in a safe manner, this means a decrease in foodborne diseases and hence school attendance increases. The researcher carried out this study to establish whether the learners understood the need for food safety and the risks associated with lack of food safety practices and the impact on learning.

A study to establish the importance of food safety was conducted in Ontario, Canada. This was because knowledge of food safety among high school students is important in that, students require the knowledge and long-life learning. The knowledge among the students was important because students are among the age bracket that is affected by foodborne diseases. Acquiring knowledge also ensures students get skills which they may not get elsewhere (Diplock, 2018).

A report examining how ground beef suppliers to the United States Department of Agriculture (USDA) National School Lunch Program (NSLP) performed indicated that suppliers had improved the food safety performance because fewer meat samples tested positive to Salmonella than other institutions supplying ground meat to commercial markets. This was because of previous results and warnings to the

establishments to reduce meat contamination (Ollinger, Michael, Guthrie, Bovay. 2014). In yet another report on disclosing to the public on tests of Salmonella in chicken slaughterhouses, there was a drop in salmonella levels on chicken carcasses by more than 50% (Ollinger et al, 2014). This meant that food supplied to the public and schools was much safer and reduced foodborne infections. Such reports encouraged the researcher to carry out this research to establish whether schools were following the laid down food safety guidelines to avoid learners getting infected and missing valuable school hours due to illness and to find out how well schools in Nairobi and Kajiado were aware of food safety practices.

Syeda, Rowshonara& Lundren, Pia & Laaza, Gyula &Truninge, Monica & Brown, Carla & Hugues. (2021) carried out a qualitative study looking at the needs of young people across Europe in relation to implementing food hygiene and food safety practices. The study established that although students had a good knowledge of personal hygiene, they did not practice due to forgetfulness, absence of facilities, and not caring about the outcomes. The study also showed that students did not have adequate knowledge of foodborne microorganisms and underrated the effects of foodborne illnesses. As such paying attention to students' food safety knowledge is crucial to let them know the essence of observing food safety practices to avoid foodborne diseases. These findings encouraged the researcher to establish to what extent students of Nairobi and Kajiado Counties understood the issue of food safety and its effect on teaching and learning.

Young people prefer interactive educational methods. Addressing gaps in young people's food safety knowledge is essential to improve their lack of concern towards foodborne illness and motivate them to follow food hygiene and safety behaviours

consistently. Findings have been used to develop educational resources to address gaps in knowledge, skills, attitudes and beliefs.

A report of an experimental study by Luo, Renfu & Shi, Yaosiange & Zhang (2012) to establish the relationship between nutrition and educational performance in rural China's elementary schools in Shaanxi province China, found out that, despite the Chinese government's big commitment to offer quality Education, a big number of students lacked necessary nutrients in their diets. The aim of the trial was to assess whether modest nutritional interventions can reduce rates of anemia and to assess whether additional nutrients can lead to improved performance to learners from underprivileged backgrounds. The learners who received multivitamins with mineral supplements had improved test scores (Luo et al., 2012). This study used experimental design whereas the current study used mixed method approach while applying the convergent parallel design.

A cross-sectional study was carried out in Bangladesh with the aim of establishing the level of knowledge and awareness on children's food safety amongst school-based street food handlers. The study established that food handlers who had post primary education had 9.87 times more knowledge on food handling. However, the majority of the school-based street food vendors had inadequate knowledge and awareness on children's food safety issues (Al-Mamun, Mohammad, Rahman, shah Md, Turin, Tanvir 2013). This was dangerous considering that children are more prone to foodborne illnesses. This gap made the researcher undertake the study to establish whether the school community is aware of the importance of food safety in schools to ascertain teaching and learning takes place.

A study conducted by Samara (2014) in a Brazilian school on bacterial quality and food safety on school food program found out that foodborne illnesses will have effects on individuals, on school performance and on monetary and legal issues in a school. When students get sick, they miss going to class and this can negatively affect their academic performance. Further, Samara (2014) indicated that food safety and food security are critical issues, and therefore, the whole school community including administrators, teachers' students and parents must be involved to ensure safety. This study wished to establish whether there was food borne illnesses as a result of lack of observing health safety measures in food handling in public secondary schools in Nairobi and Kajiado Counties and how it affects teaching and learning.

A survey carried out by Norazmir (2012) on information and practices on food safety among secondary students in Johor, Malaysia indicated that there were no policies governing food safety, and food being brought into school had never been considered a security concern which required policy direction. The study (Norazmir, 2012) recommended development of schools' food safety implementation strategies since policies give direction and foundation for the school. Policies allow institutions to define their goals, and the regulations enable the administrators to stamp their authority and control, and institutions become governable and manageable.

The study (Norazmir, 2012) further elaborated that the school management should be accountable for food safety, and that there should be food policy to be adhered to by the whole school community. Such a policy should ensure that schools have ways of preventing outbreak of foodborne diseases and they also have a well-articulated

plan on how to counter an outbreak. This gap in policy can only be addressed if studies on food safety are conducted in different parts of the world, hence the need for this study.

Food safety amongst students is important since consumption of contaminated food leads to illness amongst learners. In view of this, a study was carried out to assess the level of food safety knowledge and practices amongst senior high school students at International School, OAU, lle-Ife. The study also sought to establish the relationship between food safety knowledge and food safety practices. The study showed that the students had good knowledge and high level of food practices (Ilesanmi, 2017). These findings also influenced the researcher to carry out this study to establish how well learners in Nairobi and Kajiado were knowledgeable about food safety and the consequences of unsafe food and its effect in teaching and learning.

A study carried out to establish the source, cause and mode of contamination of food that was served in schools located at Ga-East district in Accra, established that, the problem had been occasioned by poor storage of meat. This meant that children got sick because of eating contaminated food from the school store and as a result, children had to stay out of class while seeking treatment. The study recommended that food safety rules should be developed to ensure food safety in school is upheld (Malm, Nyarko, Lawson, Gogo, Lawson, Afari. 2015). These findings made the researcher carry out the study on food safety and its effect on teaching and learning in Nairobi and Kajiado Counties.

A study by Ababio, Taylor, Swainson and Daramola (2016) on the effect of food threats in school meals on student's wellbeing, academic performance and finance in

a school in Ashanti, Ghana established that 52% of students who ate school meals had gotten sick due to food contamination 3 to 12 times annually. The academic performance was affected by 12% of students were out of school due to sickness. Hence, the need of the study to establish whether foodborne illnesses affect attendance and school performance in public secondary schools in Nairobi and Kajiado Counties.

Serrem K, Illes, Serrem, C, Atubukha, Duney. (2021) in a study to look at challenges of food safety and sanitation in a public university in a developing country concluded that although a high number 80% of the students had knowledge on food safety, most students failed to practice the safety measures which was as a result of poor attitude to food safety and sanitation amongst the students. The study recommended that universities should introduce food safety courses to reduce the risk of foodborne diseases and hence the need for this study to establish the attitude of food safety practices amongst the learners.

A study conducted by Ng'ang'a (2013) on reasons that made schools implement Safety standards in public secondary in Nyeri Central District established that, schools under study had not fully provided safe physical environment for the learners and facilities such as kitchens and dining halls where food was prepared and served were faced with challenges. Similarly, a study conducted by Kirimi (2014) on organizational aspects leading to observation of safety standard guidelines in secondary schools in Buuri District, Kenya, recommended that school principals should track, monitor and assess all safety conditions in the school. Lots of studies have been carried out on the effects of food on cognitive performance, in student completion and retention. Howeverthe researcher wished to establish whether the

implementation of laid down food safety measures affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

Githinji (2016) carried out a study to explore dietary practices, nutritional status and school performance among upper primary children in selected public schools in Nairobi County, Kenya. The findings confirmed that adolescent children suffered from malnutrition with 9% being undernourished, whereas 8.6% were overweight. The study also found out that the provision of adequate food positively impacted school performance, especially in co-curricular activities. However, there was no significant association between dietary practices and classroom activities. On the issue of nutritional status, children with high Body Mass Index (BMI) were less active, especially in the field, and were comfortable sitting. On the other hand, children with regular weight displayed higher performance levels in class activities such as completion of assignments. These findings called for more research to establish whether maintaining health safety practices affected teaching and learning in Nairobi and Kajiado Counties.

A cross-sectional study was carried out to examine the food safety and sanitation knowledge of food handlers in high schools in Kenya. The study found that whereas the food handlers had enough knowledge about food contamination, their knowledge on personal hygiene and transmission of food-borne disease was adequate. The study also found out that over half of the participants had not received any training on food safety and sanitation. Indeed, none of the participants had heard of the Hazard Analysis Critical Control Point (HACCP) and that the kitchen facilities they worked in did not carry out HACCP procedures. This meant that the health and

safety of the learners were highly compromised as they could easily get foodborne illnesses (llles, Duney, Serem,C., Atubukha, serem, K.(2021).

A report by Shale (2021) on the effects of building of a new dining hall in Malkamari school situated in northern Kenya established that, students were happy to have their meals from a clean dining hall. The construction of the dining hall resulted in increased enrollment and retention of learners. The new dining hall was also being used for learning activities such as holding debates, watching educational documentaries and conducting examinations. The researcher therefore carried out this study to find out whether the level of cleanliness in dining areas in Nairobi and Kajiado public secondary schools affected teaching and learning.

Kenya has developed the National School Meals and Nutrition Strategy 2017–2022 in response to ensuring access, completion and transition of learners. This strategy targets pre-primary and primary school learners. It aims to ascertain that children in pre-primary and primary schools have access to one nutritious meal per day and use the home-grown approach. The objectives of the strategy are to intensify knowledge among school children and the community on consumption of enough, nutritious, locally available food, to increase enrolment, attendance, retention, completion and learning outcomes of school children with equity (Republic of Kenya, 2017-2022). Since the issue of food safety is of importance and the government continues to develop guidelines to achieve it, the researcher therefore wishes to study whether maintaining food health safety practices affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

2.6 Waste Management

Waste is produced by activities of man and animals, and it comes in solid, liquid or gas forms. Waste can be in the form of mud, trash, sludge, litter and other solid forms. The absence of progressive and operational legal framework governing waste management and inadequate enforcement creates gaps in waste management (Debrah, Vidal & Dinis, 2021).

Solid waste is increasing in all parts of the universe and schools are not exceptional. The high population and many activities in schools has led to an increase of solid waste. If waste is not managed, it leads to contamination which becomes a health hazard. If food waste is not well disposed of it can be infested by disease carrying parasites. The smell from solid waste can lead to breathing difficulties. If chemicals are not well discarded, they can mix with water which leads to contamination and can cause disease. Gases emanating from laboratories or kitchens, if not well managed can affect breathing. Any illness in the students will keep them out of school or can lower their concentration and therefore affect teaching and learning. This research looked at how waste management practices affected teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

Sharma, Srivastava, Singh, P. Singh, R. (2018) in their study of effects of waste management on the environment reported that, poor waste management can contribute to unsafe health. Waste that is not properly managed attracts rodents which can harbour disease causing parasites which can bring about illnesses like yellow fever, plague and gastrointestinal infections and burning waste can expose people to diseases like cancer. Toxic waste materials will contaminate ground water, soil and air which can also bring waterborne and airborne diseases. These findings

encouraged the researcher to carry out this study on how waste management practices affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

The environment is threatened by poor waste management. The world has seen an increment of urban dwellers and by 2012 the municipalities had about 3 billion people. This large population produced about 1.2 kgs of solid waste per person which translates to 1.3 tonnes per person per year. It is expected that by 2025, the urban population will reach 4.3 billion producing 1.42 kgs or 2,2 billion tonnes per year. Countries the world over experience problems of solid waste management but the developing countries like Kenya who lack waste management systems suffer more (KENPRO, 2019).

The government of New Zealand recommends separating, reducing, reusing, recycling and composting as good options for managing school waste. It also recommends that school boards look for ways to dispose of school waste (MOE-New Zealand, 2021). The researcher was interested in finding out how schools manage their waste and the effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

To manage waste in schools, Californian schools are guided by regulations such as Public Resources Code sections 42620, California Integrated Waste Management Act, Senate Bill 373 and California Education Code- sections 3170 to 3276. The issue of solid waste management in Californian schools is crucial since education institutions alone generate waste amounting to 562442 tons per year (ErichLawson, 2017). If this issue is not checked it will have negative effects on the environment and students' health which will in turn have an impact on teaching and learning.

Management of waste has benefits which include reducing cost of waste disposal, enhanced safety and wellbeing of learners and workers as well as better use of school finances (Compactor Management Company, 2021). Solid waste management is important to all human beings and hence the reason why the researcher wishes to carry out the study on how waste management affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

Edilberta (2016) in an article on the role of students in environmental preservation in the Philippines argued that students should be the guards of the environment as they live in it. Throwing garbage in a careless manner worsens land and water pollution. Emission of fumes from factories and vehicles lead to air pollution. Edilberta (2016) also argues that the school should play its role to educate the students on responsible waste management and this should be extended to their homes. Schools should also have waste management programmes which should be fully implemented. It was therefore important to carry out this research to establish whether the public secondary schools in Nairobi and Kajiado have any practical waste management programmes.

India has many elementary schools totaling over 1.22 million and 222 million primary and elementary schools. These schools generate a lot of waste in the form of food waste, plastic waste, paper, floor sweeping, aluminum foils and many others from stationery items and pencil sharpening. The problems the schools face is awareness, infrastructure, and technology, human power, budget, planning and overall management. A study by Gupta, Goel, and Rupa (2019) on waste management in selected New Delhi schools established that most of the waste was generated at the collection point and it was not segregated. The only segregated was

furniture and garden waste, however, 51% of all waste was regularly discarded. From the findings, it was recommended that corrective measures should be applied, and students should be more involved in waste management. Since waste management is a challenge, the researcher therefore wished to find out how public secondary schools in Nairobi and Kajiado Counties manage both solid and liquid waste and how it affects teaching and learning

A study carried out in River's state Nigeria to look at the relationship between waste management practices and sustainable learning, established that schools produced a lot of human waste in both solid and liquid waste. This was due to inadequate sanitary facilities resulting in students defecating and urinating anywhere. The result was air polluting around the classrooms and the school compound. The unbecoming waste management practices therefore posed a threat to the health of the learners and teachers and students could not pay attention in class and also failed to attend school (Aderiye & Ovwromoh 2024) This study used survey research design while the current study used the mixed method design.

The school environmental conservation program Kenya (SEP-K) aims at providing a road map on environmental conservation through schools. When fully implemented it is expected to bring a positive attitude towards maintaining a clean environment. Kajiado County is used as a pilot County (KENPRO, 2019).

Gakungu (2011) indicated that the issue of waste management in Kenya is real. This is due to poor collection systems that are not environmentally right. Indeed, most of the waste is not collected and only less than 50% of the population gets any garbage collection service (Ahmed, Kisimbili & Said. 2018). Gakungu and Gitau (2012) in a study on solid waste management in public technical training institutions found out

that these institutions produce waste, which is not disposed safely, effectively or economically. As a result, garbage accumulates causing pollution, dirt and hence impacts on the living standards of the school community. They also established that the waste generated includes wrapping materials, papers, pens, food remains, glass, old clothes, computers, metal, wood, medicine and plastics. This study was important to find out how public secondary schools in Nairobi and Kajiado dispose of waste and its effect on teaching and learning.

Uwamwezi (2018) in a study to assess whether learners were aware about waste management issues as well as their views and practices to manage waste in selected public and private schools and students in Westlands Sub-County, Nairobi, established that waste in schools included food such as fruit and vegetable remains, pen, flower cuttings, clothe remains, empty plastic bottles, bags and bookcases and filing cabinets. The study also established those views on how to manage waste was crucial in management in secondary schools. The researcher wished to find out whether the student's appreciated that waste management affects teaching and learning.

A study conducted by Wambeye, Wasike, Obino. (2022) to examine how schools manage waste in Bungoma County in Kenya, reported that dust bins were barely provided in schools. It also showed that there was poor management of sanitary towels whereby towels were thrown carelessly and thus exposed learners to foul smell and infections. Water systems were also clogged due to mishandling of the sanitary towels. On the issue of waste disposal, 84% of the schools showed that most of their waste was burned and the smoke emitted from the burning waste resulted in illnesses such as skin and eye infections as well as respiratory and cardiovascular

infections. Any illness for students meant they either miss school or cannot properly concentrate in class activities. The researcher was interested to find out whether schools were concerned with taking care of their environments by having appropriate waste management practices in public secondary schools Nairobi and Kajiado and its effect on teaching and learning.

2.7 Summary and Research Gaps

Most studies were carried out in temperate countries whose conditions of buildings are different from the tropics. Additionally, most studies looked at the nutritional value of food other than the implementation of health safety practices in food. Studies in Kenya looked at general safety standards and not on health safety. There was concentration on pre-primary and primary schools and less on secondary schools. Most studies concentrated on provision of water in schools and impact on children's health and not on the effect of provision of adequate and safe water on teaching and learning. Most studies concentrated on primary school children and not secondary school students.

Research on the area of policy on waste management was not exhaustive. Most studies on waste management in schools carried out in Kenya looked at the types of waste in schools and did not look at effects of waste management practices on teaching and learning. Other studies looked at the effects of education on waste management but not on the effects of waste management on teaching and learning. Several studies used quantitative research design, others used survey method, and others used experimental design however, this study used the mixed method approach while applying the convergent parallel design.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides information on the research design and methodology of the study. The chapter is organized according to the following sub-headings: research design, location of the study, target population, sampling matrix, instrumentation, piloting, validity, reliability, data collection techniques, data analysis and logistical and ethical consideration.

3.2 Research Design

This study used a Mixed Method approach whereby the Convergent Parallel Design was applied. This design (which entails collecting both the quantitative and qualitative data simultaneously) was suitable for the study in that it enabled the researcher to reach out to a wide range of the respondents at the same time and hence saved time. The design was also chosen as it would enable the researcher to cover any weaknesses of the qualitative information from the few respondents. The design would also allow the researcher to deliberate on areas of convergence and that of deviation between the qualitative and quantitative results (Harvard Catalyst, 2023).

The assumption as stated by Creswell and Creswell (2018) was that both quantitative and qualitative data would provide different types of information and to determine whether there is convergence, difference or there is some combination of the information. The convergent parallel design is illustrated in Figure 3.1.

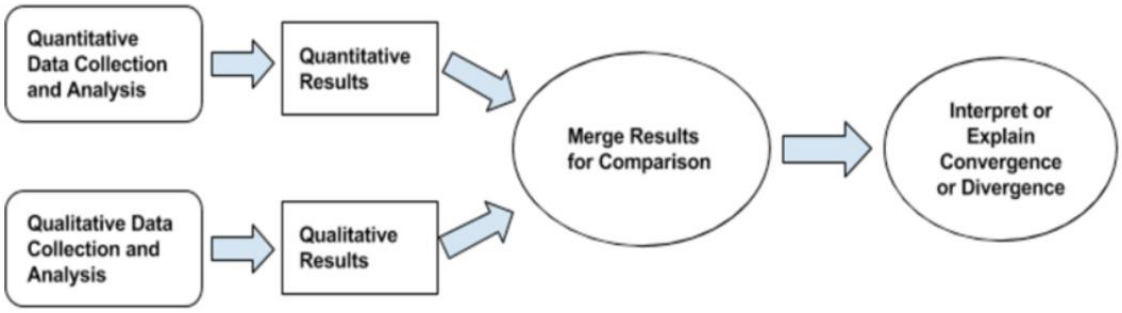

Diagram of the applied convergent parallel design (Creswell & Plano Clark, 2015, p. 56).

Figure 3.1: **Convergent Parallel Design**

A convergent parallel design entails that the researcher simultaneously conducts the quantitative and qualitative elements at the same time of the research procedure, evaluates the methods equally, analyzes the two components independently, and interprets the results together (Creswell & Plano Clark, 2011).

In the convergent design, quantitative data and results yield general trends and relationships, while qualitative results provide in-depth personal perspectives of individuals. The combination or merging of both quantitative and qualitative results adds up to not only more data, but also a more complete understanding than what would have been provided by each database alone (Zheng, 2015).

The use of this mixed method research design is to ensure that one form of collecting data gives strength to offset the weakness of the other and assist in a better understanding of a research problem. According to Caruth (2013) the combination of quantitative and qualitative data gives more comprehensive results. The mixed method can use qualitative research to explain quantitative findings and by combining the two it widens the understanding of the study (Creswell, 2009). This approach enabled the researcher to make observations and describe issues and observations as experienced by the participants. Creswell (2009) further states that

the issues addressed by social and health science researchers are intricate and hence the use of either qualitative or quantitative approaches alone may not sufficiently address this intricacy.

Bergman (2011) argues that mixed methods help in understanding inconsistencies found in quantitative results and qualitative findings and it enables the study respondents to be heard and the findings are based on participants' involvement. Due to its flexibility, mixed methods can fit into many study designs such as observational studies and randomized trials. The mixed method approach enables the researcher to collect rich wide-ranging data (Fetter, Curry & Creswell, 2013).

3.3 Location of the Study

The study was carried out in Nairobi and Kajiado Counties. These two counties are part of the larger Nairobi metropolitan area, and they share some common challenges. Both Nairobi and Kajiado are water scarce areas with Nairobi sourcing water from other counties of Kiambu Muranga and Nyandarua (Capital News 2024). Whereas some areas like the slums have inadequate water (Ledant, 2013. Kajiado county on the other hand relies unreliable water pods, dams and springs as well as boreholes and piped water. Some of the aquifers are polluted and boreholes at times dry up (Relief Web 2022).

Nairobi suffers from flooding during the heavy rains leading to contamination of water. Kajiado county also experiences drought and flooding during the long rains which leads to pollution of the aquifers due to poor drainage. On the provision of food both counties rely on food brought to the markets from other counties or regions. According to the Consumer Grassroots Association (CGA) (2021) about 67% of respondents in a survey carried out in Nairobi, Kajiado and Kirinyaga

reported that the food they bought from the market was of lower hygiene standards. It is also noted that in 2022 the two counties reported an outbreak of cholera. In early 2024 when the country faced flooding, Nairobi was hard hit especially in the informal settlements and 34 cases of cholera were reported and children could not access their schools.

Waste management in both counties has a lot of challenges. Nakuwa (2023) due to the high population Nairobi produceshuge amounts of waste. According to the world bank 2000- 4000 tonnes of solid waste are generated daily in the Nairobi metropolitan area. The catapult (2021) also reported that Nairobi city produces more solid waste than it collects and disposes and the official dumping site in Dandora is overcapacity. Kajiado county on the other hand has many waste management challenges and lack laws governing waste management.

The challenges facing the two counties are extended to the schools in that schools are not able to access safe food, adequate water, and waste management services which are quite expensive. The high population, especially in the sum areas and cosmopolitan areas make access to school buildings difficult leading to overcrowding.

