

**RISK FACTORS ASSOCIATED WITH HYGIENE AND SANITATION
PRACTICES IN PUBLIC SECONDARY SCHOOLS IN KITALE
MUNICIPALITY TRANS NZOIA COUNTY, KENYA**

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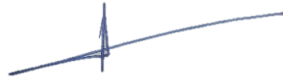
**THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE AWARD OF MASTERS
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DECLARATION AND APPROVAL

This thesis is my original work and has not been presented for a degree in any other University or for any other award.

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We confirm that the work reported in this thesis was carried out by the candidate under our supervision.



Mount Kenya University

DEDICATION

I dedicate this study to my beloved wife Esther Kwamboka and my son Aiden Doyle
Kebati.



ACKNOWLEDGEMENT

Infinite thanks to God for His grace and mercies upon my health and the opportunity to pursue my studies at Mount Kenya University School of Public Health. I extend my heartfelt appreciation to Mount Kenya University for providing strong institutional and departmental support throughout this academic journey.

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ABSTRACT

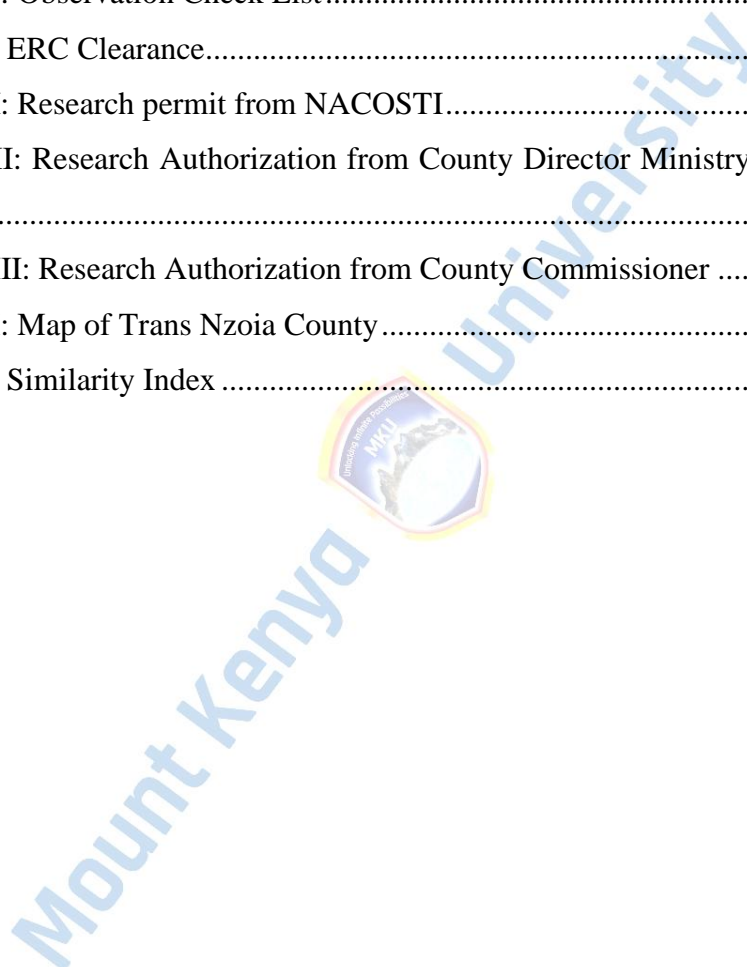
Sanitation and hygiene play a crucial role in ensuring a safe and healthy learning environment in schools. However, public secondary schools in Kitale Municipality, Trans-Nzoia County, Kenya, face persistent challenges in maintaining adequate sanitation and hygiene standards. This study aimed to assess the risk factors associated with sanitation and hygiene practices in these schools, focusing on the level of adherence to cleanliness protocols, the factors influencing sanitation and hygiene, and students' perceptions of the prevailing conditions. A descriptive cross-sectional study design was employed, utilizing stratified random sampling to select 385 students and 40 teachers from various public secondary schools. Data collection methods included structured questionnaires, interviews, and observational checklists. Descriptive statistics, including means and cross-tabulations, were used for data analysis, while Pearson's Chi-square test determined the relationships between variables, with significance set at $p \leq 0.05$. The findings indicated that while some cleanliness protocols were observed, significant gaps remained in waste collection and sanitation facility maintenance. Many schools lacked proper waste disposal mechanisms, adequate water distribution, and sufficient funding for maintaining hygiene infrastructure. The study also found that compliance with school health guidelines, such as medical certification for food handlers, was low. Moreover, inadequate access to water and handwashing stations contributed to unhygienic conditions, increasing the risk of sanitation-related diseases. However, students demonstrated an informed perception of hygiene standards, largely due to public health education initiatives. The study concluded that inadequate infrastructure, insufficient funding, and lack of consistent enforcement of sanitation policies were the primary barriers to maintaining proper hygiene standards. It recommends that the Ministry of Education allocate additional resources for sanitation infrastructure and partner with donors to improve water supply and waste disposal. The Trans-Nzoia County Public Health Department should conduct regular sanitary inspections and ensure compliance with hygiene guidelines. Furthermore, school administrators should enhance awareness programs and health education to foster sustainable hygiene practices among students and staff.

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LIST OF ABBREVIATIONS AND ACRONYMS

AMREF	African Medical Research Foundation
AEO	Area Education Officer
GoK	Government of Kenya
JCA	Joint Call to Action
JMP	Joint Monitoring Programme
KESSP	Kenya Education Sector Wide Support Programme
MDG	Millennium Development Goal
MoEST	Ministry of Education, Science and Technology
MoH	Ministry of Health
MoPND	Ministry of Planning and National Development
MoWNR	Ministry of Water and National Resources
MPH	Master in Public Health
NGO	Non-Governmental Organisation
NSHG	National School Health Guidelines
PHO	Public Health Officer
SWAP	Sector Wide Approach
SWASH	School Water and Sanitation Hygiene
UNICEF	United Nations Children's Fund
UN	United Nations
WASH	Water Sanitation and Hygiene
WHO	World Health Organisation
HBM	Health Belief Model

CHAPTER ONE: INTRODUCTION

1.0: Introduction

This chapter provides a comprehensive overview of the research focus. It outlines the background information, problem statement, justification for the study, objectives, research questions, significance, anticipated outputs, and conceptual framework.

1.1 Background Information

Sanitation and hygiene are critical factors in promoting the health and well-being of individuals and communities. However, in many parts of the world, including Trans Nzoia County in Kenya, access to adequate sanitation facilities and proper hygiene practices remains a challenge. This is particularly evident in public secondary schools, where the cleanliness of facilities and the overall state of sanitation and hygiene can have a significant impact on the health and educational outcomes of the students (Mutua & Runguma, 2020). Trans Nzoia County is located in the Rift Valley region of Kenya and is home to a significant population, including a large number of school-age children. The county faces various challenges in providing adequate sanitation and hygiene in public secondary schools. The rapid population growth, coupled with rural-urban migration, has put immense pressure on existing infrastructure and services, including sanitation facilities (Aaron & Felix, 2020). As a result, many schools in the county struggle to meet the demand for proper sanitation and hygiene facilities, leading to low standards and inadequate resources (Githaka et al., 2019).

The Kenyan government has implemented several policies and strategies over the years to address these challenges in the health and education sectors. Efforts have been made to improve sanitation and hygiene facilities in schools, recognizing their crucial role in promoting good health and creating a conducive learning environment (Singh Chouhan

et al., 2022). One significant reform was the launch of Free Primary Education in 2003, which aimed to increase access to education for all children, leading to a substantial increase in student enrolment in public schools (Muanda et al., 2020). However, this rapid influx of students has strained the already limited sanitation and hygiene facilities in secondary schools throughout the country, including Trans Nzoia County (Bishoge, 2021).