The choice of the two counties gives a wider view of the study area which has some similarities and some differences and represented both rural and urban settings without comparing them.

3.4 Target Population

3.4.1 Schools

The study targeted 197 public secondary schools in the two Counties under study distributed as 104, and 93 in Nairobi and Kajiado respectively. Schools' target included three categories that is: boys boarding, girls boarding and mixed day schools. The categorization of BB, GB, and MD represented all schools since National, County or Sub County schools are either boarding, mixed or day schools. These categories were necessary since schools of different types face different health and hygiene related challenges. The study targeted a total of 113,516 students distributed as 79,390 and 34,126 in Nairobi and Kajiado Counties respectively.

3.4.2 Respondents

The researcher targeted 9860 respondents which included all the principals from the 197 secondary schools, 884 class teachers of the 197 schools 8580 students sampling 40 form two students from each school and the 2 County Quality Assurance Officers.

a) **Principals:** 197 principals were targeted. Principals are in charge of policy interpretation and implementation**.** Principals were targeted in the study because they play an important role of ensuring that all programmes and activities in the school run smoothly. It is the principal's responsibility to interpret, formulate interventions as well as monitor the implementation process to facilitate teaching and learning.

b) **Class Teachers:** A total of 884 class teachers were targeted. Class teachers play a big role as they oversee both the academic and social welfare of the

learners. They are the ones who receive complaints and issues that require attention to facilitate teaching and learning.

c) **Students:** A total of 8580 students (40 form two students from each school), were targeted since they are the beneficiaries of the health safety measures put in place in the school. The health safety measures aim to improve their health while in school and hence the need to get their views.

d) **County Quality Assurance Officers** 2 CQASOs in the two Counties Nairobi and Kajiado were targeted. CQASOs are the overall assessment officers in the Counties and receive all assessment reports on issues affecting teaching and learning and forward recommendations on the school needs to the policy makers. They also recommend resource allocation to specific schools according to their needs.

Table 3.1: Distribution of Target Population per County

Schools Categories	Schools	Principals	Students	Class teachers	County Quality Assurance Officers (CQASOs)	
Nairobi County						
Boys Boarding	23	23	920	92	1	
Girls boarding	22	22	880	88		
Mixed Day	58	58	2320	232		
Total	**104**	**104**	**4180**	**388**		
Kajiado County						
Boys Boarding	14	14	560	56		
Girls boarding	17	17	1360	68		
Mixed Day	62	62	2480	248		
Total	**93**	**93**	**4400**	**496**		
Grand Total	**197**	**197**	**8580**	**884**	**2**	**9860**

3.5 Sampling Technique

The proposed study used both probability and non-probability sampling techniques. This is because probability sampling would lead to greater breadth in obtaining information from a representative sample. On the other hand, non-probability sampling technique would lead to acquiring better information from carefully selected cases from a small number of units (Qiu & Eftekharian, 2020).

3.5.1 Sampling Design

At various stages of the study the researcher used both stratified sampling and simple random sampling which are types of probability sampling. These approaches ensured that the sample chosen was representative in comparison to non-probability sampling techniques (Andale, 2015).

3.5.1.1 Schools

To decide on the schools to be studied, stratified sampling technique which is a probability sampling method was used. The researcher got the list of schools from each sub county and categorized into strata of boys boarding, girls boarding and mixed day schools and then used simple random sampling technique to select the sampling units from each stratum for representation as stated by Daniel (2012). In the categorization all categories were targeted since national, extra-county, sub - county schools are either boarding, day or mixed.

Stratified sampling techniques have a higher statistical accuracy in comparison to simple random sampling because the unpredictability within the smaller groups is lower compared to the variations when dealing with the entire population. The researcher got a sample of 19 public secondary schools, that is 10 (BB-2, GB-2&MD-6), 9 (BB-1, GB-2&MD-6) from Nairobi and Kajiado Counties respectively.

To arrive at this sample, the researcher used 10% of the targeted schools per category. Gay (1996) maintains that at least 10% of the total population is representative.

3.5.1.2 Respondents

a) Principals

Purposeful sampling was used to select the principals. Purposeful sampling is broadly used in qualitative research to assist in getting and selecting information in a case (Patton, 2002). This requires the researcher to pick out and get persons or groups of persons that are specialists in the area of interest (Creswell & Plano, 2017).

b) Teachers

Purposeful sampling was used to select 76 form one to four class teachers. Purposeful sampling is broadly used in qualitative research to assist in getting and selecting information in a case (Patton, 2002). This requires the researcher to pick out and get persons or groups of persons that are specialists in interest (Creswell & Plano, 2017). Class teachers are experts in their respective areas, and they are the ones who meet the students every day getting feedback on the student's welfare and hence were purposely targeted.

c) Students

On the part of the students, stratified random sampling was applied, stratified random sampling is a probability sampling technique whereby the whole population is divided into smaller subgroups known as strata. The smaller groups are formed due to the same characteristics and traits. As such, two students were selected from the whole school population because they had the knowledge about their institutions

and had time to take part in the research. After identifying the strata, simple random sampling was used to get the actual sample (Investopedia, 2023).

d) CQASOs

Convenience sampling techniques were used for the two County Quality Assurance Officers in the study. This is a non-Probability sampling technique in which the researcher decides on who should be in the study and is mostly guided by the proficiency of the researcher. The CQASOs were targeted as the experts in charge of assuring standards in schools. The population from which the sample was obtained is considered similar in that all schools observe and implement the same policies and guidelines whose implementation is supervised by QASOs and other relevant bodies.

The total number of respondents in this study was 249. This comprised 10, and 9 principals drawn from Nairobi and Kajiado Counties respectively. A total of 152 student respondents; 80 from Nairobi and 72 from Kajiado were under study. This included BB-20, GB-16 and MD-48 for Nairobi and BB-8, GB-16, MD-48 for Kajiado. It also included 76 class teachers as follows which represented a class teacher for each form: Nairobi (BB-8, GB-8 & MD-24), Kajiado (BB-4, GB-8 &MD-24). The researcher as well included the 2 CQASOs in the study sample.

Table 3.2: Sampling Matrix

School categories	No. of schools	No. of Principals	No of Students	No of class teachers	No. of CQASO	Total
Nairobi County						
Boys Boarding	2	2	16	8		26
Girls Boarding	2	2	16	8		26
Mixed Day	6	6	48	24		78
Total	**10**	**10**	**80**	**40**	**1**	**131**
Kajiado County						
Boys Boarding	1	1	8	4		13
Girls Boarding	2	2	16	8		26
Mixed Day	6	6	48	24		78
Total	**9**	**9**	**72**	**36**	**1**	**118**
Grand Total	**19**	**19**	**152**	**76**	**2**	**249**

3.6 Research Instruments

This study used questionnaires and interview schedules as illustrated:

a) Questionnaire for school principals

b) Questionnaire for class teachers

c) Questionnaire for students

d) County Quality Assurance and Standards Officers' interview schedule

The introduction part of the questionnaire described the purpose of the study and petitioned the respondents to follow the instructions and be honest. The items in the questionnaires were prepared as per Bebbie's (1995) guidelines whereby items should be clear for participants to interpret them in a similar manner and that questions are appropriate and restricted to only one issue to avoid double-barrelled questions. Negative or biased items are avoided so as not to discourage respondents to give their objective views. The questionnaires contained both open and closed ended questions.

3.6.1 Questionnaire for Principals

This questionnaire was administered to school principals who are the policy implementers at the school level. The questionnaire was both structured and semi-structured and focused on all the four specific objectives of this study. Section A looked for background information of the respondents which could affect their answers. Section B gathered data on how safety of school buildings affected teaching and learning. Section C sought answers on how water adequacy and safety affected teaching and learning. Section D sought answers on how safe handling of food affected teaching and learning and Section E collected information on how waste management affected teaching and learning.

3.6.2 Questionnaire for Class Teachers

This questionnaire was administered to class teachers. The class teachers catered for students' academic performance and social welfare. They are the ones who meet students first daily. The questionnaire was both structured and semi-structured and focused on all the four specific objectives of this study. Section A looked for background information of the respondents which could affect their answers. Section B gathered data on how safety of school buildings affected teaching and learning. Section C sought answers on how water adequacy and safety affected teaching and learning. Section D sought answers on how safe handling of food affected teaching and learning and Section E collected information on how waste management affected teaching and learning.

3.6.3 Questionnaire for Students

This questionnaire was administered to students who are the beneficiaries of the effective implementation of safety guidelines as well as part of the implementers of the same guidelines. The questionnaire was both structured and semi-structured and focused on all the four specific objectives of this study. Section A looked for background information of the respondents which could affect their answers. Section B gathered data on how safety of school buildings affected teaching and learning. Section C sought answers on how water adequacy and safety affected teaching and learning. Section D sought answers on how safe handling of food affected teaching and learning and Section E collected information on how waste management affected teaching and learning.

3.6.4 Interview Schedule for CQASOS

The interview schedule was used to collect comprehensive information from County Quality Assurance & Standards Officers (CQASOS) on the implementation of health and safety guidelines and their effect on teaching and learning. The interview schedule was developed along the reviewed literature and the research questions. Use of interviews enabled the researcher to explore the views and beliefs of the respondents. The interview schedule had guiding questions that enabled the researcher to focus on the study objectives.

3.7 Validity and Reliability of Research Instruments

3.7.1 Validity of Research Instruments

The research instruments were validated in terms of content and face validity. This is because according to Patton (2002), research instruments may not be without fault. Davies and Dodd (2002) further state that a researcher needs to know for sure

that the instruments in use will give correct conclusion. Validity and reliability increase transparency and decrease opportunities to insert researcher bias in qualitative research (Singh, 2014). In research, it is possible for a measurement to be reliable but invalid; however, if a measurement is unreliable, then it cannot be valid (Thatcher, 2010; Twycross & Shields, 2004).

To start with, the questionnaires were presented to Kenyatta University supervisors to assess whether the set of items correctly represents the variables being tested. The supervisors were requested to make recommendations to the researcher after going through the instruments. Most of the questions were valid but objective question four which was asking the respondents to state other ways of implementing safety guidelines was amended to specify health safety guidelines but not general safety guidelines.

Secondly, the interview guide was presented to the supervisors at Kenyatta University who gave their opinion on the objectivity and the language of the interview questions. The researcher also validated the interview guide by carrying out test interviews with peers. McGrath, Palmgren, Liljedahl. (2019) asserts that interview guides help to provide the researcher with a chance to look at the language, the clarity of the questions, and aspects of active listening.

Questionnaires were administered to principals, class teachers and students in two schools in the study area which were not to be part of the sample. Random sampling of students was done for the purpose of the pilot. An Education Officer and a Quality Assurance officer were interviewed to test the validity of the interview schedule.

3.7.2 Reliability of Research Instruments

For an instrument to be reliable, it should consistently give the same results when repeated tests of the same topic are taken under the same circumstances (Nsubuga, 2000). The reliability of the questionnaires was carried out through test-retest method and administered to two public secondary schools; one from each County under study and which was not part of the sample. The same respondents from the same secondary schools filled in the questionnaires twice in a two-week interval.

Pearson Product Moment Correlation Coefficient was calculated for each questionnaire. If reliability coefficient fell within the acceptable range of 0.7-1.0 as proposed by Mugenda and Mugenda (2003), the questionnaires would be used for data collection. On the other hand, the interview guide was subjected to a test-retest method whereby an expert interviewed an education officer and a quality assurance officer and the same was repeated after two weeks.

Reliability and validity form psychometric properties of measurement scales that are very important in estimating adequacy and accuracy procedures of scientific research as mentioned by Bajpai and Bajpai (2014).

3.7.3 Pilot Testing of Research Instruments

Pilot study is essential in the research process as it helps the researcher detect design issues and they are able to know whether the research is practically possible, the resources required and the cost of the research. Carrying out the pilot study the researcher gets prepared for any issues that may crop up in the main study (Simkus 2023). Questionnaires were administered to school principals, class teachers and students in two schools in the study area which was not part of the sample. A mock interview was conducted with an education officer and a quality assurance officer.

Suggestions given by the experts were incorporated in the instrument and gaps identified during piloting addressed using the instruments to collect data.

The pilot study guaranteed that the researcher got the envisioned data from the questionnaires and assisted to note challenges the respondents may come across while responding and in so doing make corrections accordingly and hence, the researcher was able to collect accurate data. The researcher also noted the time required to fill the questionnaires and amend the items suitably. The validity of interview guides was ensured by use of triangulation of researchers, which is suggested by (Creswell & Miller, 2000). The researcher requested two experts to interview QASOs using the developed interview guide. The researcher then checked the responses given against the research objectives and made relevant adjustments. The researcher was able to change the probing questions to the CQASOs to get the required results.

3.8 Data Collection Procedure

Data collection was carried out in three phases. The phases were pre-field, field work and post-field logistics phases. The researcher first got a data collection clearance letter from Kenyatta University, printed the research instruments and ensured they were complete, checked physical outline and adequacy in readiness for data collection exercise. The researcher then applied for a research permit from the National Commission for Science Technology and Innovation (NACOSTI). This was followed by drawing up a work plan and a budget showing the order of activities to be undertaken during data collection.

The researcher then visited the office of the two County Directors (Education) where the research was to be carried out for clearance and introduction to the schools which were visited.

The questionaries to the principals, teachers and students had both quantitative and qualitative elements. All the elements of the questionnaires were filled in at the same time. On the other hand, the interview with the CQASOs took place within the same period of data collection. The data were collected using the convergent parallel research design where both quantitative and qualitative data were collected simultaneously and analyzed separately. The data then were merged during interpretation. It is noted that part of the qualitative aspects was also in the quantitative questionnaires.

In phase 1, questionnaires to the principals, class teachers, and students were distributed to the respondents and timelines agreed on. The researcher booked appointments with CQASOS and conducted the interviews. In phase 2, the researcher categorized the quantitative and qualitative data and, in the 3rd phase, compared results. This study had independent, dependent and intervening variables. The independent variable was health and safety on school buildings, water, food and waste management. The outcome of ensuring health safety would lead to effective teaching and learning which is the dependent variable of the study. Intervening variables that are likely to affect teaching and learning include internal and external environmental factors.

To start with, the researcher visited sampled schools and provided a letter of introduction to the school principals and explained the purpose of the visit. In line with the convergent parallel design, the questionnaires which had both the

quantitative and qualitative components were issued to the respondents and an explanation on what was required was done. To enhance confidentiality and return rate, all questionnaires duly filled were packed in an envelope and sealed in full view of the respondents.

With regards to the interview, the researcher planned with the CQASOs on the most appropriate place and time to be interviewed. The researcher requested to use a tape recorder during the interview to enable accurate data capture. Finally, a follow up was made to schools that had not submitted their questionnaires for purposes of finding out whether there were any challenges related to filling the questionnaires and if any, rectified the situation.

In summary, quantitative data were collected from the respondents' using questionnaires while qualitative data were collected from the respondents using an interview schedule as well as from some sections of the questionnaires.

4.9 Data Analysis

Data which generated both quantitative and qualitative data was analyzed as per the listed study objectives:

i To establish the status of school buildings and how it affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties

ii To determine how the quality of water affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties

iii To establish how food safety practices affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties

iv To determine how waste management practices affect teaching and learning in public secondary schools in Nairobi and Kajiado Counties

The collected data were analyzed using the Convergent Parallel Design whereby the quantitative and qualitative data were analyzed separately. All the four objectives generated both quantitative and qualitative data. The researcher first categorized the instruments into their homogenous groups, summarized the quantitative data into frequencies and percentages with the help of SPSS Version 28.0. The quantitative data were presented using frequency tables and graphical representations. The researcher transcribed all interviews, then coded the qualitative information and then proceeded to report in narrative form. The quantitative and qualitative data were then merged during interpretation.

3.10 Ethical Considerations

The researcher was responsible for ethical issues within the study so as to conduct effective and meaningful research. The researcher ensured compliance with research ethical values.

First, research authorization was obtained from Kenyatta University's Graduate School. This was followed by getting clearance from the National Council for Science Technology and Innovation (NACOSTI). Finally, an introductory letter explaining the purpose and intention was received. This letter indicated that the participants were protected by concealing their identity and maintaining confidentiality. The researcher took accountability in data analysis and reporting of the research findings to ensure that the collected information was authentic, and confidentiality and anonymity of the respondents was always maintained. The issue of confidentiality was emphasized to the respondents before collecting the data.

The researcher ensured the informed consent of the respondents was attained by preparing the consent form and ensuring the respondents read, understood and agreed with the elements of the consent. The informed consent process involved giving a respondent adequate information concerning the study. Respondents had the liberty to accept or reject participation and they should be given an opportunity to ask questions (UCI, 2019). The consent document was signed with the participants' full knowledge of what it means without coercion.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Introduction

The purpose of this study was to establish the health safety status and its effects on teaching and learning regarding school buildings, water, food and waste management in public secondary Schools in Nairobi and Kajiado Counties, Kenya. This chapter presents the findings, interpretations and discussion according to the objectives. The first part of the discussion looks at the demographic characteristics of the respondents while the second part of the discussion looks at each objective of the research. The findings of this study are presented under the research objectives as stated:

i) The status of school buildings and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

ii) The quality of water and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

iii) The status of food safety practices and their effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

iv) The status of waste management practices and their effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

In the presentation of the findings of this study, the convergent parallel model of analysis was used which entailed:

i) Separate analysis of quantitative and qualitative data

ii) Convergence and interpretation of results

In this study, the data generated were both quantitative and qualitative. The quantitative data were analyzed using descriptive statistics (frequencies and percentages) while the qualitative data were analyzed using content analysis and presented in a narrative manner. The data is presented as per the convergent parallel design whereby the quantitative data is presented first, followed by qualitative data and then the merged data. The quantitative data focused on the demographic characteristics of the respondents, the Likert scale responses of the respondents where the output was numerical and presented in form of tables and figures. The qualitative data focussed on the responses from the CQASOs and some of the responses from the principals, teachers and students.

The researcher presented the data analysis as per the research objectives. The researcher used statistical analysis to present and interpret data to show the relationships between the studied variables on Health Safety and its Effects on Teaching and Learning in Public Secondary Schools in Nairobi and Kajiado Counties.

Questionnaires were administered to 19 principals, 76 teachers and 152 students of sampled secondary schools in Nairobi and Kajiado Counties. Interviews were also conducted with the two CQASOs. A total of 247 out of 249 respondents from the sampled secondary schools in Nairobi and Kajiado Counties completed and returned their questionnaires. This represented a 98.8% return rate of the questionnaires. This study had a high rate of questionnaire return due the attitudes of the respondents towards the study topic, the structure of the questionnaire and the fact that the research was carried out during the first term of the school calendar when students are relaxed as they settle in a new year.

4.2 Demographic Characteristics of the Respondents

The researcher proceeded to analyse the demographic characteristics of the study respondents using bar graphs and pie charts.

4.2.1 Gender of Respondents

Table 4.1: Gender of Respondents (Principals, Teachers and Students)

	Principals		Teachers		Students	
	n	%	n	%	N	%
Male	11	57.9%	32	44.4%	83	42%
Female	8	42.1%	40	55.6%	69	58%
Total	19	100%	19	100%	152	100%

Results in Table 4.1 indicate that 58% of the principals were male while 42% were female. The ratio is almost 1:1. This indicates the male gender is more in management than the female gender. The results also show that the percentage of male teachers was 44.4% while that of female teachers was 55.6%. Thus, female teachers were slightly more in this study, and out of the 152 students' participants, majority were female (54.6%).

4.2.2 Academic Qualifications of Respondents

Table 4.2: Academic Qualification (CQASOs, Principals and Teachers)

	CQASOs		Principals		Teachers	
	n	%	n	%	n	%
PhD	2	100%	0	0	4	5.6%
M.Ed.	0	0%	11	57.9%	63	87.5%
B.Ed.	0	0%	8	42.1%	5	6.9%
Total	2`	100%	19	100%	72	100%

Table 4.2 indicates that a majority (57.9%) of the principals had a Master of Education (M.Ed.) while the least proportion (42.1%) of the principals had a Bachelor of Education (B.Ed.).

A majority (87.5%) of teachers had a Master of Education (M.Ed.) while the least proportion (5.6%) and 6.9% of the respondents had a Doctorate (PhD) and a Bachelor of Education (B.Ed.) respectively. The two CQASOs are PhD holders. This is very encouraging bearing in mind the nature and gravity of their work of ensuring health safety is maintained in the schools. The academic qualification of the CQASOs, principals and teachers were an indicator that all were qualified to implement laid down health and safety guidelines.,

4.2.3 Age of the Respondents (Students)

Table 4.3: Age Bracket of Students

Years	**n**	**%**
14-16	100	65.8%
17-18	47	30.9%
Above 18	5	3.3%
Total	**152**	**100%**

A majority (66%) of the students were aged between 14-16 years while the least proportion (3%) were aged above 18 years as indicated by Table 4.3. All the students were old enough to appreciate the health and safety requirements.

4.2.4 Working Experience of the CQASOs

Both the two CQASOs indicated that they had worked for above 15 years since employment and the two CQASOs indicated that they had worked for more than five

years in their respective Counties. The CQASOS had adequate working experience to give their views on the health and safety issues in the schools.

4.3 Effects of Health Safety of School Buildings on Teaching and Learning

The first objective sought to establish the status of school buildings and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties. The researcher looked at the status of the buildings in the following areas: cleanliness, ventilation, safety and lighting. The researcher collected information from the following respondents: CQASOs, principals, teachers and students. The two interviewed CQASOs represented Nairobi and Kajiado Counties. A total of nineteen (19) principals, seventy-six (76) teachers and a hundred and fifty-two students (152) participated in the study. Findings of the research are reported on Table 4.4 for the following areas: cleanliness, ventilation, safety of buildings and lighting.

4.3.1 Status of Cleanliness of School Premises

Quantitative Results

The researcher looked at the status of cleanliness of the school premises in the following areas: toilets, classrooms, dining areas and laboratories as illustrated in Table 4.4.

Table 4.4: Status of Cleanliness

Cleanliness	Principals (n=19)					Teachers (n=72)					Student (n=152)				
	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE
Toilets	0	5.3	15.8	36.8	42.1	5.6	2.8	13.9	44.4	33.3	11.2	15.8	17.1	18.4	37.5
Classrooms	0	0	5.3	47.4	47.4	2.8	1.4	13.9	38.3	48.6	3.9	3.3	13.2	22.4	57.2
Dining Areas	15.8	31.6	26.3	15.8	10.5	11.1	11.1	25.0	30.6	22.2	15.8	10.5	14.4	17.8	37.5
Laboratories	0	0	21.1	31.6	47.4	2.8	11.1	18.1	30.6	37.5	6.6	6.6	8.6	15.8	62.5

KEY: NA-Not at All LE-Little Extent ME- Moderate Extent HE-High Extent VHE-Very High Extent

The quantitative results as illustrated by Table 4.4 shows that a majority which included (78.9%) of the principals and 77.7% of the teachers indicated to a High and Very High Extent respectively that they had clean toilets. The response of the students was somehow lukewarm because only 55.9% of the students indicated to a High and Very High Extent to having clean toilets.

A majority (94.8%) of the principals and most of the teachers (86.9%) indicated to a High and Very High Extent that their classrooms were cleaned on a regular basis. Similarly, most of the students, 79.6 % indicated to a High and Very High Extent to having classrooms that were cleaned on a regular basis. The least proportion (26.3%) of the principals, and an average number of both teachers and students at 52.8% and 55.3% respectively indicated having dining areas that are cleaned and well maintained. A majority (79%) of the principals, teachers and students at 68.1% and 78.3% respectively indicated to a High and Very High Extent to having laboratories that are always clean and well maintained. Thus, from this study, most of the schools in Nairobi and Kajiado Counties had clean premises which included toilets, classrooms, dining areas and laboratories as highlighted in Figure 4.1.

Figure 4.1: ***Learning Block (Nairobi county)***

The researcher also observed similar buildings that were very clean and well maintained. An example of a learning block is illustrated by Figure 4.2.

Figure 4.2: ***Learning Block (Kajiado county)***

From Figure 4.1 and Figure 4.2, it was noted that the learning block surroundings were clean and well maintained and this would enhance teaching and learning.

Figure 4.3 on the other hand shows the level of cleanliness inside a classroom. Although the classroom looked congested, it was clean.

Figure 4.3: ***A picture of a clean classroom***

Figure 4.3 shows a clean classroom however, the classroom is overcrowded and the dust bin inappropriately located. Any outbreak of an infectious disease pose a threat of spread of illness among the learners interfering with learning activities to both the learners and teachers.

Despite the positive findings on matters cleanliness, the researcher however noted that there were some challenges faced in the implementation of health safety guidelines. It was evident from the study and visible in Figure 4.4 that a fair number (55.3%) of the students indicated that most of the challenges were in toilets. This was followed closely by dining halls at 12.5%, playgrounds (9.2%), water (7.9%), classrooms at 4.6%, libraries (3.3%), food and laboratories at 2.6% and kitchen (2.0%).

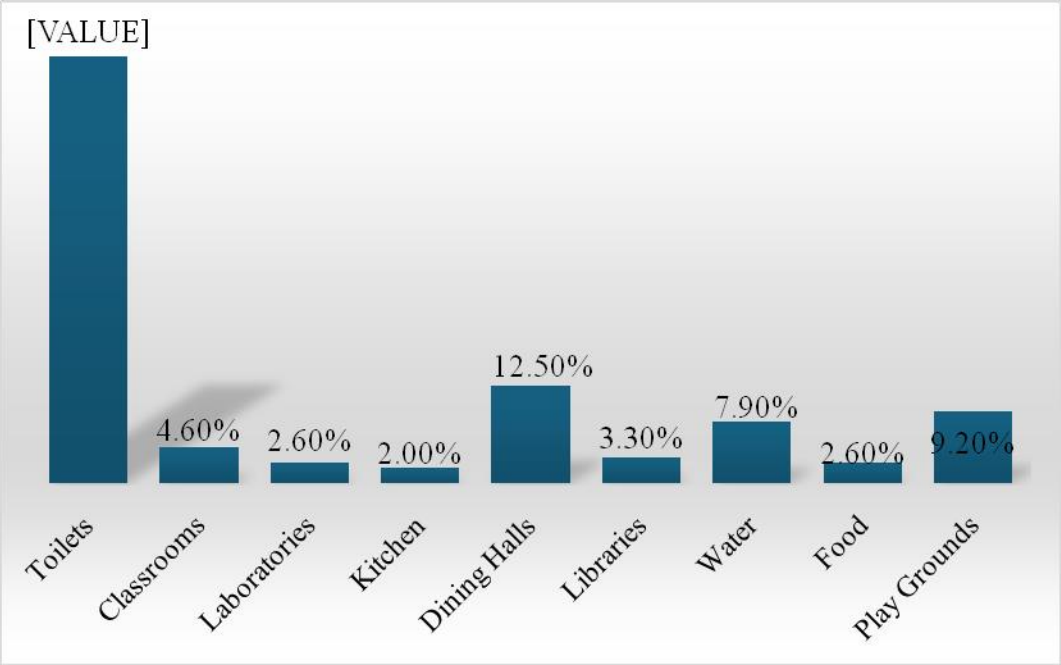

Figure 4.4: ***Challenges in Implementation of Health Safety***

The researcher also observed that most of the sampled secondary schools in Nairobi and Kajiado lacked adequate toilets. However, the researcher was impressed with the high levels of cleanliness in the toilets, dining halls, playgrounds, water, classrooms, libraries, food, laboratories and kitchen.

The researcher noted that most of the schools were well maintained as shown by Figure 4.5.

Figure 4.5: ***A well-maintained school premise in a Kajiado school***

Clean surroundings enhance teaching and learning

Qualitative Results

On the qualitative results on cleanliness, a teacher said that "education on food handling should be improved by ensuring that there is clean water, sanitation, proper hygiene. We should also avail enough cleaning materials."

The researcher also sought to inquire on how the teacher's improved hygiene within the school one of the teachers said that:

> Talks are held in laboratories and dormitories about hygiene in class meetings and we do so by interacting with the students and getting to know whether some have different health issues that need to be addressed by the school administration.

On health and sanitation, a teacher indicated that:

> compliance with the COVID-19 Protocols is observed and cleanliness of toilets, classes, offices is done, and hand washing is also done. Emphasis on safety measures whenever there is an outbreak of any disease is ensured

There was agreement that the school premises that is classrooms, laboratories, libraries and dining areas were cleaned on a regular basis. However, there was a divergence on the part of the students where quite a moderate percentage; 55.9% indicated that toilets were not clean. Students also reported that the toilets were inadequate, and this meant that there could be a delay on the part of the students while using the toilets.

The teachers also noted that there was a need to improve education on food handling by ensuring that there is clean water, sanitation, proper hygiene and enough cleaning detergents. They also indicated that they had regular talks in laboratories and dormitories about hygiene in class meetings and that they did so by interacting with the students and getting to know whether some have different health issues that need to be addressed. This meant that the teachers took matters of health and safety seriously and worked with the students to ensure hygiene was observed.

In line with the Constitution of Kenya (2010), which provides for safe, serene and conducive school buildings to enhance teaching and learning (COK, 2010), the schools had indeed maintained cleanliness in the school premises. The safety standards manual also stipulates that there should be adequate and suitable buildings which should allow safety for learners and hence doors should open outside, and windows should not have grilles (MOE, 2008) The guidelines also emphasize on the status of toilets, that they should be adequate, clean and well-ventilated and boys' and girls' toilets should be separate. As noted, however, there was still a challenge on the adequacy and cleanliness of toilets in the schools.

Similar studies have shown a similar trend to this study. A study looking at the relationship between sanitation facilities and enrollment was carried out between 2013 and 2018 in Pakistan (which stands number seven in the world in terms of access to basic toilet provision) whereby 1 out of 3 schools lack toilets (Gullani, 2021).

Similar studies have shown that safety and hygiene are basic elements of structural quality that should be present in every Early Childhood Education (ECE) classroom and may have an impact on process quality and child outcomes. One study in Cambodia (Rao & Pearson, 2009) found that community preschools conducted in ECE teachers' homes posed problems in terms of hygiene, lack of clean water and sanitation, and no appropriate space for children to play. The presence of these elements of safety and hygiene can also reduce the propagation of germs, keeping children healthy and promoting their school attendance (Adlerstein & Cortázar. 2020).

While carrying out a study on school safety and its influence on teaching and learning processes in Nairobi and Nyeri Counties, Wanderi (2018) contrasts with this study since the findings established that some of the schools sampled did not have spacious dining halls and this made students eat from outside hence exposing them to food contamination. The report also showed that the dining and kitchen areas were not clean with 57.6% of students and 15% of the deputy principals and 28% of the principals reporting that the areas were not clean. The conclusion was that the dining areas were not safe, and students were at risk of getting sick due to contamination.

4.3.2 The Effects of Cleanliness of School Premises on Teaching and Learning

Quantitative Results

The quantitative results as illustrated by Table 4.5 show how cleanliness affects teaching and learning in secondary schools in both Kajiado and Nairobi Counties. The content in the table looks at how a clean environment leads to improved learning outcomes, how adequate sanitation influences full participation in learning activities, how clean and well-maintained libraries impact on reading and how a clean school environment influences students' discipline.

Table 4.5: Cleanliness, Teaching and Learning

Cleanliness and Teaching and learning	Principals (n=19)					Teachers (n=72)					Student (n=152)				
	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE
Improved learning outcomes	0	0	0	31.6	68.4	2.8	1.4	2.8	27.8	65.3	1.3	1.3	7.9	26.3	63.2
participation	0	0	5.3	52.6	42.1	4.2	1.4	4.2	36.1	54.2	5.9	3.3	13.2	29.6	48.0
Reading enhanced	0	0	5.3	52.6	42.1	5.6	2.8	6.9	25.0	59.7	7.9	1.3	18.4	23.0	49.3
Better discipline	0	0	5.3	36.8	57.9	2.8	5.6	16.7	25.0	50.0	6.6	7.9	14.5	22.4	48.7

KEY: NA-Not At All LE-Little Extent ME- Moderate Extent HE-High Extent VHE-Very High Extent

Table 4.5 shows that all the principals, teachers (93.1%) and students (89.5%) indicated to a High and Very High Extent that clean environment leads to improved learning outcomes. A majority (94.7%) of the principals, teachers (90.3%) and students (77.0%) indicated to a High and Very High Extent that adequate sanitation facilities enable students to fully participate in learning activities. A majority (94.7%) of principals, teachers (84.7%) and students (72.3%) indicated to a High and Very High Extent that safe, clean and well-maintained libraries encourage learners to read more. A majority (94.7%) of the principals, 75.0% of teachers and 71.1% of students indicated to a High and Very High Extent that a clean school environment enhances students' discipline.

Qualitative Results

Qualitative results were computed from the interview which was conducted by the researcher on the two CQASOs to enquire on whether the school principals in Nairobi and Kajiado Counties were trained in health and hygiene safety in schools. CQASOs 1 stated as follows:

> The principals were not well trained, but the schools mostly follow the Child Friendly Schools Manual (CFS). The school community may learn through interaction with Quality Assurance Officers and that in Nairobi County, schools were working closely with County Government which was implementing the Health Safety Policy.

CQASO 2 reported that:

> The Head teachers have been trained in health and hygiene using the Child Friendly Manual developed by UNICEF and every school has a copy of the manual. There were also NGOs like World Vision that have been training teachers and students on handwashing and taking care of their health.

The researcher also sought to find out the type of Teachers' Development Programs in place to enable them handle health and safety issues. CQASOS 2 noted the following:

> Every school had a teacher in charge of the health programme. Schools also had a Physical Education (P.E.) and Sports Management Committee where the teacher in charge of health issues is a member of this committee. Also, a COVID-19 Committee was put in place after the outbreak of COVID-19 in 2020 to ensure COVID-19 protocols were observed and were continuous. Schools had wash points; sanitizers and all staff and students wore face masks. Health and Safety programmes were in place and were facilitated by NGOs that trained 30 teachers on health and safety in Ilbisil region. However, this has not covered the whole of Kajiado County and there is no follow up.

From this outcome, there seemed to be a gap in the training of teachers on school health safety which could pose a threat to ensuring the health safety of learners. It was evident that there was over dependency on other organs other than the Ministry in charge of education in training on health safety matters.

The researcher also inquired from the CQASOs concerning the supervision of teachers and students on health and hygiene safety. CQASO 1 indicated the following:

> Teachers were not well supervised. However, the teachers supervised the students and there is a duty roster for both teachers and students. Duties were allocated to the students such as sweeping and cleaning of school premises and supervised by class masters, prefects and dorm masters. Heads of Departments (HODs) are the overall supervisors. Also, some schools held competitions on cleanliness which was an incentive for the students to keep their premises clean.

The belief was that clean environments would have a positive impact to teaching and learning as the students are comfortable to live and study in clean environments.

Convergence of the findings

As per the qualitative and quantitative data presented above, it was thus very evident from this research that clean environment led to improved learning outcomes, adequate sanitation resulted to full participation in learning activities, clean and well-maintained libraries improved reading and clean school environment improved students' discipline. It was also noted that the training on health and safety was not adequate. It was only the principals who had been training using the CFS manual. There were indications that training was left to other players other than the ministry in charge of education. It is also worth noting that the outbreak of COVID-19 brought a new impetus for maintaining hygiene amongst the school community.

A study carried out in KwaZulu-Natal province, South Africa, established that there is a link of security and cleanliness, and this could be the reason why urban schools were cleaner than rural schools. This study, just like the current study, concluded that cleanliness enhanced learning and also boosted teaching and learning activities as well as increasing academic performance of the learners (Uleanya, 2020). Pushparatnam, Bazaldua, Holla, Azvedo, Clarke & Devecelli (2021) agree with this study on classroom facilities and safety and state that schools should have clean drinking water, hand washing facilities appropriate for children, toilets with hand washing facilities appropriate for children, clean toilets and separate toilets for girls.

In their study on student's perspective on the impact of cleanliness of university facilities on academic achievement, Kiplagat, Khamasi, Jelimo and Mokaya (2022) arrived at a similar conclusion with this study since they exposed that 88% of students agreed that their performance would improve if their premises were clean and 92% said that if the campus and halls of residence were better organized then

their academic qualifications would improve. Unlike this study which showed that the principals, teachers and students agreed that the school premises were clean, the study by Kiplagat et al., (2022) also revealed that 74 % of the students reported that the campus environment was not clean and 54% of the students indicated that the learning halls were not cleaned often.

Similar studies have also shown that schools with toilet facilities increase enrollment. Hence, inadequate toilets like what this study has established affect teaching and learning. However, in relation to gender, girls only school's toilet facilities increased enrollment whereas boys' school and mixed schools did not show much relationship between toilet facility and enrolment (Gullani, 2021). Kim and Rhee (2019) also arrived at a similar conclusion as this study. They carried out a study in Kenya from 2013-2015 whose aim was to establish the impact if provision of toilets in primary school on school attendance. The study found out that a rise in toilets increases school attendance and more so amongst the girls. The study therefore concluded that provision of toilets plays a pivotal role in reducing gender education gap and brings a general enhancement in school attendance.

4.3.3 Status of School Safety

Quantitative Results

The study also sought to find out the status of school safety and how it affects learning in public secondary schools in Nairobi and Kajiado Counties. Table 4.6 highlights the findings on ventilation, safety and lighting in relation to teaching and learning. The quantitative results which were generated from the questionnaires administered to the principals, teachers and students provided the following results as illustrated by Table 4.6.

Table 4.6: Ventilation, Safety and Lighting in Relation to Teaching and Learning

Ventilation, safety and lighting and teaching and learning	Principals (n=19)					Teachers (n=72)					Student (n=152)				
	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE
VENTILATION															
Classroom	5.3	0	0	52.6	42.1	6.9	4.2	18.1	29.2	41.7	7.9	4.6	17.8	17.8	52.0
Laboratories	0	0	21.1	31.6	47.4	6.9	11.1	6.9	38.9	36.1	7.9	3.3	7.2	13.8	67.8
Spacious Dining areas	5.3	26.3	42.1	15.8	10.5	5.3	5.3	20.8	26.4	22.2	31.6	13.2	15.1	15.8	24.3
SAFETY AND LIGHTING															
Safety Kits	21.1	15.8	42.1	15.8	5.3	29.2	22.2	11.1	25.0	12.5	15.1	13.2	18.4	12.5	40.8
Perimeter Wall	15.8	10.5	36.8	10.5	26.3	16.7	13.9	13.9	23.6	31.9	12.5	5.3	10.5	17.1	54.6
Grass/still water	5.3	0	26.3	36.8	31.6	1.4	6.9	20.8	29.2	41.7	7.2	6.6	9.9	12.5	63.8
Unused premises	5.3	0	10.5	21.1	63.2	9.7	4.2	9.7	26.4	50.0	27.0	5.3	5.9	7.9	53.9
Laboratories	10.5	42.1	26.3	10.5	10.5	15.3	18.1	27.8	22.2	16.7	15.8	15.8	18.4	17.8	32.2
Regulations	0	5.3	26.3	36.8	31.6	12.5	6.9	13.9	20.8	45.8	7.2	3.9	11.2	8.6	69.1
Lit Laboratories	0	0	10.5	47.4	42.1	5.6	12.5	8.3	31.9	41.7	9.2	4.6	7.9	11.8	66.4

KEY: NA-Not at All LE-Little Extent ME- Moderate Extent HE-High Extent VHE-Very High Extent

a) Ventilation

Table 4.4 shows that a majority (94.7%) of the principals, 70.9% of teachers and 69.8% of students indicated to a High Extent and Very High Extent that they had adequate classroom ventilation as shown by Figure 4.6.

Figure 4.6: ***A Picture of a well-ventilated classroom***

Figure 4.6 illustrates a clean, well ventilated an well lit classroom and students are seen fully concentrating in their class work.

Quantitative Results

A majority (79.0%) of the principals, 75.0% of the teachers and 81.6% of students indicated to a High Extent and Very High Extent to having laboratories that are well ventilated. The least proportion of principals (26.3%), 48.6% of teachers and 40.1% of students indicated to a High Extent and Very High Extent to having dining areas that are not congested.

Qualitative Results

On the qualitative results on spacing and ventilation, the principals, teachers and CQASO 1 concurred that:

> They ensured that there was enough spacing and ventilation, and that students always kept the doors open. Interestingly, female students indicated that their schools had well-ventilated laboratories which had enough lighting in laboratories. It was established that teaching and learning took place in rooms that were well ventilated with less congestion and with enough seating space for the learners.

In line with the expectation as indicated in the safety standards manual for schools, classrooms, libraries and laboratories and all other rooms should be well lit and ventilated (MOE, 2008). The schools had ensured that learning areas were well ventilated as per the research findings.

Convergence of the findings

The merged results as per the qualitative and quantitative data presented above, indicated that the levels of ventilation in the secondary schools were adequate in both Nairobi and Kajiado schools, especially in female secondary schools.

A study carried out in 8 primary schools in England (on ventilation rates in schools) established that low ventilation rates in learning areas have huge impact on learners' attention, observance and affects learners' memories and concentration. The study, therefore, just like this study, concluded that the physical surroundings in schools affect teaching and learning (Bako Biro, Clements-Croome, Kochhar, Awbi, Williams. 2018). A study on association between classroom ventilation and learning outcome in Danish schools found out that pupils who had mechanical ventilation had the highest scores. The findings add to the conviction that inadequate ventilation affects teaching and learning (Toftum, Kjeldsen, Wargoki, Mena, Hansen, Clausen. 2015).

b) Status of School Safety

Quantitative results

The quantitative results as shown by Table 4.6 show that the least proportion (21.1%) of principals and teachers (37.5%) respectively indicated to a High Extent and Very High Extent to having emergency kits in the staffroom. An average number of students (53.3%) also indicated having emergency kits in the staffroom. This shows that most schools in Nairobi and Kajiado did not have emergency kits in the staffroom. The least proportion (36.8%) of principals, 36.1% of teachers indicated to a High Extent and Very High Extent to having a proper perimeter wall. An overwhelming number (71.7%) of students indicated to a High Extent and Very High Extent to having a proper perimeter wall. A majority (68.4%) of principals and 70.9% of teachers indicated to a Very High Extent to grass being kept short and stagnant water avoided in the school to eliminate harmful insects and animals.

A majority (84.3%) of principals, 76.4% of teachers and 61.8% of students indicated to a High Extent and Very High Extent to there being no abandoned buildings in the school compound that can be used for illicit activities like smoking and drug peddling. A majority (68.4%) of the principals and 66.6% of teachers indicated to a Very High Extent to having rules and regulations on laboratory safety. Similarly, a majority (77.7%) of the students indicated to a Very High Extent to having rules and regulations on laboratory safety.

Qualitative Results

On the qualitative results on compliance with Health and Hygiene Safety of School Buildings, the researcher noted as follows from the two CQASOs, that most schools complied with Health and Hygiene Safety of School Buildings. CQASO 2 responded that:

> Schools comply with building regulations which should have the Bill of Quantities (BQs) and the National Environment Management Authority (NEMA) report. These documents must be provided to the County Director of Education's office as per the Ministry of Education check list/ regulations. Every school should have a site plan. The site plan was to ensure that different premises were well located to maximize safety. A NEMA report must be in place during construction and there should also be a Public Health report before schools are registered.

The CQASO also noted that "During COVID-19, every school had to have a Public Health Officer visiting schools to induct the school community on the COVID-19 protocols through demonstration."

CQASO 1 responded that:

> Not all schools comply however if they do not the County Education Board (CEB) writes to the schools requesting them to comply. If they do not, the matter is reported to higher authorities including the central government represented by the Regional Commissioner. A case was reported in one sub-County where the Regional Commissioner set up a multi-agency team to look at the issue. There have been cases reported of collapsing of school buildings, schools constructed under power lines, and this resulted in County Director's office to carry mapping where power lines were near schools. The report was forwarded to the office in charge of roads and Kenya Power and Lighting Company for action.

On the issue of compliance to building regulations, one of the CQASO 1 responded that:

> Some schools have complied, others have not. The compliance to school building regulations had some issues since not all schools complied. The schools which had issues with compliance were the ones which were mostly in the slums and offering Alternative Provision of Basic Education (ABPET). It was reported that education officers had been assigned to establish and weed out schools that had not complied with the building regulations. The reason to ensure buildings were well constructed was to

> avoid collapsing of buildings which had been witnessed resulting to injury and death of some learners. Hence, with unsafe buildings teaching and learning cannot be well attained.

When asked whether standards assessment has been carried out to find out levels of compliance to set guidelines, one CQASO said, "Yes. The criteria were based on academic performance to identify academic gaps. Although schools have infrastructure, schools still perform poorly and hence the need-to-know reasons."

CQASO 2 responded that:

> Standards assessments are carried out and have established that schools have health challenges. Students have complained about mistreatment by the nurses in sick bays. They felt that they are not treated well by the nurses and matrons. Students say they are treated with the same medication, mainly pain killers or they are told they are pretending. Schools should be connected to nearest health units where nurses could rotate from the schools to the health unit and vice versa. Schools should allow children who have health issues to seek medical attention. This will avoid cases where children collapse or die in schools. It was reported that all public-school students have a health insurance cover called EDU AFYA which takes care of medical costs and assists if death occurs. The major issue facing this cover is lack of knowledge about it to the teachers and the students. Psychosocial problems are also affecting both teachers and students. This area has not been taken seriously and the guidance and counselling department is not strong to handle the issues of mental health.