Despite the government's efforts, the statistics paint a grim picture of the current state of sanitation and hygiene in public secondary schools. Only a small percentage of schools have access to clean and safe drinking water, while appropriate sanitation facilities are lacking in the majority of schools (Muanda et al., 2020). For instance, many schools rely on pit latrines that serve a large number of students, resulting in overcrowding and compromised hygiene standards (Githaka et al., 2019). The situation is further exacerbated by incidents of collapsing pit latrines and frequent school closures by the public health department in Trans Nzoia County (Sharma, 2021). The lack of water conservation practices in schools also contributes to the challenges, with students often having to fetch water from nearby sources, which may be of questionable quality and pose health risks (Githaka et al., 2019).

The inadequate sanitation and hygiene conditions in public secondary schools have far-reaching consequences. Poor sanitation and hygiene not only compromise the health and well-being of students but also contribute to increased absenteeism and dropout rates, particularly among girls (Sharma, 2021). Girls, in particular, face unique challenges as they require safe, clean, and private sanitation facilities (Muanda et al., 2020). The lack of proper facilities in schools hampers their ability to manage

menstrual hygiene effectively and can lead to embarrassment, discomfort, and decreased participation in educational activities (Anyango, 2019).

Addressing the sanitation and hygiene challenges in public secondary schools in Trans Nzoia County requires a comprehensive approach. It involves not only improving infrastructure and access to clean water and sanitation facilities but also promoting proper hygiene practices among students, teachers, and the broader school community (Anyango, 2019). It is essential to engage various stakeholders, including the government, local authorities, educators, parents, and community members, to develop and implement sustainable solutions (Saleem et al., 2019). This may include increasing investments in school infrastructure, providing training and awareness programs on hygiene practices, promoting water conservation measures, and strengthening the monitoring and maintenance of sanitation facilities (Kituyi & Moi, 2021).

By prioritizing sanitation and hygiene in public secondary schools, Trans Nzoia County can create a healthier and more conducive learning environment for its students. Improved sanitation and hygiene facilities will not only reduce the risk of diseases but also contribute to better attendance, improved educational outcomes, and the overall well-being of the students (Githaka et al., 2019).

1.2 Problem Statement

Sanitation and hygiene conditions in public secondary schools within Trans Nzoia County, Kenya, are a pressing issue that hinders the health, well-being, and educational opportunities of students. This problem is not isolated to Trans Nzoia County alone but is reflective of broader challenges at the African, Sub-Saharan, Kenyan, and county levels.

At the African level, statistics highlight the magnitude of the problem. Approximately 50% of the population in the developing world, amounting to 2.5 billion people, lack improved sanitation facilities (Bishoge, 2021). Moreover, over 884 million people still rely on unsafe drinking water sources, leading to the spread of waterborne diseases (Bishoge, 2021).

Sub-Saharan Africa faces even more significant challenges in sanitation and hygiene. The region has the highest percentage of its population without access to improved sanitation, with an estimated 64% lacking proper facilities (Kookana et al., 2020). Similarly, access to clean drinking water is limited, with around 27% of the population lacking safe water sources (Kookana et al., 2020).

Within Kenya, the sanitation and hygiene situation remains critical. A substantial portion of the population lacks access to improved sanitation facilities, with only 30% having access to basic sanitation services (World Health Organization, 2021). Furthermore, the prevalence of open defecation stands at approximately 14% (World Health Organization, 2021). These conditions contribute to the widespread occurrence of preventable diseases and hinder overall development (Anyango, 2019).

In Trans Nzoia County specifically, the sanitation and hygiene challenges persist. The reliance on pit latrines is common, with approximately 97% of households using this sanitation system (Onencan et al., 2019). Access to clean and safe drinking water is compromised, with only 10% coverage of piped water and widespread pollution of underground water sources (Sharma, 2021). These factors significantly affect public secondary schools, where overcrowded and inadequate sanitation facilities prevail. Only 29% of schools in Kenya have access to clean water and appropriate sanitation facilities, contributing to compromised hygiene standards and health risks for students

(Onencan et al., 2019). In Trans Nzoia County, collapsing pit latrines and frequent school closures due to sanitation-related concerns further exacerbate the problem (Sharma, 2021).

Given the alarming statistics in the African, Sub-Saharan, Kenyan, and Trans Nzoia County levels, it is evident that the sanitation and hygiene conditions in public secondary schools pose a substantial problem. The lack of clean water, proper sanitation facilities, and adequate hygiene practices contribute to poor health outcomes, increased absenteeism, and hindered educational progress. Urgent measures and interventions are needed to address these challenges and create a safe and healthy learning environment for students in Trans Nzoia County and beyond.

1.3 Justification

Sanitation and hygiene are fundamental to creating a healthy learning environment, yet public secondary schools in Kitale Municipality, Trans-Nzoia County, continue to experience challenges in maintaining adequate sanitation standards. Despite national policies and guidelines on school hygiene, gaps in implementation, infrastructure, and compliance persist, leading to increased risks of sanitation-related diseases, poor academic performance, and reduced student attendance.

Existing research on school sanitation in Kenya has primarily focused on primary schools and urban settings, leaving a knowledge gap regarding the specific sanitation and hygiene challenges faced by public secondary schools in semi-urban and rural areas like Kitale Municipality. Furthermore, while government and donor interventions exist, their effectiveness in addressing these challenges has not been adequately assessed. This study was therefore necessary to provide empirical evidence on the key

factors affecting sanitation and hygiene in these schools, identify compliance gaps, and recommend practical interventions tailored to the local context.

By addressing these issues, the study contributes to informed decision-making by policymakers, education administrators, and public health officials, ensuring targeted strategies to improve sanitation and hygiene in schools, thereby fostering a safer and more conducive learning environment.

1.4 Study Objectives

1.4.1 Broad Objective

To assess the risk factors associated with sanitation and hygiene practices in public secondary schools in Kitale Municipality Trans Nzoia County, Kenya

1.4.2 Specific Objectives

1. To assess the level of adherence to cleanliness Standard Operating Procedures and protocols in public secondary schools within Kitale municipality Trans Nzoia County, Kenya
2. To assess the impact of infrastructure, water availability, and hygiene education on sanitation and hygiene compliance in public secondary schools within Kitale Municipality, Trans-Nzoia County, Kenya.
3. To examine the perception of students on sanitation and hygiene in public secondary schools in Kitale Municipality Trans Nzoia County, Kenya

1.5 Research Questions

1. What is the level of adherence to cleanliness Standard Operating Procedures and protocols in public secondary schools within Kitale municipality Trans Nzoia County?
2. What are the factors influencing sanitation and hygiene in public secondary schools within Kitale municipality, Trans Nzoia County?
3. What is the perception of students regarding sanitation and hygiene in public secondary schools within Kitale municipality, Trans Nzoia County?

1.6 Significance and Anticipated Output

This study on the assessment of sanitation and hygiene in public secondary schools in Trans Nzoia County holds significant importance for various stakeholders, including policymakers, educators, parents, and the community. The anticipated outputs of this study are expected to contribute to the following:

1. **Improved Health and Well-being:** By assessing the cleanliness of facilities and identifying factors affecting sanitation and hygiene, the study can provide insights into the health risks faced by pupils. The findings will help raise awareness about the importance of proper sanitation and hygiene practices, leading to improved health outcomes and well-being among students.
2. **Enhanced Learning Environment:** The study will identify the common diseases related to poor sanitation and hygiene, enabling targeted interventions to mitigate these health risks. Creating a safe and hygienic learning environment can positively impact students' attendance, concentration, and overall educational experience, ultimately enhancing their academic performance.

3. **Policy Development:** The research findings will serve as evidence for policymakers and education authorities to develop informed policies and strategies for improving sanitation and hygiene in public secondary schools. This study can guide the formulation of specific guidelines, regulations, and resource allocation to address the identified challenges and promote better sanitation practices within educational institutions.
4. **Community Engagement:** By highlighting the sanitation and hygiene issues in public secondary schools, the study can generate awareness and engagement within the local community. It can foster partnerships among various stakeholders, such as parents, community leaders, and school management, to collectively work towards implementing sustainable solutions and ensuring the long-term maintenance of improved sanitation and hygiene practices.