Both the CQASOs indicated that they had indeed trained on health and hygiene safety in schools.

From these responses, schools had health safety challenges and students felt they were not getting the right treatment in the school health units. This issue can be addressed by collaborating and liaising with the nearest health units for effective treatment. The issue of referral according to the CQASOs should also be considered so that serious cases that cannot be handled by the school nurse should be referred to the hospital. It is also noted that one of the emerging issues among teachers and

learners is mental health and it is an issue that requires special attention. If left to the teaching counsellors, they may not be able to handle it since they are not adequately trained and may require trained medical staff.

The researcher also tried to establish whether the principals and teachers were trained on health and safety issues. CQASO 1 responded that:

> Head teachers have been trained in health hygiene using the Child Friendly Manual developed by UNICEF. Every school has a copy of the Manual. There are NGOs like world vision that have been training on hand washing and teachers were also trained to take care on their health.

CQASO 2 responded that:

> Both the principals and the teachers are not well trained, but the schools follow the Child friendly Schools Manual (CFS). The school community may learn through interaction with quality assurance officers. The health policy is being implemented by the organ that was managing the County.

From this response, training on health safety issues was not adequate. The ministry in charge of education had not put in measures to train the school management and the teachers on health safety management. Over reliance on other organs like NGOs may not yield desired results and a wide range of teachers may not be reached.

One principal responded as follows:

> Students are served with an adequate balanced diet and have constant dialogue with learners. They are sensitizing on safety issues in assemblies or closed meetings, and they are encouraged to come up with measures to enhance their safety. For example, not vandalizing sockets, water taps. On training, all learners are trained on disaster management skills and also establish learner-centered clubs and societies that deal with healthy and safety issues.

another principal indicated that:

> Departments have been created to take care of students' psychological issues and ensure that students' physical health and personal hygiene and personal grooming is observed at all times. We have also built health facilities and introduced vaccination programs. We have also emphasized mental health and wellness.

Another principal reported that

> Students are encouraged to participate in regular clean ups and ensured that there is continuous sensitization of students and other stakeholders on health and safety issues. We also have introduced a motivation and reward system to encourage adoption of health and practices. We have also provided sanitary towels for girls who cannot afford to retain them in school. We also have regular school inspections by health officers.

One teacher responded as follows:

> Resources have been provided for health and safety guidelines and created awareness of the importance of maintaining health and safety measures by putting up more posters about health and safety guidelines. health topics are also discussed during life skills and class lessons and health and safety clubs are established. Culturally relevant lessons are also given.

another teacher also indicated that:

> Health officers are invited to sensitize the students and teachers on health and safety issues and have health practitioners to attend to students and school staff. regular fire safety drills are conducted, and students are regularly reminded on health and safety guidelines. Workshops, seminars and events for teachers to enlighten them on health and safety guidelines are conducted. There is also the establishment of guidance and counselling services in schools.

On safety issues another teacher indicated that:

> The school ensures that there are fire extinguishers, fire exits, rails on the staircases and fire assembly points that are clearly indicated and labelled. First aid, and safety kits are also provided. There is enough lighting around the school compound and having more security personnel around the school and
> also improve signages across the school.

> Another teacher said that.

> There is need to put-up posters in science classrooms that reminds students to be safe and healthy. Also, learners should be accompanied by a teacher while attending P.E lessons. Schools also have safety committees to handle the safety of all students and staff. Educators should also be given opportunities for effective professional training when implementing a new curriculum on health and safety guidelines.

Upon further inquiry, the researcher then noted the following concerning the nature of teachers' involvement in health and safety issues at school.

A teacher responded that:

> Students are advised on washing hands before meals, on the importance of following fire safety precautions, on proper disposal of sharp equipment and airing of clothes from outside, to abstain from sex, avoid running upstairs, to put on face masks and to stay safe in those areas.

A teacher also said the following concerning training, inspection and risk assessment:

> Learners are trained in using fire extinguishers and how to safely handle apparatus and appliances. Tools and equipment are inspected to make sure they are in good condition. Potential risks are assessed within the institution and control measures implemented to mitigate the risks, especially in areas like science laboratories.

On matters awareness and advocacy, another teacher indicated as follows:

> Awareness on health and safety issues; changes happening on their body and how to avoid stressful situations and by always raising concerns over unhygienic conditions are created the school administration advocates for a safe environment free from violence, bullying and harassment; harmful cultural practices and pregnancy.

On matters first aid, one teacher said:

> Students are drilled on the first aid techniques and how to apply or administer the techniques should one get injured or faint and on how to respond to unhealthy situations at school. Students are also encouraged to maintain high standards of cleanliness through talks, especially girls during life skills lessons. Health and safety guidelines as well as how to escape during emergencies like fire accidents are taught in class.

Another teacher commented on syllabi integration, record keeping and societies:

> There is a need to integrate health issues in the content taught to the learners and keep the records on student health condition so that corrective measures are put in place. Furthermore, teachers attend the health clubs and are even patrons of these health clubs.

On the use of assemblies and lessons, another teacher indicated as follows:

> During the school assemblies, the programmes and topics touching on health and safety issues are discussed. Health and safety issues are also discussed during guidance and counselling lessons and life skills lessons, normal lessons like Biology, Home Science and Languages.

On Staff meeting, briefs and special days a teacher said the following:

> During staff meetings and briefs, after agendas are done, safety and health issues are discussed plus other issues concerning the school. Teachers are involved in coming up with safety guidelines in the school. Learner safety is emphasized during lunch time and the school has set aside a day where all class teachers discuss health and safety issues with learners and that it is the mandate of all teachers to talk about Health and Safety guidelines. Also, students are guided and counselled on emotional, psychological, self-control, mental health and self-esteem issues.

The researcher also sought to find out whether the school uses posters and professionals. A teacher indicated the following, "Health posters are placed on notice boards across the school. Also, the school usually invites professionals to talk about health and safety topics."

On guidance and counseling, a teacher indicated that, "We usually carry out guidance and counseling to students. We also guide them on physical health and grooming tips; We talk to students about proper grooming and maintaining physical health."

And on contacting authorities; a teacher said that "The school usually alerts the relevant authorities whenever there is an outbreak of diseases. For teachers to be fully involved in health safety measures, they should have the school health policy and implement it."

Quantitative Results

However, upon enquiry on whether teachers had a copy of the Kenya Health School Policy (which should guide them to implement the health safety measures), a minority (30.6%) of teachers indicated that they had a copy of the Kenya Health School Policy (KHSP) as shown by Table 4.7.

Table 4.7: Possession of a Copy of Kenya Health School Policy (KHSP)

	n	**%**
Yes	22	30.6%
No	50	69.4%
Total	**72**	**100%**

The researcher then proceeded to inquire from the teachers on why they did not have a copy of the Kenya Health School Policy (KHSP). The following were the reasons given by the teachers. “I have never attended any Health and Safety training.” Others said that I have never seen a copy of it.” Another teacher also said that “I am not aware of the existence of the KHSP.” Another also said that “I have no idea why we do not have a copy.” Yet another also indicated that, “I do not know where to get it. If present, it has not been availed to us.”

Qualitative Results

Another teacher said the following:

> A copy was to be availed but it has not been delivered to us. Also, the teacher in charge of health is the only one with a copy of it since he is the custodian teacher of health and safety matters. But I promise to get a copy of it soon.

4.3.4 Explained Health Safety Guidelines (HSG)

Quantitative findings

The researcher then inquired from the teachers if they explained Health and Safety Guidelines to their class. The following was the response from them:

Table 4.8: Explained HSG To Class

	n	%
Yes	54	75.0%
No	18	25.0%
Total	**72**	**100%**

Table 4.8 shows that most teachers; 75.0% indicated that they indeed explained Health and Safety Guidelines to their class. A few; 25.0% indicated that they did not explain to their class.

4.3.5 Method of Explanation of HSG to Class

Qualitative Results

The researcher further inquired from the teachers, which methods they used to explain Health Safety Guidelines. The response of one teacher was as follows:

> Learners are asked to clean both their bodies and classes and advised to always put on clean clothes. Health and safety measures are also highlighted, and students reminded on the whereabouts of the water points, waste disposal areas and proper hygiene. Students are reminded on how to respond to safety in emergencies.

Another teacher also indicated that teachers indeed provide advice to students:

> Students should be constantly cleaning their hands to avoid pathogens, infections and drink a lot of water. Concerning COVID-19, students are advised to observe COVID-19 protocols, keep social distance, wash hands and advice students to dress warmly.

Another teacher also indicated the following:

> Assemblies, clubs and lessons are utilized to counsel and guide students on self-love, self-drive and how to overcome challenges that lead to emotional stress. The importance of observing health and safety is emphasized and life skills training is integrated during regular classroom teaching. Students are also encouraged to maintain high levels of cleanliness in and out of class.

A teacher also said the following:

> The school ensures that Health and Safety Guidelines are followed in the laboratories and frequent meetings are held with students to discuss health and safety measures. Students are advised to live together in harmony, and they are also given Health and Safety guidelines to read.

On health issues, the teachers also said that:

> We ensure that there is proper arrangement of desks in class to allow students move in class with ease and impress on the need for health practices and safety measures to learners and how to use fire extinguishers and use of exit areas. We also ensure that learners are released in time to seek medical help and also sensitize learners to common diseases and how to prevent them.

Convergence of the findings

As per the qualitative and quantitative data presented, the study indicated that most schools complied with health and hygiene safety of school buildings. Although a good number of schools had proper perimeter walls, short and well-kept grass and lacked stagnant water, most schools did not have emergency kits. There were also no abandoned buildings in the school compound and rules and regulations on laboratory safety were available. Reports from the CQASOs showed that whereas some schools complied with construction guidelines, others did not. This resulted in some school buildings collapsing. The CQASOs also reported that there were cases of food poisoning and students getting sick meaning that there was a lapse in food safety practices

However, it was noted that schools lacked copies of the Kenya schools Health Policy and could not explain the lack of the policy. It was therefore clear that most schools were implementing the Child Friendly Manual for Schools (CFS) and not the Kenya Schools Health Policy (KSHP) as prescribed by the Ministry in-charge of Education.

Both the principals and the teachers agreed that students were sensitized on health and safety guidelines during class and in assemblies. The teachers proposed that they should be trained in health safety guidelines and that health safety content should be captured in the curriculum.

4.3.6 Status of Lighting

Quantitative Results

Quantitative results as indicated in Figure 4.6 illustrate the quality of lighting in the laboratories. Table 4.4 illustrates that a majority (89.5%) of the principals and 73.6% of teachers indicated to a High Extent and Very High Extent to having enough lighting in their laboratories. Similarly, a majority (78.2%) of the students indicated to a High Extent and Very High Extent to having enough lighting in their laboratories as shown by Figure 4.7.

Figure 4.7: ***A Picture of a Well-Lit Laboratory***

The well lit and clean laboratory motivates students to take part in practical lessons.

Qualitative results

From the qualitative results, most of the principals, teachers and CQASOs indicated that:

> Schools had enough lighting in their laboratories and classes which enabled learners to take part in learning activities as they could see better and observe activities easily." Schools should not be registered if they do not meet the basic registration requirements for basic education".

Convergence of the findings

As per the quantitative and qualitative data presented, it was established that schools had enough lighting in their laboratories and classrooms. Figure 4.7 illustrates the quality of lighting in the laboratories and classrooms. This is in line with the Ministry of Education guidelines which stipulate that classrooms, libraries and laboratories and all other rooms should be well lit and ventilated (MOE, 2008).

Dahlan and Eissa (2015) examining the effect of day lighting in classrooms on students' performance at King Abdul Aziz University Campus at Jeddah, Saudi Arabia, established that daylight has a positive effect on the learning environment.

Daylight reduces operational costs and help to improve learners' vision, insights, well-being and output. The study concluded that daylight in classrooms assists in energy saving, increase student' attendance makes learners to be environmentally responsible as well as ensuring a conducive environment enabling students to learn. This agrees with this study that proper lighting enhances teaching and learning.

A study conducted amongst 150 students from Alpha course in Malaysia, reported that poor lighting makes students fall asleep and lose focus in their studies. The students also indicated that improved lighting would improve their performance. The study also said that a mixture of artificial and natural lighting in classrooms increases the quality of lighting. The study therefore concluded, just like this study, that, lighting has a strong relationship with students' learning performance and students are comfortable in a well-lit environment (Sanaaz & Soodeh, 2012).

A study by Barret et al., (2019) on how school buildings affect learning concludes that, schools with good conditions such as lighting, air quality, temperature control, acoustics, and age-appropriate learning spaces contribute to pupils' progress in learning. A report from Chan (2017) showed that exposure to mold, poor ventilation, poor lighting intolerable temperatures, and noise negatively interfered with school programs. The study established that when children do not get enough light then there is interference with the sleeping cycle, and this will affect the children's concentration span and alertness (Figueiro & Rea, 2010). According to Guardino and Antia (2012), the structural features of classrooms like noise and lighting can enable teaching and learning to take place. Hence, these findings agree with the findings of the study that well-lit learning rooms enables students learn better.

4.3.7 Effects of School Buildings on Teaching and Learning

The researcher also sought to establish the effects of school buildings on teaching and learning. The study focused on the safety of school Buildings and School Safety Programmes and its effects on teaching and learning.

a) Effects of School Buildings

Quantitative Results

The quantitative results as illustrated by Figure 4.8 show that an overwhelming majority (84.2%), of the principals, teachers (80.5%) and students (71.7%) indicated to a High Extent and Very High Extent that a clean school environment contributes to improved learning outcomes. Figure 4,8 shows a clean learning block and clean surroundings which influence teaching and learning.

Figure 4.8: ***Learning Block***

Figure 4.8,shows the buildings and surroundings are clean however, the uneven grounds can easily lead to students tripping causing injury and keeping students out of class.

Similarly, all the principals (100%), teachers (91.7%) and students (79.6%) indicated to a High Extent and Very High Extent that well-maintained school buildings enable students to attend school. Figure 4.9 shows a well-maintained administration block and classrooms. Such premises attracted students to remain in school and attend classes.

Figure 4.9: ***A Picture of an Administration Block and Classrooms***
This photo shows well constructed buildings and a barrier for on going construction. This ensures learners are not injured and attend to various learning activities.

A majority (42.1%) of the principals, teachers (63.9%) and students (54.6%) indicated to a Very High Extent that safety in the laboratories enable learners to fully participate in practical classes.

Table 4.9: School Safety and Teaching and Learning

Safety and effect on teaching and learning	Principals (n=19)					Teachers (n=72)					Student (n=152)				
	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE
BUILDINGS															
School buildings and attendance	0	0	15.8	26.3	57.9	2.8	6.9	9.7	31.9	48.6	3.9	6.6	17.8	30.9	40.8
safety in the laboratories and full participation	0	0	0	57.9	42.1	2.8	2.8	2.8	27.8	63.9	2.0	4.6	13.8	25.0	54.6
SCHOOL PROGRAMMES															
Participation in Programming	0	5.3	15.8	47.4	31.6	11.1	6.9	18.1	26.4	37.5	13.2	12.5	21.7	25.7	27.0
Students Training	0	0	10.5	52.6	36.8	6.9	4.2	9.7	30.6	48.6	7.9	4.6	11.2	28.9	47.4

KEY: NA-Not at All LE-Little Extent ME- Moderate Extent HE-High Extent VHE-Very High Extent

Qualitative Results

On the qualitative results, the CQASOs noted that there had been cases reported on school buildings collapsing. CQASO 1 noted the following:

> There have been cases reported of collapsing school buildings and schools constructed under power lines and this resulted in the County Director's office to carry out mapping where power lines were near schools. The report was forwarded to the officer in charge of roads and the officer in charge of Kenya Power and Lighting Company for necessary action.

This is an indicator that some schools did not follow the laid down building construction guidelines may be due to ignorance or lack of supervision.

The researcher also sought to find out whether the schools complied with building regulations. The CQASOs noted that some schools had complied while others had not. Figure 4.10 shows a well-constructed dormitory block where the learners sleep in.

Figure 4.10: ***A Picture of a Dormitory Block***

A well built and maintained dormitory ensures the safety of learners from injury and hence learners are able to take part in learning activities.

However, some school buildings were not well maintained as illustrated by Figure 4.11; that shows a dormitory that had a broken pane.

Figure 4.11: ***A Picture of a Dormitory Block***

This photo showing a missing window pane may let in mosquitoes and cold which can affect student's health keeping learners out of class. This photo also shows a building that was incomplete wit sharp edges that can also hurt students. This could be as a result of inadequate finances allocated by the ministry education to schools with low enrollment.

CQASO 2 noted the following:

> Building plans must be approved by the in-charge in the Ministry of Public Health. Also, schools must comply with building regulations that should have the Bill of Quantities (BQs) and the NEMA report. These documents must be handed over to the County Director of Education's office as per the Ministry of Education's check list/regulations. Every school should therefore comply before registration.

There were some well-constructed buildings that were well maintained and well-trimmed in some schools as illustrated by Figure 4.12.

Figure 4.12: ***A Picture of a School Building***

Well constructed budlings and well kept surroundings motivates learners to attend and remain in school.

Figure 4.13: ***A Picture of a School Library***

A clean well organized and well lit library motivates students to read more. Such schools had higher enrolment and higher transition rates.

As per the qualitative and quantitative data presented, it was thus very evident from this research that clean well maintained school buildings lead to improved learning outcomes. Well-constructed buildings also attract students and make them attend and remain in school and clean well-lit laboratories enable students to fully participate in practical lessons. Buildings that are not well constructed could lead to accidents resulting to injuries which could keep students out of class.

A similar study by Deng-Guang, Yu, Du, Chen, Sung, Zhou. (2023) sought to examine the relationship of students' knowledge and safety in the laboratories and their learning efficiencies and just like in this study, it concluded that improving students' safety behaviour and making them conscious of the need of their safety improves learning efficiency.

The above findings agree with Rossi (2020) who indicated that students' health is worsened by school buildings that have leaks, molds, rusts and broken heating and cooling systems. In a study to investigate the effects of temperatures and lighting on learning performance in university classrooms in North Dakota USA, it was established, just like in this study that brighter light improved attentiveness. On the other hand, neutral temperatures were important for working memory and generally a comfortable environment was a motivator to improved performance (Pradhan, Jang, Chauhan.2024).

A study investigating the safety awareness in the laboratory by tertiary students in Trinidad agrees with our findings and showed that students were aware of the safety issues, but identification of hazards and emergence response was low. The study, therefore, concluded that there should be more training to improve safety in the laboratories (Walters, Lawrence and Jalsa, 2017; Ayana et al, 2017). A study in New

York on the status of libraries on student achievement agrees with this study as it established that a safe friendly library has a constructive impact on student attainment and motivation. When students are treated well in libraries, it assists students in acquiring knowledge and lifelong learning (Small, 2010).

Other studies indicated that safety and hygiene are basic elements of structural quality that should be present in every ECE classroom and may have an impact on process quality and child outcomes (Rao & Pearson, 2009). Safety and hygiene can also reduce the propagation of germs, keeping children healthy and promoting their attendance (Mohamed, Abbady, Ahmedy. 2021).

Similar studies have shown that COVID-19 impacted higher education students' life to the core. They reported being stressed, due to change of mode of study from face to face to online learning, postponement of semesters and examinations being adjusted. It was also noticed that in underdeveloped countries, students could not cope well with online learning (Kerzic, Tomazevic & Umek, 2020). Hence in line with this study health and safety is of great importance to learning as it determines whether students attend school or not.

The neglect in science rooms led to the study on how teacher trainees can improve safety in the laboratories using the Science Training Immersive Modules for University Learning Around Teacher Education (STIMULATE). This approach ensures the teacher deliberately creates a safety atmosphere in the rooms. The results showed that where the teachers applied STIMULATE there are positive learning gains (Annetta, Lamb, Minogue, Folta, Holmes, Vallet, Cheng. 2014). This study laid emphasis on laboratory regulations to ensure safety in the laboratories, Safe laboratories will enhance learning and hence the findings Annetta et al., (2014)

agrees with the findings of the current study where safety in laboratories allows learners to perform better in practical lessons.

Kiplagat, Khamasi, Jelimo and Mokaya (2022) in their study on "Student's Perspective on the Impact of Cleanliness of University Facilities on Academic Achievement" exposed that 88% of students agreed that their performance would improve if their premises were clean and 92% said that if the campus and halls of residence were better organized then their academic qualifications would improve. The study revealed that 74 % of the students reported that the campus environment was not clean and 54% of the students indicated that the learning halls were not cleaned often. The finding that lack of clean environment has negative impact on the learners, agrees with this study that clean environment encourages teaching and learning.

a) School Safety Programmes

Quantitative Findings

The quantitative results on the issue of the presence of health safety programmes in the schools, a majority (79.0%) of the principals, teachers (63.9%) and students (52.7%) indicated to a High Extent and Very High Extent that students participate in designing health school programmes. A majority (89.4%) of the principals, teachers (79.2%) and students (76.3%) indicated to a High Extent and Very High Extent that students were involved in awareness sessions on health safety (see Table 4.7).

Qualitative findings

It was noted on the qualitative results that the issue of school healthy programmes is crucial in school as it enables school safety guidelines to be implemented in a

structured manner. When asked whether there were any school programmes in school, CQASO 1 said the following:

> Every school should have a teacher in charge of the health programme. Schools should also have a Physical Education (P.E.) and sports management committee and the teacher in charge of health issues is a member of this committee. The COVID committee was put in place to ensure COVID protocols are observed and are continuous. Schools should have wash points, sanitizers and all should wear face masks.

A teacher indicated that:

> There are health safety programmes where teachers involve learners in health safety programmes. Schools organize exchange programmes with other learners from other schools about health safety issues. Also, we have students who are in charge of health in every class.

The principals and teachers also said they involve the learners in health programmes.

A principal reported that:

> Students were allowed to participate in the designing of health school programmes and allow them to air their views on health issues. It was only with available programmes that schools would be able to know how well they are doing in the areas of health and safety. Also, health safety in schools would become a reality if there were health safety programmes in schools.

Convergence of the findings

The qualitative and quantitative data presented above, this study established that school safety programmes have a greater impact on teaching and learning. The presence of school safety programmes is an assurance of a better teaching and learning experience.

The above findings espouse SDG number 4 on quality education that promotes teaching and learning. They also agree with the findings of Guardino and Antia (2012) that structural features of classrooms enable effective teaching and learning to take place. The above findings are also in line with the findings of Barrett (2019) that education systems, such as curricula, teachers, and education infrastructure, help

to improve the quality of education. The findings are also like those of Mokaya (2013) that school infrastructure is therefore a very important component in ensuring successful education.

In summary, the purpose of Objective I was to establish the status of school buildings and how it affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties. This study established that the status of school buildings does indeed affect teaching and learning in public secondary schools. Clean well-maintained school buildings lead to improved learning outcomes. Well-constructed buildings also attract students and make them attend school and clean well-lit laboratories enable students to fully participate in practical lessons. Buildings that are not well constructed could lead to accidents resulting to injuries which could keep students out of class. Therefore, the better the status, the better the learning experience as students can remain in school, concentrate in learning and read better. The worse the status, the worse the learning experience.

4.4 Effects of Safety of Water on Teaching and Learning

The second objective sought to establish the status of water and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties. The researcher collected information from the following respondents: CQASOs, principals, teachers and students. The two interviewed CQASOs represented Nairobi and Kajiado Counties. A total of nineteen (19) principals, seventy-two (72) teachers and a hundred and fifty-two students (152) participated in the study.

4.4.1 Status of Water quality and availabilty

Quantitative Results

Quantitative results presented on Table 4.8 shows the status of water in sampled secondary schools in Nairobi and Kajiado Counties in the following areas: water purifiers, water storage, water treatment, clean labelled water points, water harvesting, water treatment and safety of water from vandalism as well as education on water safety**.**

Table 4.10: Status of Water in schools

Indicators of status of water	Principals (n=19)					Teachers (n=72)					Student (n=152)				
	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE
Purification	5.3	10.5	15.8	42.1	26.3	12.5	9.7	11.1	34.7	31.9	15.1	11.2	15.8	18.4	39.5
Source	5.3	0	10.5	42.1	42.1	4.2	9.7	19.4	33.3	33.3	8.6	15.1	20.4	21.1	34.9
Storage	5.3	0	31.6	42.1	21.1	2.8	8.3	22.2	30.6	36.1	11.2	9.2	19.1	18.4	42.1
Treated	21.1	0	21.1	36.8	21.1	9.7	5.6	25.0	30.6	29.2	21.7	14.5	26.3	11.2	26.3
Labeled water Points	5.3	5.3	26.3	42.1	21.1	15.3	5.6	18.1	30.6	30.6	27.6	11.2	13.8	15.8	31.6
Enough Water Points	5.3	0	26.3	36.8	31.6	4.2	8.3	20.8	31.9	34.7	13.2	10.5	15.1	17.1	44.1
Rainwater	31.6	31.6	26.3	10.5	0	27.8	23.6	19.5	18.1	11.1	40.8	15.8	11.2	11.8	20.4
Clean water	0	10.5	21.1	57.9	10.5	9.7	4.2	20.8	30.6	34.7	17.1	8.6	18.4	15.8	40.1
Vandalism	5.3	21.1	26.3	26.3	21.1	5.6	9.7	15.3	37.5	31.9	11.2	8.6	17.1	18.4	44.7
Purchased Water	10.5	42.1	21.1	26.3	0	33.3	12.5	15.3	19.4	19.4	42.8	12.5	12.5	8.6	23.7
Water Safety Education	0	21.1	36.8	36.8	5.3	11.1	9.7	22.2	26.4	26.4	28.3	7.2	13.2	11.8	39.5

KEY: NA-Not at All LE-Little Extent ME- Moderate Extent HE-High Extent VHE-Very High Extent

According to Table 4.8, a majority (88.4%) of the principals and slight majority (66.6%) of teachers indicated that their schools provided water purifiers or clean drinking water. However, an average number (57.9%) of students indicated that their schools provided water purifiers or clean drinking water. A majority (84.2%) of principals and a slight majority of teachers (66.6%) indicated that the source of water in the school was reliable. However, an average number (56.0%) of students indicated that the source of water in their school was reliable.

A slight majority (63.2%) of principals and a slight majority (66.7%) of teachers indicated that they had enough water storage. Similarly, an average number of students (60.5%) indicated they had enough water storage as indicated in Figure 4.14.

Figure 4.14: ***A Picture of Water Tanks***

An average number (57.9%) of principals and teachers (59.8%) indicated that the water in their school is regularly treated. In contrast, only a few (37.5%) of the students indicated that the water in their school is regularly treated.

A slight majority (63.2%) of principals and slight majority (61.2%) of teachers indicated that their school had clearly labeled water points where students could access drinking water from. In contrast, only a small proportion (47.4%) of the students indicated that their school had clearly labeled water points where students could access drinking water from. A slight majority (68.4%) of principals and slight majority (66.6%) of teachers indicated that they had enough water points. Similarly, a slight majority (61.2%) of students indicated they had enough water points.

The least proportion (10.5%) of principals and of teachers (29.2%) indicated that rainwater is harvested to complement other water sources. Similarly, the least proportion (32.2%) of students indicated that rainwater is harvested to compliment other water sources. This is illustrated by Figure 4.15.

Figure 4.15: ***A Picture of Water Tanks (water harvesting)***

Harvesting of water as shown in figure 4.14 and 4.15 supplements the water supply and this ensures the schools do not lack water to drink and clean the premises. This

ascertains that leaners remain healthy and attend, complete school and maintain discipline.

A slight majority (68.4%) of principals and a slight majority (65.3%) of teachers indicated that the school water was free from contamination. Similarly, an average number (55.9%) of students indicated that the school water was free from contamination. The least proportion (47.4%) of principals indicated that their water systems were free from vandalism. In contrast, a slight majority (69.4%) of teachers and a slight majority (63.1%) of students indicated that their water systems were free from vandalism.

The least proportion (26.3%) of principals, teachers (38.8%) and students (32.3%) indicated that they sometimes purchased water for use in the school. The least proportion (42.1%) of principals indicated that their students were educated on water safety. An average number (57.0%) of teachers and an average number of students (51.3%) indicated that students were educated on water safety.

Qualitative Results

Qualitative data were computed from both the questionnaires for teachers and the interview from the CQASOs.

CQASO 2 noted the following on access to safe and adequate water:

> Some schools do not have access to adequate and clean safe drinking water. Schools fetch water while others buy water and others have piped water. Some other schools have adequate drinking water; these are schools that have their own bore holes.

On challenges facing schools, in terms of provision of adequate and clean water, CQASO 2 noted the following:

> There are inadequate clean water supplies and a high cost of electricity such that those with boreholes find it difficult to pump the water. There is wastage of water by students. Lack of purification of the water is common in most

> schools over relied on NGOs to purify the water. During the rainy season, floods occur which affect learning premises and dormitories. Schools should have an adequate supply of clean water and have proper drainage systems. However, some schools still had challenges in this area. Also, access to safe and adequate water was a serious challenge as most schools do not have adequate safe drinking water. Some of the schools also had dry boreholes.

CQASO 1 reported that:

> Some of the schools relied on water provided by the County government though the supply was very unreliable since it was rationed. This forced schools to buy water from vendors and thus there was no guarantee of its safety and adequacy.

The CQASO 1 also noted that:

> Schools have been encouraged to harvest rainwater. The reports on causes of strikes in Nairobi schools have indicated that lack of clean adequate water is one of the causes of strikes in schools. In some schools in Kajiado, students fetched water, others bought water and others had piped water.

A teacher responded that, "If there has to be an improvement on education, then there is need to have clean water, sanitation and proper hygiene."

Most of the schools ensured that there was proper sanitation by placing wash points outside the classes as illustrated by Figure 4.16.

Figure 4.16: ***A Picture of Wash Points Outside the Classrooms***

Convergence of the findings

Data from both quantitative and qualitative data on the status of water was varied. As per quantitative data presented above, it was noted that most of the schools in Nairobi and Kajiado had water purifiers or clean drinking water, and that the source of water in the school was reliable. The schools also had enough water storage and the water in the schools was regularly treated. They also had clearly labeled water points where students could access drinking water from and had enough water points as illustrated in Figure 4.17.

Figure 4.17: ***A Picture of Water Points***

The wash points as shown in figures 4.16 and 4.17are appropriately located and therefore accessible to the learners. This will help learners wash hands and remain free from diseases that would interfere with learning.

Some of the schools indicated that rainwater was harvested to complement other water sources and they also noted that the school water was free from contamination. An average number of schools indicated that their water systems

were free from vandalism. Only a few schools indicated that they purchased water for use in the school and were educated on water safety.

The qualitative data contradicted the quantitative data in that whereas the school principals indicated that they had adequate water and water storage, the CQASOS on the other hand indicated that water adequacy and storage was a challenge in that most schools did not have enough water, enough storage and water was not adequately harvested. They also indicated that there was over reliance on other players like NGOs to purify the water.

The expectation of the Kenyan government is that all citizens including students should have access to adequate clean safe water (COK, 2010). The Safety Standards Manual for Schools MOE (2008) stipulates that learners should have access to clean and safe drinking water and that water to ensure cleanliness is also provided. The Kenya School Health Safety Policy of 2018 reiterates that a clean school environment should have adequate water supply, enough sanitation and suitable clean ways of promoting hygiene among the school community (MOE, 2018). The need to have clean water is to avoid contamination which leads to outbreak of diseases such as typhoid, cholera and dysentery (MOE, 2008).

As such, it is important for learners to have access to clean and safe water for drinking and for cleaning the premises. Serious illnesses among the learners could lead to absenteeism and poor learning outcomes. As such schools should also ensure that the rights of female students are catered for to cater for their needs during the menses (MOE, 2018). It is noted that as per the reports from the CQASOs the levels of adequate clean water have not yet been attained by the schools.

In agreement with reports from the CQASOs, inadequate access to water continues to be a serious problem at many South African schools as was reported by Jones (2021) that about 150,000 learners have no access to water in the schools. Many schools in developing and developed countries lack adequate water and sanitation services, with associated potential detrimental effects on health and school attendance (Jasper, 2012).

The CQASO reports agree with earlier findings which had found out that many schools had a high prevalence of diseases related to inadequate water supply, sanitization, and hygiene (particularly lack of handwashing), and where child malnutrition and other underlying health problems are common. Schools, particularly those in rural areas, often completely lack drinking-water, sanitation and hand washing facilities; alternatively, where such facilities do exist, they are often inadequate in both quality and quantity. A study carried out in rural Kazakhstan schools did not have other sources of water and a few students said they got water rarely and the water was unsafe due to bad odour, taste and colour (Balatova, Tussupova, Toleubekou, Berdiyev, Sharapatova and Sratstrom 2021)

4.4.2 Effects of Water Safety on Teaching and Learning

The researcher also sought to establish the effects of water safety on teaching and learning. The study focused on water adequacy and water safety.

The quantitative results on effects of water safety on teaching and learning is highlighted in Figure 4.18, all the principals (100.0%) and majority (81.9%) of teachers indicated that their schools provided water purifiers or clean drinking water. Similarly, a majority (76.3%) of students indicated that their schools provided water purifiers or clean drinking water.

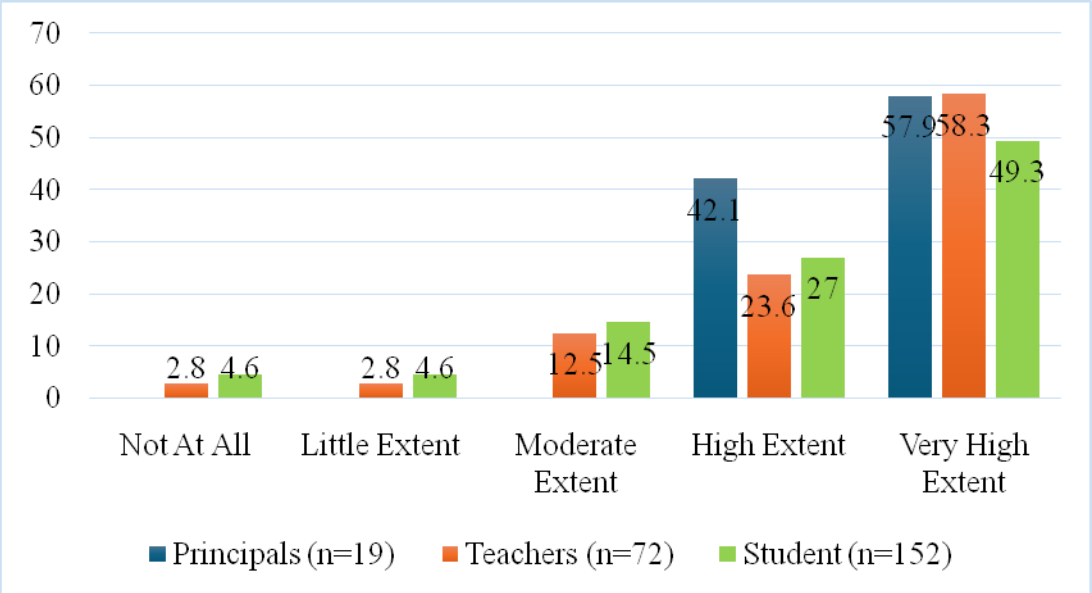

Figure 4.18: ***Extent to Which School Provide Water Purifier or Clean Drinking Water***

4.4.2.1 Qualitative Results

Qualitative Results

Qualitative results from CQASOs showed the following:

CQASO 1 reported that

> During the rainy seasons, floods occur which affects learning premises, kitchens and dormitories. Several schools had water challenges in relation to adequacy and safety. Flooding would affect the learning premises, and this would keep learners out of the learning areas and hence interfere with attendance. On the other hand, when students are engaged in fetching of water, this means that students will spend class time looking for water and, in the process, miss out on valuable learning time. Learners would take advantage and skip class with the excuse of fetching water. Consumption of unclean water could also lead to contamination and illness which can keep learners out of school, hence interfering with the teaching and learning processes resulting to absenteeism and lack of concentration due to pain. Learners were getting ill due to contaminated water, and this made them stay out of class as they sought treatment.

The merged results from the qualitative and quantitative data presented from this research showed that the safety of water has a greater impact on teaching and learning since it affects the learning premises and students' health that keeps

learners out of school. It was also reported that indeed learners were getting ill due to contaminated water, and this made them stay out of class as they sought treatment until they recovered. Sickness because of contamination resulted in poor concentration due to pain, hence, interfering with teaching and learning. Fetching water keeps students out of class hence interfering with learning and this can also lead to indiscipline among the learners who can take advantage of fetching water for mischief. This agrees with the finding by Itegi (2017) that junior girls were bullied by the senior girls while drawing water by jumping the queue and mocking the younger learners.

Most of the schools in Nairobi and Kajiado Counties had wash points across the school compound as illustrated by Figure 4.19.

Figure 4.19: ***A Picture of a Wash Point***

Availability of wash points helps in ensuring students clean their hands, but there is need to provide soap and smoothen the surroundings areas to avoid students tripping which can bring injuries and keep students out of class.

In summary, the purpose of Objective II was to establish the effects of safety of water on teaching and learning in public secondary schools in Nairobi and Kajiado Counties. The study established that safety of water has a positive impact on teaching and learning in that adequate safe water enabled learners to attend and remain in class. Clean and safe water ensures that learners consume clean water and hence avoid contamination and infections from water-borne diseases which can keep them out of learning activities. Also, fetching water led to wastage of valuable time for learning and opened an avenue for indiscipline amongst the learners. Water adequacy was also a challenge in the semi-arid Kajiado county where the schools completely relied on boreholes which could run dry, the seasonal rivers, the rainwater where it was harvested and buying from the vendors.

4.5 Effects of Food Safety Practices on Teaching and Learning

The third objective sought to establish the status of the following areas: Food Safety Practices and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties. The researcher collected information from the following respondents: CQASOs, principals, teachers and students. The two interviewed CQASOs represented Nairobi and Kajiado Counties. A total of nineteen (19) principals, seventy-two (72) teachers and a hundred and fifty-two students (152) participated in this study.

4.5.1 Status of Food Safety Practices

Quantitative Results

Quantitative results on status of food practices in sampled secondary schools in Nairobi and Kajiado Counties are shown on Table 4.11.

Table 4.11: Food Safety Practices

Status of food practices	Principals (n=19)					Teachers (n=72)					Student (n=152)				
	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE
Source	0	0	5.3	57.9	36.8	6.9	2.8	13.9	27.8	48.6	9.2	4.6	7.2	17.8	61.2
Storage	0	0	5.3	47.4	47.4	2.8	6.9	13.9	34.7	41.7	3.3	4.6	14.5	15.1	62.5
Preparation	0	0	10.5	47.4	42.1	4.2	6.9	18.1	30.6	40.3	4.6	7.9	10.5	19.7	57.2
Food	0	0	10.5	36.8	52.6	4.2	4.2	13.9	38.9	38.9	7.9	5.9	16.4	20.4	49.3
Serving	5.3	0	21.1	52.6	21.1	5.6	1.4	19.4	36.1	37.5	9.9	9.9	14.5	17.8	48.0
Kitchens cleaned	5.3	5.3	0	57.9	31.6	4.2	0	18.1	31.9	45.8	6.6	7.2	11.2	18.4	56.6
kitchens regulations	10.5	0	15.8	57.9	15.8	9.7	2.8	15.3	27.8	44.4	15.8	11.2	11.8	19.7	41.4
Vendors	5.3	0	5.3	5.3	84.2	4.2	1.4	8.3	20.8	65.3	15.1	2.6	11.2	6.6	64.5
Students trained	10.5	5.3	5.3	52.6	26.3	23.6	8.3	15.3	19.4	33.3	46.1	11.2	5.9	9.9	27.0
Cleaned Dining areas	5.3	0	5.3	63.2	26.3	5.6	1.4	13.9	30.6	48.6	27.6	7.2	10.5	17.8	36.8

KEY: NA-Not at All LE-Little Extent ME- Moderate Extent HE-High Extent VHE-Very High Extent

According to Table 4.9, a majority (94.7%) of the principals and teachers (76.4%) indicated that food was purchased from reliable and safe sources. Similarly, a majority (79.0%) of the students also indicated that food was purchased from reliable and safe sources. The majority (94.8%) of the principals and teachers (76.4%) indicated that food was stored in safe places. Similarly, a majority (77.6%) of the students indicated that food was stored in safe places as illustrated by Figure 4.20.

Figure 4.20: ***A Picture of a perishable food storage facility***

Ensuring perishable food is stored by itself will avoid contamination of the food and keep students healthy and attend to various learning activities.

The majority (89.5%) of the principals and teachers (70.9%) indicated that food was prepared in a safe place. Similarly, a majority (76.9%) of the students indicated that food was prepared from a safe place as illustrated in Figure 4.21.

Figure 4.21: ***A Picture of a serving area with food in the plates***

Safe food means students will not get any contamination which would hinder their participation in learning activities

The majority (89.4%) of the principals and teachers (77.8%) indicated that the food handlers' health and hygiene was ascertained. Similarly, a slight majority (69.7%) of the students indicated that the food handlers' health and hygiene were ascertained. The majority (73.7%) of the principals and teachers (73.6%) indicated that the food was served from a safe place. Similarly, a slight majority (65.8%) of the students indicated that the food was served in a safe place. The majority (89.5%) of the principals and teachers (77.7%) indicated that the school kitchen was regularly cleaned. Similarly, a majority (75.0%) of the students indicated that the school kitchen was regularly cleaned. Majority (73.7%) of the principals and teachers (72.2%) indicated that the school kitchen was in line with safety standards. Similarly, a slight majority (61.1%) of the students indicated that the school kitchen was in line with safety standards as shown by Figure 4.22.

Figure 4.22: ***A Picture of Wash Points Outside the Kitchen in a Kajiado school***

The provision of wash points help learners keep off germs and remain healthy to attend classes. However, the dusty surrounding could pose a health risk and this can cause breathing difficulties keeping learners out of school.

A majority (89.5%) of the principals and teachers (86.1%) indicated that food vendors were kept out of school. Similarly, a majority (71.1%) of the students indicated that food vendors were kept out of school. The majority (78.9%) of the principals and an average number (52.7%) of teachers indicated that the students were educated on how to handle food brought from home. On the contrary, the least proportion (36.9%) of the students indicated that they were educated on how to handle food brought from home. The majority (89.5%) of the principals and teachers (79.2%) indicated that the dining areas were regularly cleaned. Similarly, an average number (54.6%) of the students indicated that the dining areas were regularly cleaned as illustrated by Figure 4.23.

Figure 4.23: ***A Picture of a Well Cleaned dining hall***

Clean dining areas contribute to the well being of the learners hence enhancing teaching and learning.

Qualitative Results

Qualitative findings from the CQASO 2 noted the following:

> Most of the food is sourced from local markets and some are sourced directly from farmers. Some schools grew their own food. Also, the suppliers either took food to the schools or schools sent their school vans to collect the food. The schools that had interacted with CQASOs and public health officers stored their food in shelves and stacks which are off the ground. However, in some schools, food was stored in a mixed-up manner. Dry foods were bought once a term whereas vegetables were bought daily or twice a week. There were two types of stores; dry food stores and perishable stores; both of which were close to the kitchen. Most schools had stores but those which did not had improvised by utilizing other available rooms in the school.

A store for dry food is illustrated by Figure 4.24.

Figure 4.24: ***A Picture of a Dry Food Storage Facility***

This is an illustration of how to store food in the proper way to keep contamination away and retain students in class.

CQASO 1 noted the following:

> All the food handlers should have valid medical certificates of six months to one year. There had been issues relating to poor food handling that resulted in stomach upsets.

CQASO 2 reported that:

> All food handlers are usually examined after every six months, and it was the responsibility of the school principals to ensure that the food handlers get their medical examination certificate. Also, all the food handlers must wear aprons and caps. There should also be cluster meetings to sensitize school managers and support staff on food safety. Furthermore, there should be a whole school community approach to ensure food safety in schools.

It was noted that the principals had introduced motivation and reward systems to encourage adoption of Health and Safety practices on food safety practices. A principal indicated that:

> Health officers were invited to sensitize the students and teachers on food health and safety issues and invited health practitioners to come to schools to attend to both students and the school staff. The food-handlers underwent medical tests and were issued certificates. However, the food handlers did not have uniforms.

The researcher sought the views of the teachers, and a teacher indicated as follows:

> Resources for Health and Safety Guidelines on food handling are provided and awareness of the importance of maintaining health and safety measures is created by putting up more posters about health and safety guidelines.
>
> Another teacher said that:
>
> Health topics on food safety are discussed during life skills and class lessons. We have also established health and safety clubs which discuss better food handling procedures. The school administration ensured that there is clean water, sanitation and proper hygiene in the dining areas.

The researcher noted that there were food storage facilities where food was stored as per the guidelines illustrated in Figures 4.25.

Figure 4.25: ***A Picture of a Dry Food Storage Facility***

Proper storage of food will ensure the food is not contaminated and students remain healthy and attend, complete school and maintain discipline.

The researcher also observed that whereas the boarding schools had dining halls, most of the day schools only had kitchens and no dining areas and hence the learners ate from outside posing threats to food safety.

The quantitative data presented above established that most of the schools in Nairobi and Kajiado Counties had purchased food from reliable and safe sources. Also, food was stored in safe places and was prepared from safe places. It was also noted that food handlers' health and hygiene was ascertained. The school kitchen was regularly cleaned, and food was prepared and served from safe places. Also, the school kitchen was in line with safety standards and food vendors were kept out of school. The students were also educated on how to handle food brought from home.