1.6.1 Anticipated Outputs:

1. **Comprehensive Assessment Report:** The study will produce a detailed report on the cleanliness of facilities in public secondary schools within Trans Nzoia County. This report will provide a comprehensive overview of the existing conditions and highlight areas that require improvement.
2. **Identification of Key Factors:** The study will identify and document the factors that affect sanitation and hygiene in public secondary schools. These factors may include infrastructure limitations, water availability, waste management practices, and behavioral aspects. Understanding these factors will assist in formulating targeted interventions.
3. **Disease Mapping and Analysis:** The study will contribute to the identification and mapping of common diseases related to poor sanitation and hygiene

practices among pupils. This analysis will help prioritize health interventions and design appropriate strategies for disease prevention and control within the school setting.

4. **Policy Recommendations:** Based on the research findings, the study will provide evidence-based recommendations for policymakers, education authorities, and relevant stakeholders. These recommendations will guide the development of policies, guidelines, and interventions aimed at improving sanitation and hygiene practices in public secondary schools in Trans Nzoia County.
5. **Awareness and Advocacy Materials:** The study may generate materials such as informational brochures, posters, or digital media content to raise awareness among students, parents, and the wider community. These materials will emphasize the importance of sanitation and hygiene, promote behavioural change, and encourage collective responsibility for maintaining a clean and healthy school environment.

1.7 Operational Definition of Key Terms

Assessment: A systematic process of evaluating or appraising the sanitation and hygiene conditions in public secondary schools within Kitale Municipality, Trans-Nzoia County, Kenya. This involves collecting data, analyzing information, and drawing conclusions to determine the current state of sanitation and hygiene practices in the schools.

Sanitation: The provision of facilities and services for the safe disposal of human waste, maintaining cleanliness, and promoting good health

practices within the public secondary schools in Kitale Municipality, Trans-Nzoia County. It includes the availability and functionality of toilets, handwashing facilities, waste management systems, and overall cleanliness of the school environment.

Hygiene: Refers to the practices and behaviours aimed at promoting cleanliness, health, and well-being. In the context of the assessment, hygiene would include aspects such as handwashing practices, personal hygiene habits, menstrual hygiene management, food hygiene, and general cleanliness of the school premises.

Public Secondary Schools: Educational institutions in Kitale Municipality, Trans-Nzoia County, that provide secondary education to students. These schools are typically funded and managed by the government or other public entities and cater to a wide range of students from various backgrounds.

Kitale Municipality: The administrative region within Trans-Nzoia County, Kenya, which encompasses a specific geographic area and includes multiple public secondary schools. Kitale Municipality is responsible for managing and overseeing various aspects of governance and services within its jurisdiction.

Trans-Nzoia County: The County in the Rift Valley Province of Kenya, where Kitale Municipality is located. Trans-Nzoia County is responsible for providing essential services, including education, sanitation, and hygiene, to its residents.

Assessment Tools: The instruments, methods, or questionnaires used to gather data and information during the assessment process. These tools may include surveys, interviews, observations, checklists, or any other means deemed appropriate for assessing the sanitation and hygiene conditions in public secondary schools.

Data Analysis: The process of organizing, interpreting, and drawing meaningful conclusions from the collected data. Data analysis in the assessment would involve analyzing the information gathered during the evaluation of sanitation and hygiene practices in public secondary schools in Kitale Municipality, Trans-Nzoia County.

Recommendations: Based on the findings of the assessment, recommendations refer to suggestions or proposals for improving sanitation and hygiene practices in public secondary schools. These recommendations may include infrastructure improvements, behaviour change interventions, training programs, policy changes, or other measures aimed at enhancing sanitation and hygiene standards.

Monitoring and Evaluation: The ongoing process of tracking progress, assessing the effectiveness of interventions, and ensuring the sustainability of improved sanitation and hygiene practices in public secondary schools.

Facilities: A structure or part of a structure that contains toilet, shower, diaper-changing unit, hand wash station, and dressing capabilities

Standard sanitation and hygiene: This includes but is not limited to practices such as proper waste disposal, regular handwashing, maintenance of clean and sanitary facilities, and adherence to established hygiene protocols.



CHAPTER TWO: LITERATURE REVIEW

2.0: Introduction

This chapter provides a comprehensive review of existing literature on sanitation and hygiene practices in educational settings. This chapter serves to contextualize the study within the broader research landscape, highlighting key findings, trends, and gaps in knowledge related to sanitation and hygiene in public secondary schools.

2.1 Overview of Sanitation and Hygiene Conditions.

Sanitation and hygiene are critical factors in promoting public health and well-being worldwide. This literature review aims to provide an overview of the global status of sanitation and hygiene, highlighting key statistics and trends. According to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), approximately 2.5 billion people, or 50% of the developing world's population, lack access to improved sanitation facilities (Saleem et al., 2019). Furthermore, over 884 million people still rely on unsafe drinking water sources, further exacerbating the sanitation challenge (World Health Organization, 2021).

The lack of access to safe sanitation and proper hygiene practices leads to severe health implications (Saleem et al., 2019). Diarrheal diseases, for instance, remain a significant threat, causing an estimated 432,000 deaths per year, mostly affecting children under the age of five (Prüss-Ustün et al., 2019). Inadequate sanitation also contributes to the spread of other waterborne diseases, including cholera, typhoid fever, and hepatitis A (Prüss-Ustün et al., 2019).

The global community has recognized the importance of sanitation and hygiene, resulting in the inclusion of specific targets in the Sustainable Development Goals (SDGs) (Githaka et al., 2019). Target 6.2 aims to achieve access to adequate and

equitable sanitation and hygiene for all by 2030 (Nkiaka et al., 2021). However, progress towards this target has been uneven.

In Sub-Saharan Africa, for instance, the sanitation situation remains challenging. Around 440 million people in the region still lack access to basic sanitation services (Bishoge, 2021). In rural areas, the situation is particularly dire, with only 30% of the population having access to improved sanitation facilities (Nkiaka et al., 2021). This lack of access perpetuates the cycle of poverty and has severe health consequences.

At the national level, Kenya faces significant challenges in sanitation and hygiene. The Kenya Demographic and Health Survey (KDHS) conducted in 2014 revealed that only 32% of households in the country had access to improved sanitation facilities (Mulatya & Mutuku, 2020). Furthermore, open defecation remains a prevalent practice in many rural areas, posing health risks and environmental concerns (Mulatya & Mutuku, 2020).

Trans Nzoia County in Kenya is no exception to these challenges. Despite efforts to improve sanitation and hygiene, the county still faces issues such as inadequate waste disposal systems, limited access to clean water, and poor hygiene practices in public secondary schools (Okari, 2019). According to a report by the Ministry of Public Health and Sanitation (MoPHS), only 10% of the population in Kitale Municipality, has access to piped water (Okari, 2019). This highlights the urgent need to address sanitation and hygiene issues in Trans Nzoia County specifically.

2.2 Sanitation and Hygiene in Kenyan Schools

Sanitation and hygiene are critical factors that contribute to the health and well-being of students in schools (World Health Organization, 2021). In Kenya, access to proper sanitation facilities and the promotion of good hygiene practices in schools are essential for ensuring a safe and conducive learning environment (Githaka et al., 2019).

Access to Sanitation Facilities: Studies consistently indicate a lack of adequate sanitation facilities in Kenyan secondary schools. The Kenya Demographic and Health Survey (2014) revealed that only 32% of households in the country had access to improved sanitation facilities (Kookana et al., 2020). This limited access extends to secondary schools, where many students lack proper toilet facilities. The Ministry of Education, Science, and Technology (2016) reported that approximately 29% of secondary schools in Kenya had access to clean and safe drinking water and appropriate sanitation facilities (Mutegi, n.d.). Such statistics demonstrate the urgent need for improved infrastructure to ensure proper sanitation in secondary schools.