The Ministry of Education has laid down guidelines on issues of food safety and states that all learners should enjoy safe and wholesome food for their bodily and intellectual development. Provision of safe food to learners ascertains good health which results to effective learning. Every school is therefore expected to ensure food is fresh and safe for consumption and is well stored. Food preparation areas should always be clean and all food providers (be they vendors or staff) should have relevant medical certificates. Those serving food must observe basic hygiene standards such as washing hands and keeping their bodies clean as well.

There should be no illegal hawking of food in schools and any food brought by outsiders must be inspected on a regular basis (MOE, 2008). Although the expectation from the ministry of education is that school meals are safe from contamination. This, however, is not always the case as at times food gets contaminated and learners get food poisoning and other ailments that keep them off

school and others cannot concentrate well due to pain as result of illnesses. The schools had tried to comply with the set guidelines.

4.5.2 Food Safety Practices Effects on Teaching and Learning

The researcher also sought to establish the effects of food safety practices on teaching and learning and this is illustrated in Figure 4.26.

Figure 4.26 illustrates the quantitative findings on how food safety practices affect teaching and learning.

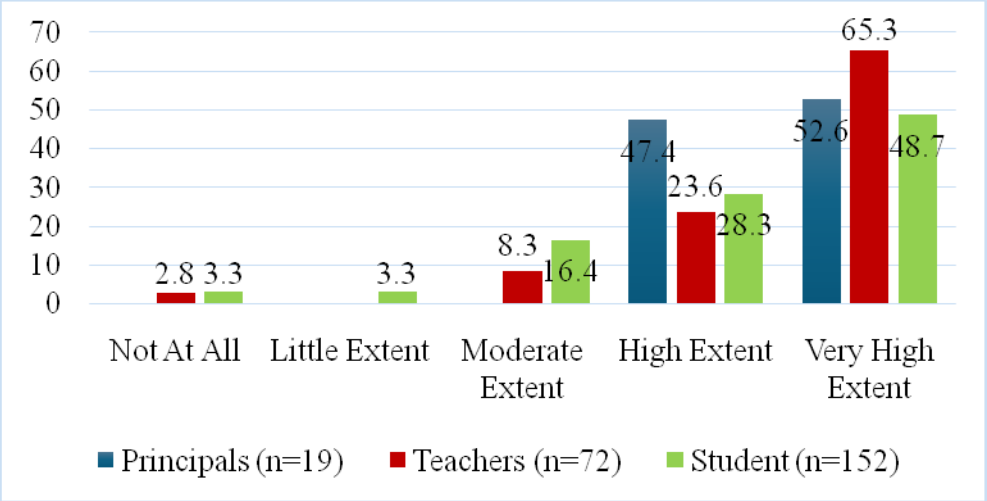

Figure 4.26: ***Food Safety and Teaching and Learning***

Quantitative Results

According to Figure 4.26 all the principals (100.0%) and majority (88.9%) of teachers indicated that provision of safe food helps to keep learners in school. Similarly, a majority (77.0%) of students indicated that provision of safe food helps to keep learners in school.

Qualitative Results

Qualitative data from the CQASOs indicated the following:

CQASO 2 reported that:

> There have been reports of paraffin or kerosene mixed with the food. Three schools have reported cases of food poisoning. However, to ensure food safety, the food served to students was also served to teachers and the teachers on duty checked on the food before it was served. We visit the schools regularly to check on the diet and hygiene of the premises.

CQASO 1 reported that:

> There were times when food contamination led to infections with stomach aches and diarrhea which kept learners out of class and thus interfering with teaching and learning. Any food challenges could easily lead to riots in school and hence interfering with school discipline.

CQASO 2 also indicated that, "Some foods were not stored properly whereby the perishable and non-perishable food were stored in a haphazard manner."

This assertion by the CQASOs is illustrated by Figure 4.27.

Figure 4.27: ***A Picture of a Mixed Storage Facility***

This photo shows dry food mixed with perishable goods. This can lead to contamination and students getting sick and not attending to class activities as intended.

Convergent of the findings

As per the qualitative and quantitative data presented above, it was thus established from this research that the food safety practices have a greater impact on teaching and learning since any food safety challenge could lead to contamination and illness which keep children out of school and keep off the children from participating in various learning activities. It was established that cases of food poisoning were reported, and learners got sick and kept off classes. Others could not easily concentrate when unwell due to stomach aches. Unsafe food could also lead to indiscipline with students rioting and causing mayhem in school. This is similar to a study that was conducted in Korea to investigate food safety management practices at children's facilities such as childcare centers, kindergartens and community child centers. This study established that food safety in community childcare centers was lower than childcare centers and that of kindergartens and that the public facilities performed better than the private facilities. The area that performed poorly was washing of fruits and vegetables at 26.5%. The results also indicated that safety of food improved with visits by education officials

In agreement with this study, assessments by quality assurance officers ensured safety. Just like this study which has indicated that teachers created awareness among the learners on proper food handling, research carried out amongst primary school learners in west part of China on nutrition and food safety concluded that when learners are educated on nutrition and food safety, there was improvement on knowledge and behaviour of the students (Shen, Hu, Zhenqiu- Sun, 2015). A study conducted in Indiana, USA on how observation of food safety curricula impacts on high school student's behaviour change noted that high school students did not have

adequate knowledge on safe food handling skills. The study indicated that students' behaviour on handling food did not meet the standards and hence there was still a gap on how students were handling different foods with less hand washing and using gloves which could result in contamination and hence spread of diseases which could keep students out of school (Barrett & Feng, 2020). This study also established the need to ensure proper food handling in schools.

Whereas this study did not entirely establish the level of training on food safety amongst the learners, Suk-Hee and Kyung-Heen (2016) carried out a study on the awareness of high school students on food and hygiene safety in the Chungnam area South Korea and established that, students from different types of schools had different views on food hygiene safety. The study found out that academic high school students attached more importance to food hygiene and safety than students from specialized schools. All the students, however, agreed that training on food safety was essential. This study, however, did not compare different schools' views on food safety.

In agreement with this study that noted that some schools especially day schools did not have dining halls, a study to investigate the level of food safety and sanitation knowledge, attitude and practice amongst students from two universities in Kenya established that due to lack of enough catering facilities in Kenyan universities, students prepared their food in inappropriate environments such as their hostel rooms. Although most students were aware of the need for food safety and had a positive attitude, 74% of the students still engaged themselves in inadequate food safety practices due to lack of appropriate apparatus. The students also raised the issue of food being provided by vendors being a health risk. The study also found out that students were not keen on

hand washing and some smoked during food preparation. The study recommended that universities should introduce food safety courses and provide students with suitable cooking and food handling amenities (Serrem et al., 2021).

In line with this study that established that food should be free from contamination, (Ucar Yilmaz,Cakiroglu. 2016). (2016) in an article on food safety noted that problems and solutions highlighted that food should be properly cleaned and should not be left in the open with room temperature for a long time. This will prevent contamination which can cause illnesses to those who consume the food. It is therefore prudent to take necessary measures to avoid contamination in all the stages of the food chain; from the garden to consumption (Ucar et al. 2016).

Wandolo (2016) carried out a study comparing the level of awareness on food safety and hygiene practices between Technical Industrial Vocational and Entrepreneurship Training (TIVET) and universities offering hospitality courses. The study also aimed to establish how the institutions implemented the Hazard Analysis and Critical Control Point (HACCP) to ensure food safety and to determine the bacterial level of vegetables served in the institutions. The study noted that the institutions were not adequately equipped, and the HACCP guidelines were not properly implemented. Lack of resources therefore, posed a threat to food safety and hygiene practices and the presence of E. coli, Salmonella and Pseudomonas confirmed lack of food safety. This study, however, established that schools were aware and alert of the need for food safety and tried to keep food free from contamination.

Unlike this study which has established that the school principals were concerned with the safety of the food served in the schools, a study to establish how food vendors

stored cooked food and to determine their personal hygiene levels in public secondary schools in Oshimili South LGA in Nigeria, established that the food vendors' hygiene was below expectation. It was also found out that the school administration was not bothered with whether the vendors were clean or not, but they were more concerned with the monies collected from the vendors. The study therefore recommended that school management should ensure that the food vendors are well trained on food handling and that teachers should monitor the vendors when food was being served and that the government should send health officers to ascertain that food was hygienically handled (Odikpo, Onyia, Ijeoma, Ilhundiebube-splendor, Uchechukwu. 2019). This study however established that food vendors were not supposed to provide food to the learners instead most schools prepared the meals.

This study established that school principals and teachers encouraged students to keep good hygiene and wash their hands before eating. However, Naumah, Arthur, Jecty. Asare. (2020) in a study on how to bring remedies on the bad effects of poor hygiene in schools in Assin North municipality, Ghana, established that learner related poor environments to food contamination. However, despite knowing that students could still go to eat in rubbish dumps, they did not wash their hands. They also reported to eating fruits without washing them. Such behaviour could lead to contamination and disease spread keeping students out of school. This study recommended that teachers and stakeholders should ensure clean environments to maintain food hygiene. In agreement of the findings of this research that clean dining areas influence teaching and learning, a study conducted in Ghana had established that improvement in dining hall facilities stimulated students to be more

regular and participate in learning. It also showed that students were happy and contented in the neat dining areas (Ocansey, 2016).

In agreement with this study which showed that food used to be contaminated resulting to food poisoning among the learners, a study to investigate the type of food hazards, frequency of occurrence and how foodborne diseases affected students in senior secondary schools in Ghana, established that 52% of students who ate school food got food-borne infections. The study also showed that students were affected in that, when they were unwell, they spent more than five days out of school (Ababio et al., 2016).

In agreement with this study that poor storage can bring about food contamination, a study to investigate the cause of food contamination resulting in foodborne disease among learners in Ga East, Ghana concluded that poor storage of meat had brought about the contamination. It was evident that students got infected by eating contaminated food from the school (Malm et al., 2015).

The status of food safety practices in the schools in Nairobi and Kajiado is illustrated by the Figures 4.28 and 4.29.

Figure 4.28: ***A Picture of a Kitchen Table and Boiler in one of the schools***

Figure 4.29: ***A Picture of a Food Storage Facility in one of the schools***

Clean kitchens and properly organized stores will ensure food safety and students remaining healthy and attending classes and taking part in all learning activities.

4.6 Effects of Waste Management on Teaching and Learning

The fourth objective sought to establish the status of solid and liquid waste management practices and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties. The researcher collected information from the following respondents: CQASOs, principals, teachers and students. The two interviewed CQASOs represented Nairobi and Kajiado Counties. A total of nineteen (19) principals, seventy-two (72) teachers and a hundred and fifty-two students (152) participated in the study.

4.6.1 Status of Waste Management

The quantitative results as shown in Table 4.12 show the status of waste management in sampled secondary schools in Nairobi and Kajiado Counties.

Table 4.12: Status of Waste Management

Status	Principals (n=19)					Teachers (n=72)					Student (n=152)				
	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE	NA	LE	ME	HE	VHE
Dustbins	0	0	21.1	52.6	26.3	4.2	9.7	19.4	23.6	43.1	11.8	15.8	9.9	21.1	41.4
disposal of waste	0	5.3	10.5	57.9	26.3	5.6	6.9	15.3	23.6	48.6	13.2	11.8	10.5	15.1	49.3
Disposal sites	0	0	5.3	47.4	47.4	1.4	4.2	11.1	31.9	51.4	11.2	3.9	7.9	19.7	57.2
Policy Guidelines	0	5.3	31.6	47.4	15.8	5.6	11.1	16.7	27.8	38.9	19.7	7.9	15.8	13.2	43.4
Time allocated	5.3	10.5	10.5	52.6	21.1	26.4	13.9	11.1	18.1	30.6	39.5	4.6	6.6	10.5	38.8
collective responsibility	0	0	15.8	52.6	31.6	4.2	11.1	6.9	30.6	47.2	8.6	3.9	13.8	15.1	58.6

KEY: NA-Not at All LE-Little Extent ME- Moderate Extent HE-High Extent VHE-Very High Extent

According to Table 4.10, a majority (78.9%) of the principals and slight majority (66.7%) of teachers indicated that there were sufficient dustbins in the school. Similarly, a slight majority (62.5%) of students indicated that there were sufficient dustbins in the school. A majority (84.2%) of the principals and teachers (72.2%) indicated that there was regular disposal of waste (which is done once a week). Similarly, a slight majority (64.4%) of the principals indicated that there was regular disposal of waste (which is done once a week). A majority (94.8%) of the principals and teachers (83.3%) indicated that there were designated areas for waste disposal. Similarly, a majority (73.9%) of students indicated that there were designated areas for waste disposal as per Figure 4.30.

Figure 4.30: ***A Dustbin Tin***

Whereas the provision of dustbins is good, the waste should be collected to avoid bad odours which can cause breathing problems and keep students fro participating in learning activities.

A slight majority (63.2%) of the principals and teachers (66.7%) indicated that there were clear policy guidelines on waste management in the school. Similarly, an average number (56.6%) of students indicated that there were clear policy guidelines on waste management in the school. A majority (73.7%) of the principals indicated that the weekends were meant for general cleaning and waste disposal. On the contrary, the least proportion (48.7%) of teachers and students (49.3%) indicated that the weekends were meant for general cleaning and waste disposal. A majority (84.2%) of the principals and teachers (77.8%) indicated that waste management in the school was a collective responsibility by students and staff. Similarly, a majority (73.7%) of the students indicated that waste management in the school was a collective responsibility by students and staff.

Qualitative results whereby the researcher sought to inquire from the two CQASOs on matters to do with waste management, CQASO 2 indicated that.

> There was no purposeful training on waste management that had been done in schools. Waste management had not been given proper attention and walking around the schools, it was imminent that there was danger due to poor waste management.

CQASO 1 reported that,

> In slum areas, there was poor waste management as evident by open sewers.

CQASO 2 reported that,

> It was evident that there was reckless defecation by students in open areas in some schools. It was evident that various schools improvised on waste management by burning and using incinerators while others dug pits.

CQASO 1 reported that

> Some schools, especially in Nairobi contracted garbage collection companies to handle their waste.

The CQASO 2 also noted that:

> The soils were dry, especially in Kajiado and thus liquid waste sipped to the ground; implying that there was no waste management system and hence they allowed liquids to sip or dry. This was because there were no sewer lines in the rural areas and hence liquid waste management becomes a challenge. There was also the challenge of liquid waste management, bad smell and mosquito breeding in some of the schools. Also, the smoke coming from the burning of waste posed a health hazard to the learners and teachers.

The CQASO 2 further noted that:

> Schools were supposed to reuse, recycle and dispose of sanitary towels through incinerators. Also, every school was supposed to manage its waste rather than contracting garbage collection companies. Schools should also disinfect waste and also burn their dry waste. But this was not always the case. The burning of waste interferes with students' health due to the smoke which triggers breathing problems.

On waste management, the teachers noted the following:

A teacher reported that,

> Waste was recycled and disposed of in the right place and the number of dustbins had been increased so as to maintain hygiene in the school.

> Another teacher also said that,

> The school also allocates a place far away from classes for waste disposal and improves sanitation areas.

The above assertions by the teachers on the availability of waste disposal mechanisms are illustrated in Table 4.31.

Figure 4.31: ***An Open Pit***

An open pit would attract disease carrying vermin as well as odours that would make students ill and interfere with teaching and learning.

Convergence of the Findings

The merged results show a variation between the quantitative and qualitative data. As per the quantitative data presented, it was established that most of the schools in Nairobi and Kajiado Counties had sufficient dustbins in their respective schools. They also had regular disposal of waste and had designated areas for waste disposal. On average, the schools also had clear policy guidelines on waste management. However, only a few schools had designated weekends meant for general cleaning and waste disposal. It was also evident that in most schools, waste management was a collective responsibility by staff and students.

On the other hand, the qualitative data brings out a different picture whereby waste management is a challenge in schools. The schools were supposed to recycle and reuse waste, but this was not the case. Schools also lacked proper waste management

for both liquid and solid waste and this posed a health safety challenge to the learners due to waste being left to dry or sip to the ground. The collection of solid waste once a week was also not adequate as this could lead to accumulation of waste resulting in bad odors and this would attract insects and vermin and hence posing a health hazard to the learners.

According to the Safety Standards Manual for Schools (2008) each school should develop rules and regulations to manage waste. This is because disposing liquid and solid waste in a poor manner could lead to poor hygiene and the spread of diseases. An orderly segregation of waste should be done where the schools would separate the waste into various categories. For example, there should be a site for kitchen waste and waste from the school compound as well as segregation of biodegradable and non-biodegradable. Also, the schools should make provisions for proper methods of destruction. Thus, in order to ensure proper disposal of waste, the following measures should be implemented: The waste disposal sites should be located in isolated places within the school compound away from any site where learners are active such as the classrooms, playgrounds, toilets, water points and gates. and that all the waste disposal areas should be fenced off and should be restricted to authorized persons only.

The waste should be burned or buried in deep protected pits. Waste buckets should be provided in the classrooms, libraries, laboratories and all learning areas and provisions for segregation should be provided. To decrease littering, litter cans should be provided within the school compound. The school administration should train the learners on appropriate waste management methods and instill the culture of proper waste disposal to the whole school community. From the findings some

schools had complied with some regulations. However, the CQASOs reported that waste management was a challenge despite the presence of the guidelines.

4.6.2 Waste Management and Teaching and Learning

The researcher also sought to find out how waste management affects teaching and learning.

Quantitative Results

Quantitative findings on the effect of waste management on teaching and learning are illustrated in Figure 4.32.

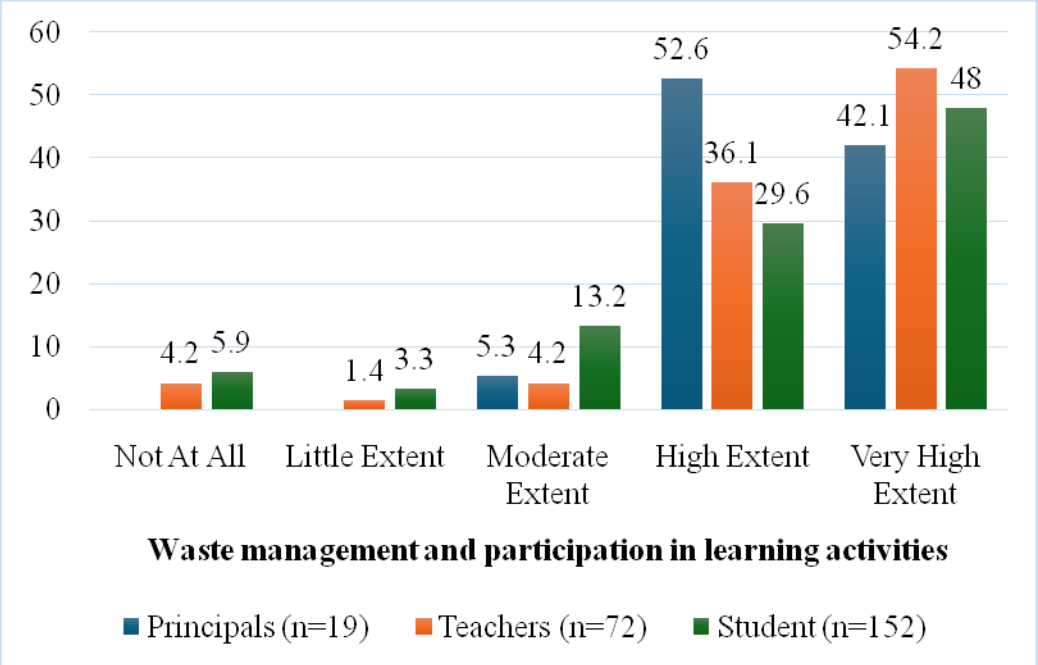

Figure 4.32: ***Waste Management and Teaching and Learning***

As evidenced by Figure 4.33, a majority (94.7%) of the principals and teachers (90.3%) indicated that proper waste management practices enabled students to fully participate in learning activities. Similarly, a majority (77.6%) of students indicated that proper waste management practices enabled students to fully participate in learning activities.

4.6.2.1 Qualitative Results

The qualitative findings from the CQASOs were as follows:

CQASO 2 said that,

> Where health and safety were taken care of, learners were more focused and learned better and were able to concentrate in their studies. Poor waste management, especially the burning of trash, led to learners having breathing difficulties which keeps the learners out of school.

CQASO 1 also stated that,

> Poor liquid management, especially in the kitchens, leads to food contamination and learners keep off classes due to illness and it affects their concentration as a result of pain. Also,

CQASO 2 also indicated that

> Proper waste management increases the levels of health and safety and decreases contamination amongst the learners and thus enabling them to remain in class and carry out their learning activities unperturbed. Clean environments would be devoid of smells and insect infestation which in turn offers a conducive environment for teaching and learning.

Convergence of the findings

The qualitative and quantitative data established that waste management practices have a greater impact on teaching and learning since unsealed sewers, open pits and could lead to contamination and illness which keep children out of school and keep off the children from participating in various learning activities. It also interferes with concentration of learners in class work due to pain because of illness. Bad odour from uncollected waste also leads to breathing difficulties for learners and the waste also attracts insects and vermin that can spread disease amongst the learners.

This study agrees with a study conducted at Candon national high school in the Philippines on the practice of solid waste management which concluded that schools were using the correct way of waste management. The study also concluded that

students should be given more training on waste management (Acena, Alcantara, Bituin, Jaramilla, Mecos, Nanagayan, Zanchez. 2017).

A study to establish the level of student's awareness on waste management amongst senior high school students in the Philippines found out that students well understood issues of solid waste and the benefits of managing the waste. However, the study showed that students did not have a good knowledge of laws governing solid waste management. Nevertheless, the study indicated the students had good waste management practices (Molina & Catan, 2021). This agrees with this study which indicated that students were aware of waste management guidelines.

In agreement with this study which indicated that poor waste management could lead to infections, a study conducted in Jakarta, Indonesia established that exposure of students to heavy metals emitted from e-waste recycling plants near schools, led to students having higher levels of manganese, lead and mercury in their hair. The study found out that exposure to manganese had an impact on students' attention, decision making and academic performance (Soetrisno & Delgado-Saborit, 2020).

Unlike this study, which established that poor waste management could affect teaching and learning by students getting in and staying out of learning activities, results of a study to establish the relationship between environmental consumption, waste recycling with academic performance found out that there was a low relationship between environmental consumption, waste recycling and academic performance. The study also indicated that students had good knowledge of caring for the environment and waste management despite COVID 19 challenges (Asio, 2021).