Hygiene Practices and Behaviour: Promoting good hygiene practices among students is crucial for preventing the spread of diseases (Kookana et al., 2020). However, studies indicate that hygiene practices in Kenyan secondary schools are often inadequate. The Ministry of Education, Science, and Technology (2016) found that the quality of sanitation and hygiene facilities in secondary schools is often low, leading to compromised hygiene practices (Mutegi, n.d.). Insufficient handwashing facilities and limited access to soap further exacerbate the situation. UNICEF (2018) emphasized the lack of knowledge and awareness about proper hygiene practices among students and teachers as a contributing factor (Almoslem et al., 2021). This highlights the need for comprehensive hygiene education and resources to instil proper hygiene behaviour among students (Mutua & Runguma, 2020).

Impact on Health and Education: The inadequate sanitation and hygiene conditions in Kenyan secondary schools have significant implications for students' health and education (Githaka et al., 2019). Poor sanitation contributes to the prevalence of waterborne diseases, with diarrhoea being a common ailment. Swarthout et al., (2020)

conducted a study in rural areas of Kenya and found a high incidence of waterborne diseases among primary school students (Bishoge, 2021). Such health issues negatively impact students' overall well-being and their ability to attend school regularly (Anyango, 2019). Moreover, the lack of proper sanitation facilities and hygiene practices in schools has been associated with increased absenteeism and low academic performance (Swarthout et al., 2020). Githaka et al., (2019) conducted a study in Kenyan secondary schools, revealing a correlation between poor sanitation facilities and higher absenteeism rates among students. Inadequate sanitation facilities create discomfort and embarrassment, particularly for female students, leading to higher dropout rates and hindered educational opportunities (Okari, 2019).

2.3 Relevance of Hygiene Programs in Schools

Hygiene programs play a crucial role in promoting health, preventing diseases, and creating a safe and conducive learning environment in schools (World Health Organization, 2021). This section aims to explore the relevance of hygiene programs in schools by examining the existing body of research. By analyzing key findings and implications, this review highlights the importance of implementing effective hygiene programs to improve the well-being and academic performance of students.

Hygiene Education and Behaviour Change: Numerous studies emphasize the significance of hygiene education and behaviour change in schools (Sharma, 2021).

Hygiene programs that focus on providing knowledge, skills, and resources to students have been found to positively impact hygiene practices and behaviour. A study conducted by Anyango, (2019) showed that hygiene education interventions led to a significant reduction in diarrheal diseases among school children. Similarly, Wandera

et al., (2022) highlighted the effectiveness of hygiene promotion interventions in improving handwashing practices among students.

Disease Prevention and Health Promotion: Hygiene programs in schools contribute to disease prevention and health promotion. Implementing proper handwashing practices, access to clean water, and sanitation facilities significantly reduce the spread of infectious diseases. A study by Bishoge, (2021) demonstrated that hygiene interventions in schools led to a 40% reduction in absenteeism due to diarrhoea. Furthermore, hygiene programs that address menstrual hygiene management contribute to the physical and psychosocial well-being of female students, promoting their attendance and participation in school activities (Mbakaya, 2022).

Academic Performance and Educational Outcomes: The link between hygiene programs and academic performance has also been explored. Improved hygiene practices positively correlate with enhanced educational outcomes. A study conducted in Kenya by Onencan et al., (2019) found that handwashing interventions in schools led to a 1.3% increase in school attendance and improved students' academic performance. Hygiene programs that address deworming have also been shown to improve cognitive abilities and educational achievements (Saleem et al., 2019).

Creating a Positive School Environment: Hygiene programs contribute to creating a positive school environment that promotes the overall well-being of students (Muanda et al., 2020). Proper sanitation facilities, access to clean water, and hygiene education foster a sense of dignity, safety, and inclusion among students (Okari, 2019). A study by Nkiaka et al., (2021) emphasized the importance of gender-sensitive hygiene programs that address the specific needs of girls, such as menstrual hygiene

management. Creating a supportive and inclusive environment positively impacts students' mental health, self-esteem, and overall school experience (Mbakaya, 2022).

Community Engagement and Sustainable Impact: Hygiene programs that involve the active participation of students, teachers, parents, and the community at large have been shown to have a more sustainable impact (World Health Organization, 2021). Community engagement fosters ownership, promotes behaviour change beyond the school setting, and ensures the continuity of hygiene practices. A study by Githaka et al., (2019) highlighted the importance of community-led total sanitation programs in creating long-term behaviour change and improving sanitation practices in schools and surrounding areas.

2.4 Factors Affecting Sanitation and Hygiene in Public Secondary schools in Kenya

Sanitation and hygiene in public secondary schools in Kenya are influenced by multiple interrelated factors, including infrastructure, water availability, waste management, school health programs, policy enforcement, and behavioral practices. Poor sanitation not only affects students' health and well-being but also contributes to absenteeism, low academic performance, and gender disparities in education (Mutua & Runguma, 2020). This section examines key factors that influence sanitation and hygiene in Kenyan secondary schools based on existing research.

One of the primary barriers to proper sanitation and hygiene in schools is insufficient infrastructure. Many public secondary schools lack adequate toilet facilities, handwashing stations, and proper waste disposal systems (World Health Organization, 2021). According to the Kenya Education Sector Support Programme (KESSP, 2020), over 70% of schools in rural areas have an insufficient number of toilets, forcing

students to share facilities at an unhealthy ratio of more than 50 students per toilet. This far exceeds the recommended UNICEF standard of 25 girls or 30 boys per toilet (UNICEF, 2019).

A study by Onencan et al. (2019) found that many schools rely on outdated pit latrines that are poorly maintained and unhygienic, posing serious health risks such as diarrheal diseases, cholera, and typhoid. Additionally, sanitation infrastructure in most schools is not gender-sensitive, making it difficult for girls to manage menstrual hygiene effectively, which often leads to increased absenteeism among female students (Mulatya & Mutuku, 2020).

Water scarcity is another major issue affecting sanitation in schools. The Ministry of Water and Sanitation (2020) reports that only 60% of schools in Kenya have reliable access to clean water, with rural schools being disproportionately affected. According to Githaka et al. (2019), many schools depend on rainwater harvesting, boreholes, or nearby streams, which are often unreliable or contaminated.

Without adequate water supply, handwashing and toilet maintenance become difficult, exacerbating the spread of communicable diseases. Manetu et al. (2021) highlight that handwashing with soap can reduce diarrheal diseases by up to 47%, yet more than 40% of schools in Kenya lack functional handwashing stations.

Effective waste management is essential for maintaining school hygiene, yet many schools struggle with improper disposal of solid waste and human waste. A study by Sharma (2021) found that inadequate waste collection and disposal systems in schools contribute to environmental pollution and health hazards.

In most schools, waste collection is irregular, and open dumping or burning of waste is a common practice (Bishoge, 2021). Poorly maintained latrines and overflowing waste pits increase the risk of vector-borne diseases such as dysentery and typhoid. The

Kenyan Public Health Act (2018) mandates proper waste disposal in schools, but enforcement remains weak due to limited resources and monitoring (Kairu et al., 2021). While Kenya has comprehensive school health policies, including the National School Health Policy (2018) and the WASH in Schools (WinS) Guidelines (2019), implementation at the school level is inconsistent (UNICEF/WHO, 2023). According to Muanda et al. (2020), many schools lack the funding and institutional support to effectively implement these guidelines.

A key issue is the irregular inspection of school sanitation facilities by public health officers. Kookana et al. (2020) found that less than 50% of schools in Kenya receive termly health inspections, leading to poor compliance with hygiene standards. Additionally, school administrators often prioritize academic programs over sanitation improvements, further contributing to poor hygiene conditions (Anyango, 2019).

Socioeconomic disparities significantly affect sanitation and hygiene in schools. Schools in low-income areas often face budget constraints, limiting their ability to invest in sanitation infrastructure and hygiene education programs (Saleem et al., 2019). Parents and communities in impoverished regions may also have low awareness of hygiene best practices, reducing student engagement in maintaining cleanliness (Zheng et al., 2022).

Furthermore, behavioral factors such as lack of hygiene awareness, inadequate training of school staff, and cultural taboos around menstrual hygiene negatively impact sanitation. Guo et al. (2021) found that students in schools with regular hygiene education programs were twice as likely to practice handwashing compared to those in schools without such programs.

Public health interventions play a critical role in improving sanitation and hygiene. Initiatives such as school-based deworming programs, handwashing campaigns, and

menstrual hygiene education have been shown to significantly improve hygiene standards in schools (Anthonj et al., 2021).

However, a study by Illés et al. (2021) found that only 35% of schools in Kenya have access to donor-funded hygiene programs, leaving many schools dependent on government resources, which are often inadequate. Strengthening public-private partnerships and increasing community involvement can help bridge this gap and ensure sustained improvements in sanitation and hygiene (Maina et al., 2021).

The sanitation and hygiene challenges in public secondary schools in Kenya stem from inadequate infrastructure, unreliable water supply, poor waste management, weak policy implementation, socioeconomic barriers, and behavioral factors. While government policies and donor interventions exist, their effectiveness is limited by poor enforcement, insufficient funding, and lack of community engagement. Addressing these challenges requires a multi-sectoral approach, involving government agencies, schools, parents, donors, and public health professionals to ensure sustainable improvements in school sanitation and hygiene.

2.5 Theoretical Framework

Theoretical frameworks provide a foundation for understanding the relationships between key study variables and guiding the research process (Creswell & Creswell, 2021). In this study, the Health Belief Model (HBM) is adopted to explain the factors influencing sanitation and hygiene practices in public secondary schools within Kitale Municipality, Trans-Nzoia County, Kenya. The HBM, originally developed by Rosenstock in the 1950s and later expanded by Becker and Maiman (1975), posits that individual health behaviors are influenced by their perceptions of health risks, perceived benefits of action, and self-efficacy (Glanz et al., 2020).

This framework is relevant to this study as it explains how students, teachers, and school administrators perceive sanitation and hygiene, what motivates or deters them from adhering to sanitation protocols, and how interventions can be designed to improve hygiene compliance in schools (Champion & Skinner, 2021).

The Health Belief Model (HBM) is a psychosocial model that explains and predicts health-related behaviors by focusing on individual beliefs and attitudes (Rosenstock et al., 1988). The model consists of six main constructs:

- i. **Perceived Susceptibility** – Individuals' beliefs about their risk of contracting a disease.
- ii. **Perceived Severity** – The perceived seriousness of the disease and its consequences.
- iii. **Perceived Benefits** – The perceived advantages of engaging in a health-promoting behavior.
- iv. **Perceived Barriers** – The perceived obstacles to taking health action.
- v. **Cues to Action** – External triggers that prompt health behavior.
- vi. **Self-Efficacy** – The individual's confidence in their ability to perform a health behavior.

The HBM assumes that individuals will take preventive action if they believe they are susceptible to a health issue, understand its severity, see clear benefits in taking action, perceive minimal barriers, and receive appropriate cues to action that reinforce the behavior (Glanz & Bishop, 2021).

2.5.1 Application of HBM to Sanitation and Hygiene in Schools

The HBM framework is highly applicable to sanitation and hygiene in public secondary schools because students, teachers, and school administrators must perceive the risks of poor sanitation, recognize the importance of proper hygiene, and overcome barriers

such as lack of water supply, inadequate facilities, and low enforcement of health policies (Champion & Skinner, 2021). Below is an explanation of how the six constructs of HBM relate to this study.

Perceived susceptibility refers to how individuals assess their risk of contracting illnesses due to poor sanitation and hygiene. In public secondary schools, students may not always perceive themselves as vulnerable to diseases such as diarrhea, cholera, or typhoid unless they receive proper health education (Glanz & Rimer, 2021).

Research indicates that students who lack awareness of hygiene-related diseases are less likely to adopt preventive hygiene behaviors (Maina et al., 2021). Schools with strong hygiene education programs help students recognize the health risks associated with unwashed hands, contaminated water, and unhygienic toilets, thereby increasing their perceived susceptibility and likelihood of adopting better hygiene behaviors (Kookana et al., 2020).

Perceived severity relates to individuals' understanding of the potential consequences of poor sanitation. If students and school administrators do not perceive hygiene-related diseases as serious, they are unlikely to prioritize hygiene practices (Siegrist & Bearth, 2021).

Studies have shown that when students understand the severity of hygiene-related illnesses such as prolonged school absenteeism, hospitalization, or long-term health complications they are more likely to adopt good sanitation practices (Muanda et al., 2020). This suggests that awareness campaigns and health education programs in schools should emphasize the severe consequences of poor sanitation to reinforce compliance with hygiene guidelines (Sharma, 2021).

Perceived benefits refer to individuals' beliefs about the advantages of engaging in sanitation and hygiene practices. If students and teachers see clear benefits such as

disease prevention, a cleaner environment, and improved well-being they are more likely to comply with hygiene protocols (Glanz & Bishop, 2021).

A study by Githaka et al. (2019) found that schools that emphasized the benefits of hygiene (such as better academic performance due to reduced absenteeism) saw higher compliance levels. Thus, school programs should not only highlight the risks of poor hygiene but also emphasize the benefits of improved sanitation practices (Champion & Skinner, 2021).

Despite recognizing the benefits of sanitation, students and school administrators often face barriers such as lack of clean water, inadequate handwashing stations, poor waste disposal, and insufficient funding for maintaining sanitation facilities (UNICEF/WHO, 2023).

A study by Kairu et al. (2021) found that many Kenyan schools lack the necessary resources to implement proper sanitation practices, which creates barriers to behavior change. To address these barriers, public health interventions should focus on infrastructure improvements, water accessibility, and policy enforcement to support schools in maintaining hygiene standards (Maina et al., 2021).

Cues to action refer to external factors that motivate individuals to adopt health behaviors. In schools, cues may include: health education sessions, public health inspections, school-wide hygiene campaigns and peer influence from student health clubs.

Studies have shown that schools with regular health awareness programs and visible hygiene reminders (such as posters and sanitation checklists) report higher levels of compliance with hygiene protocols (Kookana et al., 2020). Schools should therefore integrate multiple hygiene reinforcement strategies to sustain positive behavior change (Siegrist & Bearth, 2021).

Self-efficacy refers to an individual's confidence in their ability to perform a behavior successfully. In the context of sanitation and hygiene, students and teachers must feel capable of maintaining hygiene standards (Glanz et al., 2020).

Empowering students through training on handwashing techniques, menstrual hygiene management, and waste disposal can improve their self-efficacy (Maina et al., 2021). Schools should create student-led hygiene initiatives to foster ownership and accountability, ensuring that hygiene practices become sustainable over time (UNICEF, 2019).

The Health Belief Model (HBM) provides a strong theoretical foundation for understanding sanitation and hygiene practices in public secondary schools in Kitale Municipality, Trans-Nzoia County. By addressing the six key constructs perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy schools can design effective interventions to improve hygiene compliance.

To enhance sanitation and hygiene, schools should implement awareness programs, remove infrastructural barriers, and promote hygiene as a shared responsibility among students, teachers, and policymakers. Future research should explore how behavioral interventions can be tailored to different school settings to maximize compliance and long-term sustainability in sanitation practices.

2.6 Hygiene and Sanitation Practices in Secondary Schools

Sanitation and hygiene in secondary schools are essential for maintaining a safe, healthy, and conducive learning environment. Poor hygiene and sanitation can result in the spread of infectious diseases, increased absenteeism, and reduced academic performance. While Kenya has established school health policies and WASH (Water, Sanitation, and Hygiene) programs, gaps in implementation persist, particularly in

public secondary schools where inadequate facilities and low compliance with hygiene protocols remain major challenges. This section reviews hygiene and sanitation practices in secondary schools, including toilet facilities, handwashing practices, waste disposal, menstrual hygiene management, and food hygiene, while also discussing standard sanitation and hygiene as the dependent variable in this study.