Unlike this study which established that student had a good knowledge of waste management guidelines, a study on waste management in public schools in Bucharest, Romania, found out that students lacked knowledge on matters waste management, and this meant that educational institutions were not able to come up with sustainable waste management systems (Ioja, Loan, Onose, ANDreea, Raluca, Serbian, Catalina 2012). A study on sanitation and education India, Adukia (2016) indicated that students used the area behind the restroom, behind a signpost, behind trees or buildings as restrooms. This agrees with the qualitative findings that some schools had open defecation which could lead to contamination of water and hence resulting in the infection of learners thus keeping them out of school.

A study conducted by Wambeye et al., (2022) to examine how schools manage waste in Bungoma County in Kenya, reported that dust bins were barely provided in schools. It also showed that there was poor management of sanitary towels where towels were thrown carelessly and thus exposed learners to foul smell and infections. Water systems were also clogged due to mishandling of the sanitary towels. On the issue of waste disposal, 84% of the schools showed that most of their waste was burned and the smoke emitted from the burning waste resulted in illnesses such as skin, eye infections as well as respiratory and cardiovascular infections. Although the current study was not specifically looking at sanitary towels, there was an agreement that foul smell and smoke from burning waste could cause a health hazard leading to infections.

A study by Wambeye et al., (2022) also established that 5% of schools buried their waste and thus caused dangers of gases escaping from the soil causing harm to the learners. Unlike this study which has indicated that poor waste management can

affect teaching and learning, the study by Wambeye et al., (2022) did not however show any relationship between waste management and students' participation in education. The study also indicated that 13% of students from mixed schools reported having stagnant water in their schools. This agrees with the qualitative results of this study which indicated that liquid waste was left on the surface to run-off and dry.

In agreement with this study, which indicated that the members of the school community were satisfied with how waste was managed, Uwamwezi (2018) in a study on knowledge, attitudes and practices on waste management in selected secondary schools in Westlands Division, Nairobi County, Kenya, established that schools used different waste disposal methods. He found out that 27.3% were burning, 22.7% incineration, 15.9% use of dustbins, 15.9% use of dump pits, 6.8% use of municipal buckets, 6.8% recycling and 2.3% use of landfill sites. The study also indicated that some schools (72%) used private services whereas 18.2% relied on the County government to collect the garbage. It was also reported that majority of the respondents (72.8%) were happy with the way waste was handled.

The status of waste management in the schools in Nairobi and Kajiado Counties is illustrated by Figures 4.33.

Figure 4.33: ***A Plastic Dustbin***

The provision of covered dustbins would ensure the waste does not emit odours and attract vermin that could lead to spread of diseases which can interfere with teaching and learning.

4.7 Interpretation of the Findings

From the findings, it was noted that the level of cleanliness in school premises was generally good. This meant that the school community appreciated that cleanliness was important in enhancing teaching and learning. From the quantitative and qualitative results, it was clear that the issue of ventilation and adequate lighting was adhered to as a way of ensuring teaching and learning took place. The fact that the respondents indicated that schools had signage to properly guide the learners to safety and that there were rules and regulations on laboratory safety, was also an indication of awareness on health safety.

On the issue of compliance to health safety regulations, it was however, noted that a good number of teachers did not have copies of the health safety policy guidelines. This meant that although the Ministry of Education develops policy guidelines, they

are not properly disseminated to the users. This is a big gap which should be given attention for proper implementation of the guidelines. Despite this loophole, schools had tried to ensure health and safety in schools was maintained and they were guided by the Child Friendly Manual.

From the findings, it was noted that there was lack of training of the principals and teachers on heath safety matters. There was also over reliance on other players in the training and the Ministry of Education was not taking a lead despite the challenges related to unsafe health practices. These loopholes could have contributed to poor construction of school buildings leading to collapse of buildings and causing unhealthy living situations. Properly constructed clean premises would ensure that learners remain in class and thus decrease cases of indiscipline, therefore enhancing teaching and learning.

The findings also established that adequate clean water was still an issue in most schools. Lack of adequate clean water brought about water contamination leading to waterborne illnesses amongst the learners hence interfering with teaching and learning. Schools should therefore take the issue of water harvesting, treatment and appropriate water use seriously.

Contaminated food was shown as an occurrence in the schools. This indeed did interfere with teaching and learning and therefore the need for schools to adhere to safety regulations on food handling from the stores to the table. Proper food handling would ensure learners remain healthy and hence participate in learning activities.

The issue of waste management as reported from the qualitative data indicated that waste was managed in a haphazard manner. There was open sewer, no proper management of both solid and liquid waste which could lead to contamination and disease. Well managed waste ensured lack of contamination amongst the learners enabling them to remain in class to carry out learning activities.

The findings of this study bring out the need for heath safety in schools to be taken seriously as health safety enables teaching and learning take place and the learners remain healthy.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary, conclusions of the research and also offers the recommendations concerning the status of health safety and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

5.2 Summary

This study sought to establish the effects of health safety on teaching and learning in public secondary schools in Nairobi and Kajiado Counties. This study was influenced by the health safety challenges in schools, resulting in collapsing of schools, learners getting ill due to food poisoning and water contamination as well as poor waste management. This resulted to some schools in Nairobi and Kajiado Counties being closed due to unsafe health situations. The following study objectives sought to establish:

a) The status of school buildings and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.
b) The provision of safe water and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.
c) The status of food safety practices and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.
d) The status of waste management practices and its effects on teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

The research used the mixed method approach and applied the parallel convergent design.

5.2.1 The status of school buildings and its effects on teaching and learning

Objective one sought to establish the status of school buildings in regard to cleanliness, ventilation, safety and lighting and its effect on teaching and learning. In this objective, the principals, teachers and students agreed that their classrooms, laboratories, libraries and dining areas, were clean. These premises had adequate ventilation and lighting. Despite the affirmation of cleanliness, it was however, noted that the cleanliness and adequacy of toilets was a challenge. Inadequate toilets meant learners would spend more time waiting to use the facilities and this would make them miss some vital learning time. It was reported that clean school buildings with proper lighting and ventilation allowed students attend classes, read more, participate in practical lessons and maintained discipline while in school.

Most of the respondents indicated that there were no dangerous places or items such as open manholes, loose electric wires and potholes in the school compound which could hurt the learners. They also indicated that there was no stagnant water, and the grass was kept short hence insects and vectors had no room to infest.

Although there were rules and regulations on construction of school buildings, these rules were not always kept which led to accidents with collapse of the buildings which led to injury and sometimes death of the learners. Such instances would interfere with learning activities keeping learners out of class.

Although there was a great effort to ensure health safety, it was however noted that teachers did not have copies of the Kenya Schools Health Policy. They could also not give the reason of not having the document. It was also noted that the training on health safety was not adequately provided by the ministry in charge of education. Principals and teachers relied on Child Friendly Schools manual and NGOs and

other organs to provide the training. This therefore calls for the Ministry of Education to ensure schools get copies of the health safety policy guidelines and to organize trainings for the principals and teachers. This will ensure proper implementation of the policy and assure health safety in the schools.

Principals and teachers agreed that there were health safety programmes and that students were involved in designing them. It was also reported that some students used to get sick but lacked proper medical care in the schools. In some cases, the students felt school nurses treated their cases lightly. Lack of correct diagnosing and delay in the treatment could lead to learners getting seriously sick keeping them from class for longer periods.

A positive contribution by the government on students' health was the insurance cover for the students. This is highly commendable, and students should be well educated about the cover. The issue of mental or psychological issue came up as a serious emerging issue and should be appropriately addressed.

5.2.2 The provision of quality water and its effects on teaching and learning

It was noted that most schools had challenges in the provision of safe drinking water especially those schools in semi-arid areas. Schools relied on water supplied by the County governments and others bought water from vendors. This posed a health hazard without the guarantee of the water source. Some students also fetched water from the available water sources, and this meant students wasted time while looking for the water and lessons were lost. Cases of indiscipline could arise when students went to fetch water. Schools also lacked adequate water storage facilities which led to water shortage. Inadequate water purification could lead to contamination and spread of diseases. Harvesting of water was also not to the optimum and the safety

of water was not guaranteed. Indeed, it was reported that one of the causes of school strikes is lack of adequate clean water in schools.

Although there was evidence of inadequate water supply, it was acknowledged that there was some level of purification of water, but it was not enough. The majority of the respondents also indicated that there were clearly labeled water-points where students could access drinking water, however, the water points for use by students were not enough.

Lack of adequate clean water meant contamination which could lead to illnesses and students staying out of class and hence, missing lessons. Students also miss lessons when they go to fetch water and so this interferes with teachings and learning activities. During rainy seasons some schools were affected by floods which led to destruction of teaching and learning premises and hence interfering with teaching and learning activities.

5.2.3 The status of food safety practices and its effects on teaching and learning

Most principals, teachers and students indicated that their food was purchased from reliable and safe sources and stored in safe places. Most of them also said that their food was prepared from safe places. A majority also indicated that the food handlers' health and hygiene was carefully ascertained by ensuring they got health certificates regularly and that food was served from safe places. The majority also indicated that the school kitchens were regularly cleaned and in line with safety standards. It is also worth noting that most of the respondents also indicated that food vendors were kept out of school and that the students were educated on how to

handle food brought from home. Also, the majority noted that the dining areas were regularly cleaned.

Food was properly stored in separate stores of perishable and non-perishable food. However, a few schools mixed the food which could lead to contamination and outbreak of disease. Some schools did not have designated food stores but improvised with available rooms. There was general cleanliness in the kitchens and dining areas however, it was noted that most day schools did not have dining halls and students were served from outside and ate from outside. This posed a health risk as food could easily be contaminated during transfer from the kitchen to the outside and also during serving. Most food was bought from the local markets and was delivered by suppliers or collected by the schools. The research also noted that some schools had reported cases of food poisoning, and it was alleged by some students that food had kerosene. This posed a health threat to the learners and thus affecting teaching and learning as the sick learners stayed away from the classrooms and others could not concentrate in class due to pain. Unsafe food could also lead to unruly behaviour and evens strikes.

It was reported that provision of safe food helps to keep learners in school. Safe food practices help ensure food is not contaminated and hence no food poisoning amongst the learners occurs. This ensures that students are in school and participate in various learning activities.

5.2.4 The status of waste management practices and its effects on teaching and learning

Most principals, teachers and students indicated that there were sufficient dustbins in their schools and that there was a regular system of waste disposal (which is done once a week). Most of the respondents also indicated that there were designated areas for waste disposal and that there were clear policy guidelines on waste management in their schools. A good majority of principals and a slight majority of the teachers and students reported that there were sufficient dust beans. A majority of the respondents also indicated that weekends were meant for general cleaning and waste disposal and that waste management in the school was a collective responsibility by students and staff.

According to the CQASOs however, there was no purposeful waste management practices and there was hardly any training on waste management. Due to lack of a sewer system especially in rural setups and the slum areas there was open sewer and schools had to prepare their own septic tanks. Hence liquid waste was poorly managed, and most was left to flow and sip on the ground and to evaporate. In some areas there was open defecation, and the waste was also left to dry. Schools burnt solid waste in pits or incinerators for those that could afford. Some schools also contracted garbage collection companies to manage their waste. Liquid waste was a challenge because lack of proper management led to breeding of mosquitoes and other disease-causing vectors.

It is noted that there was a discrepancy between the qualitative data and quantitative data as far as waste management was concerned. There was also a discrepancy on general cleaning data between the principals, the teachers and the students.

Proper waste management increased levels of health and safety and decreased contamination amongst learners enabling them to remain in class and concentrate in learning activities. Proper waste management practices would also assist in countering climate change.

It is noted that due to inadequate funding, schools were not able to construct school premises as required and the provision of water and food was also a challenge. Proper waste management requires financial resources and due to inadequate and late release of funds to the schools, schools could not manage waste appropriately.

5.3 Conclusions

Based on the findings of the study, the following conclusions were made:

1. The safety of school buildings influenced teaching and learning in public secondary schools as it enabled students to attend and remain in school. Clean safe libraries enabled learners to read more, and safe clean laboratories enabled learners to fully participate in practical lessons, Clean safe premises encouraged maintenance of school discipline since there is no cause of truancy. It is important that classrooms, libraries, and laboratories are kept clean and safe for use by the learners.
2. The health and safety status of other school infrastructure like dining areas and kitchens were found to be equally important in ensuring teaching and learning takes place. Clean dining areas and kitchens ensured that there was no contamination which could result in illnesses which in turn keep students out of class. Sick learners could also not have adequate concentration due to pain in case of sickness. Food poisoning was reported to be an issue in the schools and therefore, food handling and storing of food should be done with utmost care to

avoid food contamination. Safe food would ensure school discipline since any fears of contaminated food could most likely lead to riots in the school.

3. The provision of clean, adequate and safe water is of great importance for effective teaching and learning. Water is used for drinking, cooking, cleaning premises and in the laboratories. Lack of adequate water will affect the cleanliness of the school premises; unsafe water will contaminate the food, and students may not carry out practical lessons and all this will affect the teaching and learning. The safety of water from vandalism is also crucial to avoid water poisoning which could in turn affect the learner's health and the teaching and learning process is affected. It was concluded that water is still a major challenge in schools therefore, schools should harvest rainwater and avoid misuse of water. Due to presence of water borne ailments such as cholera, amoebiasis and typhoid which mostly affect learners, schools should treat all water consumed in the school. Adequate clean water enables learners to be safe from waterborne illnesses and can therefore attend class and encourages discipline since students do not have a chance of mischief when they go to fetch water outside the school compound.
4. Appropriate sanitation facilities like hand washing and toilets facilities are necessary. This will prevent the spread of communicable diseases that keep learners out of school. With adequate hand washing facilities, the learners are assured of hygiene which will keep them safe from contamination. In the process they concentrate better on learning activities and they are mostly in class. Adequate toilets enable learners to keep time and avoid missing classes by using the toilets during designated times. With toilets appropriately located especially in mixed schools, girls can use the facilities without being traumatized and in the

process improve their participation in learning activities. Schools should therefore have adequate and clean toilets to prevent the spread of communicable diseases such as diarrhea, typhoid, intestinal parasite infections, trachoma and schistosomiasis (bilharzia).

5. Food safety practices affected teaching and learning in public secondary schools in that unsafe food led to contamination, food poisoning and other ailment which in turn keeps learners out of learning activities, or they are in pain and hence the concentration is affected. For this reason, the school administrators should ensure that the source of food, storage of food and food handling is properly taken care of.
6. Most of the schools had inadequate waste management systems and the school environment is threatened by poor waste management. The disposal of waste generated as either solid or liquid waste affects the school environment. It is very vital that the school administration liaises with the local authority on emptying of toilets and septic tanks. Furthermore, the garbage in schools accumulates very fast causing pollution, dirt and hence impacting on the living standards and teaching and learning experience of the learners. Students should be educated on responsible waste management. The involvement of the whole school community in proper waste management will enhance teaching and learning.

5.4 Recommendations

5.4.1 Recommendations for Policy

1. It was established that although the health safety policies were developed, they were however not in schools, therefore, for effective implementation of the health safety policy guidelines.

   Recommendation. There is need for the ministry of education to recruit enough QASOs who should ascertain that the developed school health policies are disseminated and implemented by the school administrators.

2. The study found out that Safety Standards Manual for Schools was published in 2008

   Recommendations The ministry of education should revise the manual to accommodate current health safety trends, and the standards should be cascaded down to schools through seminars and workshops. The Ministry of Education should ensure that the national curriculum accommodates health and safety topics, and the school administration should ensure they are taught.

5.4.2 Recommendations for Practice

1. The study found out that some schools did not follow construction guidelines.

   Recommendation. Schools should adhere to the Ministry of Public Works and the Ministry of Education construction guideline regulations to lower the risks of accidents and thus have a positive effect in the improvement of teaching and learning.

2. It was established that not all schools had proper sanitation facilities.

   Recommendation. School management should improve oral health, by providing adequate and appropriately located toilets, wash points, soap,

sanitizers, fire extinguishers and first aid kits. The school administration should also train the learners on proper hygiene.

3. It was established that there was inadequate safe water.

   Recommendation. School management should provide clean, safe and adequate water by connecting it to the main water lines where possible and harvest rainwater as much as possible. Where possible, water could be recycled for use in the lavatories and other areas.

4. It was established that although schools had put measures to ascertain safety of food, there were still cases of food poisoning reported.

   Recommendation. The school administration and food handlers should ensure proper hygiene is maintained in the kitchens, stores and during cooking and serving.

5. The study found out that waste management practices were inadequate.

   Recommendation. School administrators should come up with viable waste management practices by separating, reducing, recycling and reusing waste and the whole school community should be engaged in waste management by setting up an environmental day of cleaning the school environment.

5.4.3 Recommendations for Further Research

In the course of the research, the researcher noticed that there is need for more research on the following areas:

a) Health safety and its effects on teaching and learning in private secondary schools.

b) Health challenges affecting learners in secondary schools.

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APPENDICES

APPENDIX I: QUESTIONNAIRE FOR SCHOOL PRINCIPALS

This questionnaire is designed to obtain primary data for a research project studying the effect of health safety guidelines on teaching and learning in public secondary schools in Kajiado and Nairobi Counties, Kenya. The research targets secondary school principals who are in charge implementation of policy guidelines. The questionnaire consists of four sections (A, B, C, & D) and you are required to kindly respond to all items. Please tick √ the appropriate box or complete the answer.

Section A: General Information

1. Indicate your Gender

a) Male ( )
b) Female ( )

2) Which is your highest academic qualification?

a) PhD [ ]
b) M.Ed [ ]
c) B. Ed [ ]
d) Diploma [ ]

Section B: Health Safety Guidelines in School

3. This section of the questionnaire focuses on the various health and safety guidelines that are considered important in a school especially on school buildings, water, food and waste management. You are required to respond to each so as to demonstrate the extent to which they are taken care of in your school each in a scale of 1-5 where: **1= not at all, 2= little extent, 3= moderate extent, 4=high extent, 5=very high extent**

S/N	STATEMENTS ON HEALTH SAFETY GUIDELINES	1	2	3	4	5
School Buildings						
1	My school has clean premises					
2	We have access to clean toilets in my school					
3	Classrooms are cleaned regularly					
4	There are adequate windows in the classroom					
5	There are emergency kits in the school staffroom					
6	Dining halls are clean and well maintained					
7	Dining halls are not congested					
8	There is proper signage leading people to the right places to avoid exposing students to unhealthy interactions					
9	The school has proper perimeter fence to secure students					
10	There are no dangerous places and items in the school grounds i.e. open manholes, loose electric wires, potholes etc.					
11	Grass is kept short and stagnant water avoided in the school to eliminate harmful insects and animals					
12	There are no abandoned buildings in the school compound that can be used for illicit activities like smoking drug peddling etc.					
13	There are adequate laboratories in the school					
14	Laboratories are always clean and well maintained					
15	Laboratories are well ventilated to allow proper air circulation					
16	There is enough lighting in the laboratories					
17	There are rules and regulations on laboratory safety that are well displayed					
Water sanitation						
1	My school provides for water purifiers or clean drinking water					
2	Source of water in the school is reliable					
3	There is enough water storage in the school					
4	Water in the school is regularly treated					
5	There are clearly labeled points where students can access drinking water from					
6	There are enough water points for use by students					
7	Rain water is harvested to compliment other water sources					
8	School water is free from contamination					

S/N	STATEMENTS ON HEALTH SAFETY GUIDELINES	1	2	3	4	5
9	Water systems are free from vandalism					
10	Sometimes we purchase water for use in the school					
11	Students are educated on water safety					
Food Health and Safety						
1	Food is purchased from reliable and safe sources					
2	Food is stored in safe places					
3	Food is prepared from a safe place					
4	Food handlers' health and hygiene is ascertained					
5	Food is served from a safe place					
6	School kitchens are regularly cleaned					
7	School kitchens are in line with safety standards					
8	Food vendors are kept out of school					
9	Students are educated on how to handle food brought from home					
10	Dining halls are regularly cleaned					
Waste Management						
1	There are sufficient number of dustbins in my school					
2	There is regular disposal of waste which is done once a week					
3	There are designated areas for waste disposal					
4	There are clear policy guidelines on waste management in the school					
5	Weekends are meant for general cleaning and waste disposal					
6	Waste management in the school is a collective responsibility by students and staff					

4. Which other ways should you employ to implement health safety guidelines?....

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.....

.....

5. Which policy guidelines on building construction are used in the school? .....

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.....

Section C: School Environmental Factors

6. This section of the questionnaire focuses on factors that are within the school environment and that are considered important in a school like adequate teaching and learning materials, maintenance of school facilities and teachers support to learners. You are required to respond to each so as to demonstrate the extent to which they affect health and safety guidelines in your school each in a scale of 1-5 where: **1= not at all, 2= little extent, 3= moderate extent, 4=high extent, 5=very high extent**

S/N	STATEMENTS ON SCHOOL ENVIRONMENTAL FACTORS	1	2	3	4	5
1.	The school administration ensures that there is adequate teaching and learning materials					
2	The school has a health safety programme					
3.	There is regular maintenance of school facilities especially during long school holidays					
4.	The school compound is kept clean throughout					
5.	Cracks on buildings are repaired immediately after discovery					
6.	Broken furniture (chairs or tables) are quickly repaired					
7.	Laboratory equipment are often cleaned to protect them from damage					
8.	School buildings repairing are not delayed until they become worst					
9.	Preventive maintenance is carried out on school buildings					
10.	Classrooms, Libraries and laboratories are cleaned on a daily basis					
11.	Once in a while, the school engages outsourced services to trim grass and fences within the school compound					
12.	The school administration undertakes regular checks of quality of food served to students					
13.	The school administration undertakes regular checks of students in the dining area					
14.	The school administration checks the meals served by cooks regularly					
15.	The school has a programme on teacher support to learners					
16.	Majority of teachers mentor the students especially on importance of observing health and safety guidelines					
17.	Relationship between teachers and students is good					

7. Suggest other ways of maintaining a conducive school environment .....

.....

Section D: Teaching and Learning

8. This section of the questionnaire focuses on the indicators of teaching and learning that can be affected by health and safety guidelines. You are required to express your opinion in terms of how you perceive learners' achievement in a scale of 1-5 where;

1= Definitely False, 2= False, 3= No comment, 4= True, 5= Definitely True.

S/N	STATEMENTS ON TEACHING AND LEARNING	1	2	3	4	5
1.	A clean school environment contributes to improved learners' outcome					
2.	Provision of clean safe water helps learners to perform better					
3.	Provision of safe food helps to keep learners in school					
4.	Well maintained school buildings enable students to attend school					
5.	Adequate sanitation facilities enable students to fully participate in learning activities					
6.	Safety in the laboratories enable learners to fully participate in practical classes					
7.	Safe clean and well-maintained libraries encourage learners to read more					
8.	A clean school environment enhances students' discipline					
9.	Students participate in designing a health school programme					
10.	Students are involved in awareness sessions on health safety					

9. Suggest other ways of improving teaching and learning in schools .....

.....