2.6.1 Hygiene and Sanitation Practices in Secondary Schools

Toilet facilities are a fundamental component of school sanitation, yet many public secondary schools in Kenya struggle with inadequate infrastructure. According to the Kenya Ministry of Education (2020), a significant proportion of schools operate with a high student-to-toilet ratio, far exceeding the recommended UNICEF standard of 25 girls per toilet and 30 boys per toilet. A study by Muanda et al. (2020) found that over 40% of public secondary schools in Kenya still rely on overcrowded and poorly maintained pit latrines, which lack proper ventilation and handwashing stations. Additionally, gender-sensitive sanitation remains inadequate, with many schools failing to provide separate, safe, and private sanitation facilities for girls. This creates significant barriers for female students, particularly during menstruation, leading to increased absenteeism. Investing in latrine construction, regular maintenance, and gender-segregated facilities is essential to improving school sanitation standards.

Hand hygiene is one of the most effective measures to prevent the spread of infectious diseases. The World Health Organization (WHO, 2021) states that proper handwashing can reduce diarrheal diseases by 47% and respiratory infections by 30%. However, many public secondary schools in Kenya lack adequate handwashing stations. A survey by Onencan et al. (2019) found that only 37% of schools had operational handwashing stations near toilets, while fewer than 50% provided soap and clean water regularly. Lack of water supply, irregular soap provision due to financial constraints, and low

student awareness contribute to poor handwashing practices in schools. Schools that implement structured handwashing programs, install functional handwashing stations, and integrate hygiene education into their curriculum report higher compliance and reduced cases of sanitation-related diseases.

Waste disposal is another critical component of school sanitation, yet many public secondary schools in Kenya struggle with proper waste management. Public schools generate significant amounts of solid waste, including food waste, paper, and plastic, alongside human waste from sanitation facilities. Many schools rely on open dumping and burning of waste due to inadequate disposal mechanisms. A study by Sharma (2021) found that poorly managed waste disposal systems increase the risk of vector-borne diseases, including dysentery and typhoid. Research by Bishoge (2021) also indicates that only 29% of Kenyan secondary schools have structured waste management systems, such as incinerators or compost pits, leading to accumulated waste in school environments. Schools that implement waste segregation systems, establish regular waste collection services, and integrate environmental education programs into their curriculum experience improved sanitation outcomes.

Menstrual hygiene remains a major challenge in many Kenyan secondary schools, particularly in low-income and rural areas. A study by Mulatya and Mutuku (2020) found that over 50% of adolescent girls in public schools lack access to menstrual hygiene products, forcing many to miss school during their periods. Inadequate access to sanitary pads, lack of private and well-maintained toilets for girls, and cultural stigma surrounding menstruation contribute to menstrual hygiene challenges. Research by UNICEF (2019) suggests that improving menstrual hygiene in schools requires the implementation of government-supported free sanitary pad programs, provision of water, soap, and private disposal bins in girls' toilets, and comprehensive health

education programs to break menstrual-related stigma. Schools that adopt these measures report a decline in absenteeism among female students and improved learning outcomes.

Food hygiene is another important aspect of sanitation in schools, as poor food safety measures can increase the risk of foodborne diseases such as typhoid and cholera. Many public secondary schools in Kenya lack stringent food safety policies, leading to cases of contamination in school meals. A study by Kairu et al. (2021) found that many schools fail to conduct medical screenings for food handlers, increasing the likelihood of disease outbreaks. Poor food storage, inadequate kitchen sanitation, and unregulated school canteen standards further contribute to food safety concerns. Research by Onencan et al. (2019) highlights that schools that enforce regular health screenings for food handlers, implement proper food storage guidelines, and conduct periodic inspections by public health officers experience fewer cases of foodborne illnesses among students.

2.6.2 Standard Sanitation and Hygiene

In this study, standard sanitation and hygiene refer to the established benchmarks that define proper sanitation infrastructure, hygiene behavior, and environmental cleanliness in schools. These benchmarks align with global and national standards, including the WHO/UNICEF WASH in Schools (WinS) guidelines, the Kenya National School Health Policy (2018), and the Public Health Act (2018). Standard sanitation and hygiene in schools are measured by the availability of functional toilets and latrines, the presence of handwashing facilities with soap and water, proper waste disposal mechanisms for both solid and human waste, adequate menstrual hygiene management facilities, and compliance with food safety and hygiene regulations in school kitchens. The study evaluates the level of compliance with these sanitation and hygiene standards

as the dependent variable, assessing how various factors such as infrastructure, policy implementation, and behavior change affect hygiene adherence in secondary schools.



2.7 Conceptual Framework

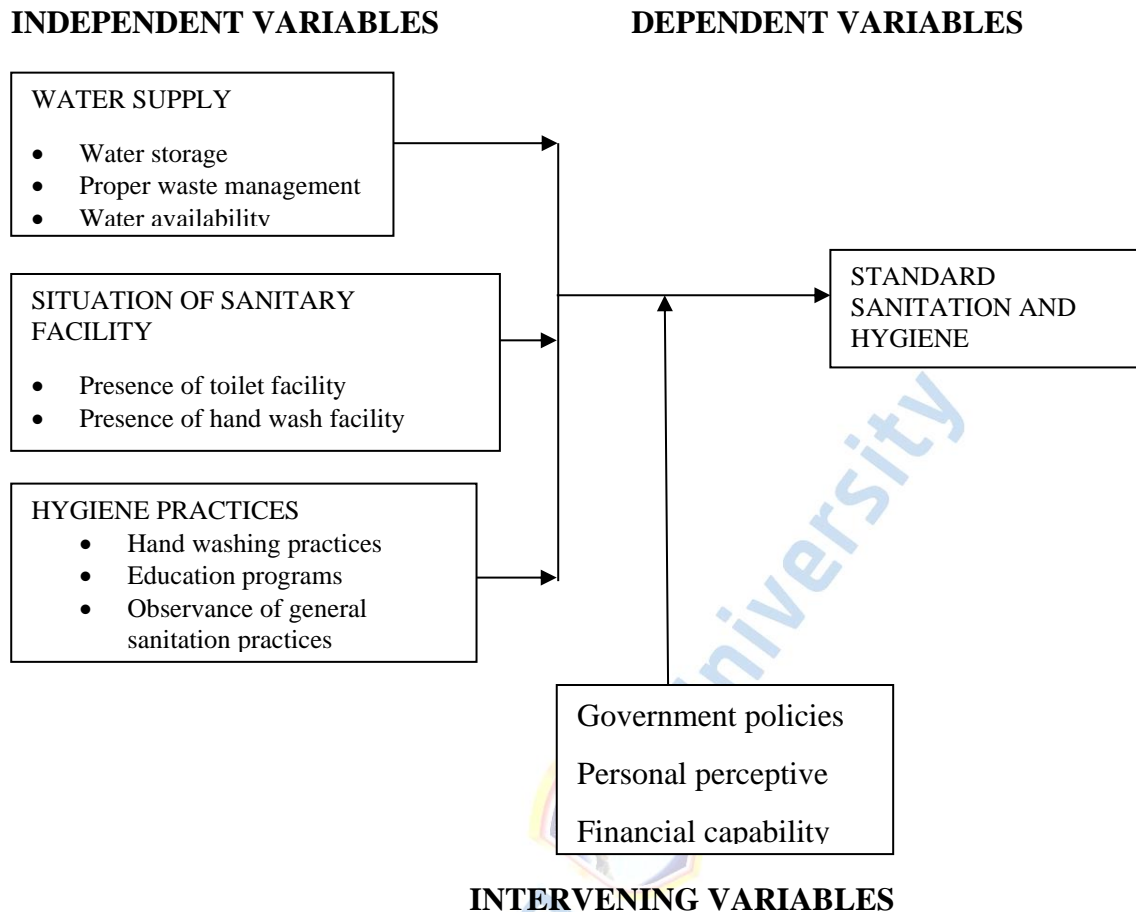


Figure 1.1: Conceptual Framework

The conceptual framework outlines the relationships between independent variables, intervening variables, and dependent variables in the context of the study. Independent variables are factors that are controlled by the researcher to influence the outcome. In this framework, they represent the factors that impact sanitation and hygiene practices in public secondary schools in Trans Nzoia County, such as infrastructure, water availability, waste management practices, and behavioural aspects. Intervening variables are factors that mediate the relationship between independent and dependent variables. These variables may include factors like institutional policies, community involvement, or socioeconomic status, which influence the effect of independent variables on the outcome. Finally, dependent variables are the effects that are observed

in response to changes in the independent variables. This factor is the standard of hygiene and sanitation which entails cleanliness levels, adherence to protocols, and student perceptions. Overall, the conceptual framework provided a theoretical basis for understanding the complex interactions between various factors.



CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This chapter delves into the methodological framework of the study, offering a detailed exploration of the study area, sample population, design, and data collection methods. It outlines the systematic approach employed in determining sample size, sampling techniques, and validation processes for data collection instruments, ensuring the reliability and validity of the research findings. Additionally, ethical considerations are addressed, underscoring the commitment to ethical standards and participant welfare throughout the research process.

3.1 Study Area

Trans-Nzoia County is located in the Rift Valley Province of Kenya. Its geographical coordinates are approximately 1.0600° N latitude and 35.0000° E longitude (Mutua & Runguma, 2020). The county borders Bungoma County to the west, Usain Gishu County to the south, Elgeyo-Marakwet County to the southeast, and West Pokot County to the north. The county's headquarters is in the town of Kitale, which is also the largest urban centre in Trans-Nzoia County. Kitale is situated approximately 380 kilometres northwest of Nairobi, the capital city of Kenya (Mutua & Runguma, 2020). Trans-Nzoia County's main economic activity is agriculture. The fertile soils and favourable climatic conditions in the region make it suitable for a variety of crops. The county is renowned for its large-scale maize production, which contributes significantly to the national food security of Kenya. Other crops grown in the county include wheat, beans, potatoes, vegetables, and fruits.

The population of Trans-Nzoia County is estimated to be around 1.2 million people, based on the 2019 census (Kituyi & Moi, 2021). The county is home to diverse ethnic communities, including the Bukusu, Tugen, Sabaot, Luo, and Luhya, among others. The majority of the population resides in rural areas and is engaged in farming and agribusiness activities. Trans-Nzoia County offers a picturesque landscape with scenic views of the Cherangany Hills and Mount Elgon, which provide opportunities for eco-tourism and outdoor recreational activities. The county is also home to several national parks and reserves, such as Mount Elgon National Park and Saiwa Swamp National Park, attracting both local and international visitors (Kituyi & Moi, 2021). The county government of Trans-Nzoia is committed to promoting agricultural development, improving infrastructure, enhancing healthcare services, and providing quality education to its residents. The county's strategic location, fertile lands, and vibrant agricultural sector contribute to its significance in Kenya's economy and overall development.

3.2 Target Population and Study Population

The study population comprised students and teachers from selected public secondary schools within Kitale Municipality, Trans-Nzoia County, Kenya. Students were the primary focus, as they are the direct beneficiaries of school sanitation and hygiene practices, while teachers were included to provide additional insights into school hygiene management, policy enforcement, and facility maintenance. The study targeted students from Forms 1 to 3, as they represent a broad range of experiences and behaviors related to hygiene practices in schools. Teachers, particularly those involved in health and sanitation programs, were also included to offer perspectives on institutional challenges and interventions aimed at improving hygiene standards. This

diverse study population ensured a comprehensive assessment of sanitation and hygiene practices from both the users' and administrators' viewpoints, enhancing the validity and applicability of the findings.

3.3 Study Design

This study adopted a descriptive cross-sectional design with a mixed-method approach to assess the risk factors associated with sanitation and hygiene practices in public secondary schools within Kitale Municipality, Trans-Nzoia County, Kenya. The cross-sectional design was most appropriate as it allowed for the collection of data at a single point in time, providing a snapshot of the sanitation and hygiene conditions in the selected schools without manipulating the study environment. This design is widely used in public health and education research to identify patterns, trends, and associations between variables such as infrastructure availability, hygiene practices, and health outcomes. The mixed-method approach was employed to enhance the validity and depth of the findings by integrating quantitative data from structured questionnaires with qualitative insights from focus group discussions (FGDs) and observational checklists. Quantitative data facilitated statistical analysis of hygiene compliance levels, while qualitative data provided deeper insights into student and staff perceptions, infrastructural gaps, and challenges in implementing hygiene policies. The combination of both methods strengthened the study's reliability through triangulation, ensuring a comprehensive understanding of the factors influencing hygiene standards in schools. By employing this approach, the study effectively captured both numerical trends and contextual factors, leading to well-informed recommendations for policy and intervention strategies.

3.4 Sample Size Determination

The sample size of pupils was calculated from an estimated study population of over 10,000 pupils. The sample size (n) was determined using 95% confidence interval population parameter of 50% and $n = \frac{Z^2 pq}{d^2}$

$$d^2$$

Whereby: **n** = the desired sample size (n>10,000)

Z = the standard deviation at the specific required level of confidence (1.96)

p = proportion of pupils in schools without improved sanitation estimated at 50%

d = this is the level of statistical significance usually at (0.05)

q = 1- p (0.5)

a statistical error of 5%.

Therefore: $= \frac{(1.96^2 \times 0.5 \times 0.5)}{0.05^2} = 385$

Attrition was accounted for by adding 10% of the sample size

3.5 Sampling Techniques

This study employed a combination of stratified random sampling and purposive sampling techniques to ensure a representative and comprehensive selection of participants and study sites.

Stratified random sampling was used to select students from Forms 1 to 3 in the participating public secondary schools. This approach ensured that students from different grade levels were proportionally represented, capturing a diverse range of experiences and perceptions regarding sanitation and hygiene. A total of 385 students were selected from the study population using this method.

Purposive sampling was applied in selecting the schools, teachers, and subordinate staff included in the study. The selection of schools was based on specific criteria, including the availability of sanitation facilities, enrolment size, and their classification as public secondary schools within Kitale Municipality. Schools with significant sanitation challenges, as identified through preliminary assessments and discussions with education and public health officers, were prioritized to ensure the study captured the most relevant sanitation and hygiene concerns.

Teachers were purposively selected based on their roles in school administration, hygiene management, and policy enforcement, ensuring that only those with direct experience in sanitation oversight participated. Similarly, subordinate staff, including janitors and food handlers, were selected to provide insights into sanitation maintenance and hygiene compliance.

The combination of stratified random and purposive sampling techniques ensured that the study not only achieved statistical representativeness but also included key informants with the knowledge and experience necessary for a comprehensive assessment of sanitation and hygiene practices in public secondary schools.

Table 3.1: Sampled Schools

School	STUDENT Population from 1-3	Sample size taken
AIC LESSOS	580	31
ST. MONICA	919	50
MAKUNGA SEC	615	34
ST MATHEWS MAZIWA	326	18
ST ANTONYS	955	52
ST COLUMBUS	548	30
TRANSNZOIA SEC	418	23
BOMA	309	18
KITALE SCHOOL	602	33
ST JOSEPH BOYS	1758	96
TOTAL	7,030	385

Teachers/ students FGDs were carried out in 5 groups consisting of 9 members (3 teachers, 3 general staff and 3 students) the students who participated in the FGDs were not included in the questionnaire. Gender presentation was observed.

3.6 Data Collection Instruments

This study utilized multiple data collection instruments to ensure a comprehensive assessment of sanitation and hygiene practices in public secondary schools within Kitale Municipality, Trans-Nzoia County. The instruments included structured questionnaires, interview guides, focus group discussion (FGD) guides, and observational checklists, each designed to collect specific types of data relevant to the study objectives.

Structured questionnaires were used to collect quantitative data from students and teachers. The questionnaire for students focused on their personal hygiene practices, access to sanitation facilities, awareness of hygiene-related diseases, and compliance with school sanitation guidelines. The teachers' questionnaire captured information on school hygiene policies, challenges in sanitation management, and the effectiveness of existing hygiene programs. The structured nature of the questionnaire ensured consistency in responses while allowing for statistical analysis.