Thank you for your cooperation

APPENDIX II: QUESTIONNAIRE FOR CLASS TEACHERS

This questionnaire is designed to obtain primary data for a research project studying the effect of health safety guidelines on teaching and learning in public secondary schools in Kajiado and Nairobi Counties, Kenya. The research targets the class teachers who are the first line supervisors and implementors of policy guidelines. The questionnaire consists of four sections (A, B, C, & D) you are asked kindly to respond to each section. Please tick √ the appropriate box or complete the answer.

Section A: General Information

1. Indicate your Gender.
   Male ( )
   Female ( )

2. Which is your highest academic qualification?
   Diploma ( )
   Bachelor's Degree ( )
   Master's Degree ( )

3. Teachers are involved in discussing health and safety issues in the school
   Yes ( )
   No ( )

   If yes, explain how.....
   .....
   .....

4. Students are involved in discussing health safety issues in the school
   Yes ( )
   No ( )

   Explain your answer.....
   .....
   .....

5. I have a copy of National School Health Policy for schools in Kenya

   Yes ( )

   No ( )

   If No, explain.....

   .....

   .....

6. I have explained health and safety guidelines to my class

   Yes ( )

   No ( )

   If Yes, explain how.....

   .....

   .....

7. Do you have health safety programs in your school?

   Yes ( )

   No ( )

   If yes, outline them.....

   .....

   .....

Section B: Health Safety Guidelines in School

8. Kindly respond to each so as to demonstrate the extent to which they are taken care of in your school each in a scale of 1-5 where: **1= not at all, 2= little extent, 3= moderate extent, 4=high extent, 5=very high extent**

S/N	STATEMENTS ON HEALTH SAFETY GUIDELINES	1	2	3	4	5
School Buildings						
1	My school has clean premises					
2	We have access to clean toilets in my school					
3	Classrooms are cleaned regularly					
4	There is adequate classroom ventilation					
5	There are emergency kits in the school staffroom					
6	Dining areas are clean and well maintained					
7	Dining areas are not congested					
8	There are proper signage leading people to right places to avoid exposing students to unhealthy interactions					
9	The school has proper perimeter fence to secure students					
10	There are no dangerous places and items in the school grounds i.e. open manholes, loose electric wires, potholes etc.					
11	Grass is kept short					
12	Stagnant water is avoided in the school to eliminate harmful insects and animals					
13	There are no abandoned buildings in the school compound					
14	There are adequate laboratories in the school					
15	Laboratories are always clean and well maintained					
16	Laboratories are well ventilated to allow proper air circulation					
17	There is enough lighting in the laboratories					
18	There are rules and regulations on laboratory safety that are well displayed					
Water sanitation						

S/N	STATEMENTS ON HEALTH SAFETY GUIDELINES	1	2	3	4	5
1	My school provides for water purifiers or clean drinking water					
2	Source of water in the school is reliable					
3	There is enough water storage in the school					
4	Water in the school is regularly treated					
5	There are clearly labeled points where students can access drinking water from					
6	There are enough water points for use by students					
7	Rain water is harvested to compliment other water sources					
8	School water is free from contamination					
9	Water systems are free from vandalism					
10	Sometimes we purchase water for use in the school					
11	Students are educated on water safety					
Food Safety						
1	Food is purchased from reliable and safe sources					
2	Food is stored in safe places					
3	Food is prepared from a safe place					
4	Food handlers' health and hygiene is ascertained					
5	Food is served from a safe place					
6	School kitchens are regularly cleaned					
7	School kitchens are in line with safety standards					
8	Food vendors are kept out of school					
9	Students are educated on how to handle food brought from home					
10	Dining areas are regularly cleaned					
Waste Management						
1	There are sufficient dustbins in the school					
2	There is regular disposal of waste which is done once a week					
3	There are designated areas for waste disposal					
4	There are clear policy guidelines on waste management in the school					

S/N	STATEMENTS ON HEALTH SAFETY GUIDELINES	1	2	3	4	5
5	Weekends are meant for general cleaning and waste disposal					
6	Waste management in the school is a collective responsibility by students and staff					

9. Suggest other ways of implementing health and safety guidelines in schools ...

.....

.....

Section C: School Environmental Factors

10. This section of the questionnaire focuses on factors that are within the school environment and that are considered important in a school like adequate teaching and learning materials, maintenance of school facilities and teachers support to learners. You are required to respond to each so as to demonstrate the extent to which they affect health and safety guidelines in your school each in a scale of 1-5 where: **1= not at all, 2= little extent, 3= moderate extent, 4=high extent, 5=very high extent**

S/N	STATEMENTS ON SCHOOL ENVIRONMENTAL FACTORS	1	2	3	4	5
1.	The school administration ensures that there is adequate teaching and learning materials					
2.	The school has a health and safety policy					
3.	There is regular maintenance of school facilities especially during long school holidays					
4.	The school compound is kept clean throughout					
5.	Cracks on buildings are repaired immediately after discovery					
6.	Broken furniture (chairs or tables) are quickly repaired					
7.	Laboratory equipment are often cleaned to protect them from damage					
	School buildings repairing are not delayed until they become worst					
9.	Preventive maintenance is carried out on school buildings					
10.	Classrooms, dormitories and laboratories are cleaned on a daily basis					
11.	Once in a while, the school engages outsourced services to trim grass and fences within the school compound					
12.	The school administration undertakes regular checks of quality of food served to students					
13.	The school administration undertakes regular checks of students in the dormitories					
14.	The school administration checks the meals served by cooks regularly					
15.	The school has a programme on teacher support to learners					
16.	Majority of teachers mentor the students especially on importance of observing health and safety guidelines					
17.	Relationship between teachers and students is good					

11. Suggest other ways of ensuring maintaining a conducive school environment...

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Section D: Teaching and Learning

12. This section of the questionnaire focuses on the indicators of teaching and learning that can be affected by health and safety guidelines. You are required to express your opinion in terms of how you perceive learners' achievement in a scale of 1-5 where; **1= Definitely False, 2= False, 3= No comment, 4= True, 5= Definitely True.**

S/N	STATEMENTS ON TEACHING AND LEARNING	1	2	3	4	5
1.	A clean school environment contributes to improved learning outcomes					
2.	Provision of clean safe water helps learners to perform better					
3.	Provision of safe food helps to keep learners in school					
4.	Well maintained school buildings enable students to attend school					
5.	Adequate sanitation facilities enable students to fully participate in learning activities					
6.	Safety in the laboratories enable learners to fully participate in practical classes					
7.	Safe clean and well-maintained libraries encourage learners to read more					
8.	A clean school environment enhances students' discipline					
9.	Students participate in designing a health school programme					
10.	Students are involved in awareness sessions on health safety					

13. Suggest other ways of improving teaching and learning in schools .....

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.....

Thank you for your cooperation

APPENDIX III: QUESTIONNAIRE FOR STUDENTS

This questionnaire is designed to obtain primary data for a research proposal studying the impact of health safety guidelines on teaching and learning in public secondary schools in Kajiado and Nairobi Counties, Kenya. The research targets secondary school students since they are the beneficiaries of the guidelines and they also play their part in the implementation of the guidelines. The questionnaire consists of four sections (A, B, C, & D). Each section has instructions on what you are required to do. You are kindly requested to respond to each of the statements in each section. Please tick √ the appropriate box or complete the answer.

Section A: General Information

1. Indicate your Gender.
   a) Male ( )
   b) Female ( )

2. Indicate the class you are in.
   a) Form one ( )
   b) Form Two ( )
   c) Form three ( )
   d) Form Four ( )

3. Indicate the County where your school is situated
   a) Nairobi ( )
   b) Kajiado ( )

4. Indicate your age in one of the following age brackets
   a) 14-16 ( )
   b) 17-18 ( )
   c) Above 18 ( )

5. Tick against one area where there are challenges in the implementation of Health safety guidelines:
   a) Toilets ( )
   b) Classrooms ( )
   c) Laboratories ( )
   d) Kitchens ( )
   e) Dining halls ( )
   f) Libraries ( )
   g) Water ( )
   h) Food ( )
   i) Play grounds ( )

Section B: Health Safety Guidelines in School

6. This section of the questionnaire focuses on the various health and safety guidelines that are considered important in a school especially on school buildings, water sanitation, food and waste management. You are required to respond to each so as to demonstrate the extent to which they are taken care of in your school each in a scale of 1-5 where: **1= not at all, 2= little extent, 3= moderate extent, 4=high extent, 5=very high extent**

S/N	STATEMENTS ON HEALTH SAFETY GUIDELINES	1	2	3	4	5
School Buildings						
1	My school has clean premises					
2	We have access to clean toilets in my school					
3	Classrooms are cleaned regularly					
4	There is adequate classroom ventilation					
5	There are emergency kits in the school staffroom					
6	Dining areas are clean and well maintained					
7	Dining areas are not congested					
8	There is proper signage leading people to right places to avoid exposing students to unhealthy interactions					
9	The school has proper perimeter fence to secure students					
10	There are no dangerous places and items in the school grounds i.e. open manholes, loose electric wires, potholes etc.					
11	Grass is kept short and stagnant water avoided in the school to eliminate harmful insects and animals					
12	There are no abandoned buildings in the school compound that can be used for illicit activities like smoking drug peddling etc.					
13	There are adequate laboratories in the school					
14	Laboratories are always clean and well maintained					
15	Laboratories are well ventilated to allow proper air circulation					
16	There is enough lighting in the laboratories					
17	There are rules and regulations on laboratory safety that are well displayed					
Water sanitation						
1	My school provides for water purifiers or clean drinking water					

S/N	STATEMENTS ON HEALTH SAFETY GUIDELINES	1	2	3	4	5
2	Source of water in the school is reliable					
3	There is enough water storage in the school					
4	Water in the school is regularly treated					
5	There are clearly labeled points where students can access drinking water from					
6	There are enough water points for use by students					
7	Rain water is harvested to compliment other water sources					
8	School water is free from contamination					
9	Water systems are free from vandalism					
10	Sometimes we purchase water for use in the school					
11	Students are educated on water safety					
Food Health and Safety						
1	Food is purchased from reliable and safe sources					
2	Food is stored in safe places					
3	Food is prepared from a safe place					
4	Food handlers' health and hygiene is ascertained					
5	Food is served from a safe place					
6	School kitchens are regularly cleaned					
7	School kitchens are in line with safety standards					
8	Food vendors are kept out of school					
9	Students are educated on how to handle food brought from home					
10	Dining halls are regularly cleaned					
Waste Management						
1	There are sufficient number of dustbins in my school					
2	There is regular disposal of waste which is done once a week					
3	There are designated areas for waste disposal					
4	There are clear policy guidelines on waste management in the school					
5	Weekends are meant for general cleaning and waste disposal					
6	Waste management in the school is a collective responsibility by students and staff					

Section C: School Environmental Factors

7. This section of the questionnaire focuses on factors that are within the school environment and that are considered important in a school like adequate teaching and learning materials, maintenance of school facilities and teachers support to learners. You are required to respond to each so as to demonstrate the extent to which they affect health and safety guidelines in your school each in a scale of 1-5 where: **1= not at all, 2= little extent, 3= moderate extent, 4=high extent, 5=very high extent**

S/N	STATEMENTS ON SCHOOL ENVIRONMENTAL FACTORS	1	2	3	4	5
1.	The school administration ensures that there is adequate teaching and learning materials					
2.	The school has a health and safety policy					
3.	There is regular maintenance of school facilities especially during long school holidays					
4.	The school compound is kept clean throughout					
5.	Cracks on buildings are repaired immediately after discovery					
6.	Broken furniture (chairs or tables) are quickly repaired					
7.	Laboratory equipment are often cleaned to protect them from damage					
8.	School buildings repairing are not delayed until they become worst					
9.	Preventive maintenance is carried out on school buildings					
10.	Classrooms, dormitories and laboratories are cleaned on a daily basis					
11.	Once in a while, the school engages outsourced services to trim grass and fences within the school compound					
12.	The school administration undertakes regular checks of quality of food served to students					
13.	The school administration undertakes regular checks of students in the dormitories					
14.	The school administration checks the meals served by cooks regularly					
15.	The school has a programme on teacher support to learners					
16.	Majority of teachers mentor the students especially on importance of observing health and safety guidelines					
17.	Relationship between teachers and students is good					

Section D: Teaching and Learning

8. This section of the questionnaire focuses on the indicators of learners' achievement that can be affected by health and safety guidelines. You are required to express your opinion in terms of how you perceive learners' achievement in a scale of 1-5 where; **1= Definitely False, 2= False, 3= No comment, 4= True, 5= Definitely True.**

S/N	STATEMENTS ON TEACHING AND LEARNING	1	2	3	4	5
1.	A clean school environment contributes to improved learning outcomes					
2.	Provision of clean safe water helps learners to perform better					
3.	Provision of safe food helps to keep learners in school					
4.	Well maintained school buildings enable students to attend school					
5.	Adequate sanitation facilities enable students to fully participate in learning activities					
6.	Safety in the laboratories enable learners to fully participate in practical classes					
7.	Safe clean and well maintained libraries encourage learners to read more					
8.	A clean school environment enhances students' discipline					
9.	Students participate in designing a health school programme					
10.	Students are involved in awareness sessions on health safety					

9. Suggest other ways of improving teaching and learning in schools .....

.....

.....

Thank you for your cooperation

APPENDIX IV: INTERVIEW GUIDE FOR CQASOS

Introduction

I am a student at Kenyatta University, Kenya. In fulfillment of requirements for the award of Doctorate Degree, I am required to conduct a study and write a thesis report. My study focuses on the implementation of health safety guidelines and their effect on teaching and learning in public secondary schools in Nairobi and Kajiado Counties in Kenya.

Instructions

This interview guide is divided into five Sections; Section A will gather biographic data of the respondents, Sections B, C, D, E, will collect information on the following research questions respectively; health and safety guidelines, food hygiene, water sanitization, school environmental factors and learners' achievement. You are kindly requested to provide answers to the questions as honestly and precisely as possible. The researcher assures you that no names of the school and the respondents mentioned will be used in the publication of this research and the information gathered will be treated with ultimate confidentiality and only for the purpose of the study.

Section A: Background Information

6. Highest Level of Education
   a) PhD ( )
   b) Masters ( )
   c) Degree ( )
   d) Diploma ( )
   e) Any other, Specify.....
   .....

7. Working Experience (years)
   a) Below 5 ( )
   b) 5-10 ( )
   c) 10-15 years ( )
   d) Above 15 ( )

8. How long have you worked in the current County?
   a) Below 5 ( )
   b) 5-10 ( )
   c) 10-15 years ( )
   d) Above 15 ( )

9. Have you been trained on health and hygiene safety in schools?
   a) Yes ( )
   b) No ( )

Give Reasons .....

.....

.....

Section B: School Buildings

10. Do you conduct standards Assessment in the schools under your jurisdiction?
11. How well are your principals trained on health and hygiene safety of schools?
12. Which teachers' development programs are in place to assist in implementation of health and hygiene safety of physical buildings in your schools?
13. Are teachers and students well supervised on health and hygiene safety of physical buildings?
14. Have your schools complied with health and hygiene safety of school buildings? Kindly explain.
15. Have your schools complied with the building regulations?

Section C: Food Hygiene

16. What are the major sources of food for your schools? Explain
17. Is food stored safely in your school? Explain
18. Are food handlers in your schools medically suitable? Explain
19. Explain what can be done to ensure food safety in the schools under your jurisdiction

Section D: Water Sanitization

20. Do all your school's access safe and adequate water? Kindly explain
21. Which challenges can you say are faced by your schools in terms of provision of adequate and clean water?

Section E: Waste management

22. Are members of your school community educated on how to manage waste?
23. What health and hygiene problems related to waste management are experienced in your schools?
24. Which best methods of waste management can you suggest for your schools?

APPENDIX V: CONSENT FORM

INFORMED CONSENT FORM

Topic of Study

Health Safety and its Effects on Teaching and learning in public secondary schools in Nairobi and Kajiado Counties

STUDENT NAME; SUSAN THAMI NJAU

REGISTRATION NUMBER E83/CE/24203/2011

Kenyatta University

School of Education

P.O Box 43844-00100

Nairobi

Department of Education Management, Policy and Curriculum Studies

Purpose of Study

This study seeks to establish how health safety in regard to school buildings, water, food and waste management affects teaching and learning in public secondary schools in Nairobi and Kajiado Counties.

Study procedures

The study will target school principals, Class teachers, Form two students and County Quality Assurance Officers (CQASOS) as the respondents. Questionnaires will be administered to the respondents who will be given two weeks to answer the questions. Filling up the questionnaires will take about fifty minutes. The researcher will book an appointment with the CQASOS to schedule the interview time and venue. The researcher will then go to pick the filled-up questionnaires.

Benefits

The study will be of benefit to the policy makers in the Ministry of Education who may be guided on how best to revise and implement guidelines on school health safety. The school management and teachers may also benefit from the study by learning areas requiring improvement in order to enhance health safety and by so doing improve the teaching and learning environment. Learners may also benefit by

appreciating the need to maintain health safety in order to improve their learning environments to enhance learning.

Confidentiality

Your responses will be anonymous and you should not write your name on the questionnaire. If you have any questions kindly contact the researcher through phone number 0722966376.

Voluntary Participation

Please note that your participation is voluntary hence you may decide to take part or not. You will be requested to sign the consent but if you wish to withdraw it is okay.

Consent

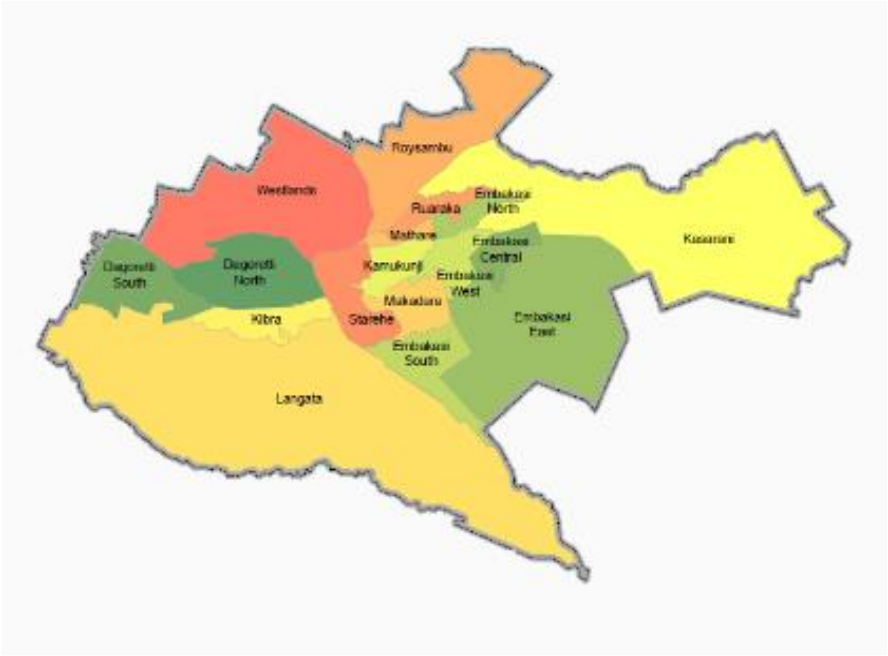
I have read and understood what is expected and have asked questions and that my participation is voluntary and I can withdraw if I so wish.

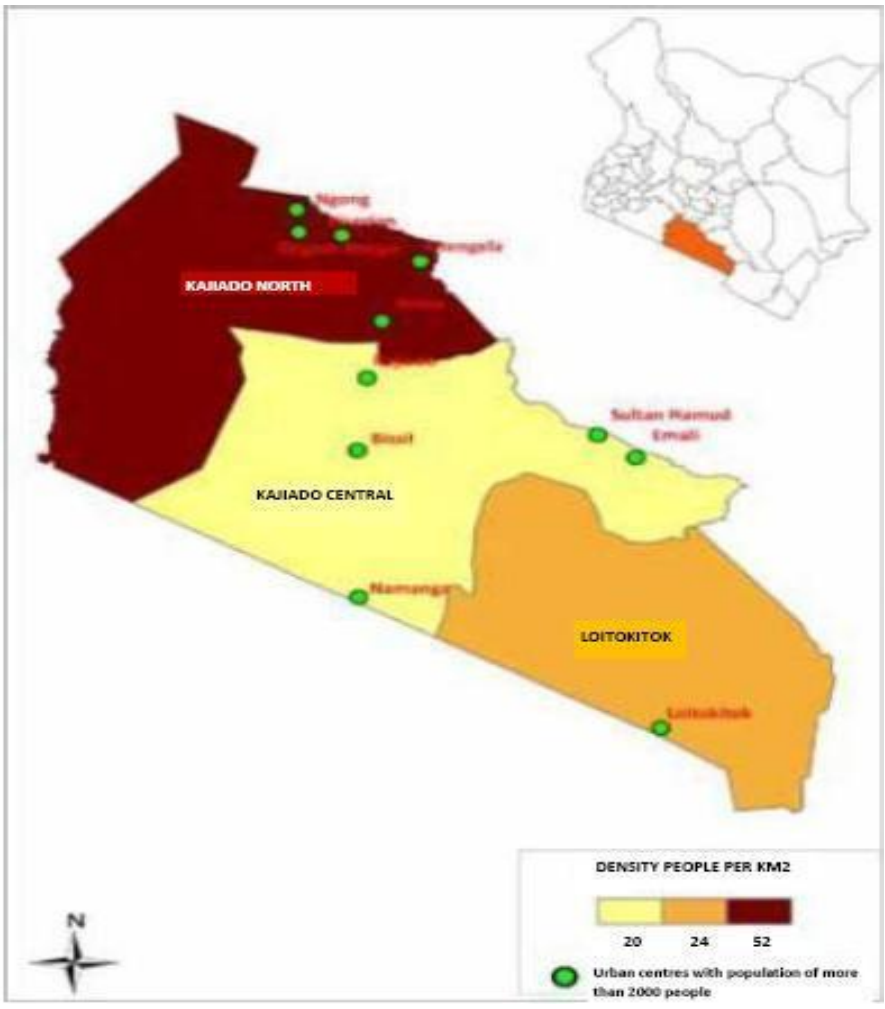
I voluntary agree to take part in this study

Participant..... **Signature**..... **Date**.....

Researcher..... **Signature** ..... **Date**.....

APPENDIX VI: LOCATION OF THE STUDY





APPENDIX VII: RESEARCH PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **515442**

Date of Issue: **04/April/2022**

RESEARCH LICENSE

This is to Certify that Ms.. Susan Thami Njau of Kenyatta University, has been licensed to conduct research in Kajiado, Nairobi on the topic: Health Safety and its Effects on Teaching and Learning in Public Secondary Schools in Nairobi and Kajiado Counties; Kenya for the period ending : 04/April/2023.

License No: **NACOSTI/P/22/16602**

515442

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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