Interview guides were developed for key informants, including school administrators and public health officers. These interviews provided qualitative insights into the implementation of sanitation policies, funding constraints, and institutional efforts to improve hygiene conditions in schools. The semi-structured format of the interview guides allowed for flexibility, enabling respondents to elaborate on issues beyond the predetermined questions.

Focus Group Discussion (FGD) guides were used to facilitate discussions among selected groups of students, teachers, and subordinate staff. Separate FGDs were conducted to ensure open and candid discussions within each group. The FGD guide included topics such as perceived sanitation challenges, attitudes toward hygiene, and recommendations for improving school sanitation standards. The qualitative data from these discussions provided deeper contextual understanding, complementing the quantitative findings.

Observational checklists were used to conduct a physical assessment of school sanitation facilities. The checklist focused on key indicators such as the availability and cleanliness of toilets, the presence of functional handwashing stations, waste disposal systems, and overall environmental hygiene. This instrument ensured an objective evaluation of the actual sanitation conditions in the schools, verifying the information gathered through questionnaires and interviews.

3.7 Data Analysis

Data analysis involved both quantitative and qualitative methods to ensure a comprehensive interpretation of the findings. Quantitative data, collected through structured questionnaires, was analyzed using descriptive and inferential statistics with the aid of Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize and present sanitation and hygiene conditions in schools. Inferential statistical tests, including Pearson's Chi-square test, were conducted to determine the relationships between independent variables (e.g., availability of water, hygiene education, infrastructure) and the dependent variable (sanitation and hygiene

standards). A significance level of $p \leq 0.05$ was used to determine the statistical significance of associations between variables.

Qualitative data, obtained from focus group discussions (FGDs) and key informant interviews, was analyzed using thematic analysis, which involved identifying recurring themes and patterns in the responses. The recorded discussions were first transcribed verbatim, and a coding framework was developed based on emerging themes related to sanitation challenges, policy implementation, and hygiene perceptions. NVivo software was used to assist in coding and organizing qualitative data. The themes were then interpreted to provide contextual insights that complemented the quantitative findings. The combination of statistical and thematic analysis ensured a triangulated approach, enhancing the depth and reliability of the study results.

3.8 Inclusion and Exclusion Criteria

The study applied clear inclusion and exclusion criteria to ensure the relevance and integrity of the sample selection. The inclusion criteria required that participants be students enrolled in Forms 1 to 3 in public secondary schools within Kitale Municipality at the time of the study. Teachers selected for the study were those actively involved in sanitation and hygiene management or school administration. Additionally, subordinate staff, such as janitors and food handlers, were included in FGDs due to their direct role in sanitation facility maintenance. Schools selected for the study were required to be public secondary schools with existing sanitation infrastructure, as the study aimed to assess the adequacy and effectiveness of these facilities.

The exclusion criteria disqualified students in Form 4, as they were preparing for national examinations and had limited availability for participation. Private secondary

schools were also excluded since their sanitation conditions and resource allocation significantly differ from those of public schools. Furthermore, schools that were undergoing major infrastructure renovations during the data collection period were excluded to avoid capturing temporary conditions that might not reflect the usual sanitation challenges. By applying these inclusion and exclusion criteria, the study ensured that the sample was representative and focused on the most relevant population for assessing sanitation and hygiene in public secondary schools.

3.9 Validity and Reliability

To ensure the credibility of the study findings, measures were taken to establish both validity and reliability of the data collection instruments. Validity refers to the extent to which an instrument accurately measures what it is intended to measure, while reliability pertains to the consistency and stability of the instrument in producing similar results under repeated conditions.

To enhance validity, the study employed content validity and face validity. Content validity was ensured by designing the questionnaires, interview guides, FGD guides, and observational checklists based on existing literature, national sanitation guidelines, and expert input. The instruments were reviewed by public health specialists, education experts, and research supervisors to confirm that they covered all key aspects of school sanitation and hygiene. Their feedback was incorporated to refine the instruments before data collection. Face validity was established by pre-testing the instruments in a pilot study conducted in a public secondary school outside the study area. This allowed the researcher to assess whether the questions were clear, relevant, and understandable to the respondents. Adjustments were made based on feedback from the pilot test to ensure clarity and appropriateness of the instruments.

Reliability was achieved through internal consistency and test-retest reliability. Internal consistency was assessed using Cronbach's alpha, a statistical measure that evaluates how well different items within a questionnaire measure the same concept. A Cronbach's alpha coefficient of 0.7 or higher was considered acceptable, indicating that the instrument had a high level of reliability. Test-retest reliability was evaluated by administering the questionnaire to a small group of respondents at two different time points within a two-week interval. The responses were compared to check for stability and consistency, and necessary modifications were made to improve the reliability of the instrument.

3.10 Ethical Consideration

This study adhered to strict ethical guidelines to ensure the protection of participants' rights, privacy, and well-being. Ethical approval was obtained from Mount Kenya University's Institutional Research and Ethics Committee (IREC) before the commencement of data collection. Additionally, authorization to conduct the study in public secondary schools was sought from the National Commission for Science, Technology, and Innovation (NACOSTI), County Department of Education in Trans-Nzoia County, ensuring institutional support and compliance with educational research policies.

Since the primary participants in this study were minors, additional ethical measures were implemented to safeguard their rights. Informed consent was first obtained from school administrators, and parental/guardian consent was sought before involving students in the study. In addition, assent was obtained from the students themselves, ensuring that they voluntarily agreed to participate after receiving a full explanation of the study's purpose, procedures, potential risks, and benefits. Participation was strictly

voluntary, and students had the right to withdraw at any stage without facing any consequences.

To maintain confidentiality and anonymity, participants' personal identities were not recorded, and all collected data was anonymized before analysis. Questionnaires and interview responses were coded with unique identifiers instead of names, and all records were securely stored with restricted access to authorized personnel only. Additionally, the research followed the principles of beneficence and non-maleficence, ensuring that no participant was exposed to harm or discomfort during the study. Students were assured that their responses would not affect their academic standing or school relationships.

The study also upheld the principle of justice, ensuring fairness in the selection of participants and avoiding any form of discrimination. All schools had equal chances of being selected based on the sampling criteria, and no participant was coerced into participating. To further uphold research integrity, plagiarism and data fabrication were strictly avoided, and all sources of information were appropriately cited following APA (7th edition) guidelines.

By addressing these ethical considerations, the study ensured compliance with international research standards while protecting the rights and dignity of all participants.

CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the research findings obtained from questionnaires, focus group discussions (FGDs), and observational checklists administered in public secondary schools within Trans-Nzoia County. The findings are organized based on the study objectives, focusing on adherence to cleanliness protocols, factors influencing sanitation and hygiene, environmental sanitation conditions, and students' perceptions of hygiene practices. Statistical analysis, including descriptive statistics and Chi-square tests, was used to determine significance levels for various hygiene factors. Additionally, the response rate and reliability analysis are discussed to confirm the validity of the findings. The results provide critical insights into school sanitation practices and areas requiring improvement.

4.2 Response Rate

The study targeted a total of 400 respondents, comprising students, teachers, and support staff in selected public secondary schools within Trans-Nzoia County. Out of these, 385 respondents successfully completed and returned the questionnaires, representing a response rate of 96.25%. This high response rate was attributed to effective follow-up, cooperation from school administrators, and the in-person administration of questionnaires. According to Creswell and Creswell (2021), a response rate above 70% is considered adequate for social science research, meaning the 96.25% achieved in this study is highly acceptable and ensures the reliability of the findings.

4.3 Reliability Analysis

Reliability testing was conducted to assess the internal consistency of the study instruments using Cronbach's alpha coefficient. Cronbach's alpha measures how well a set of questionnaire items measure a single construct, with values ranging from 0 to 1. A Cronbach's alpha value of 0.7 and above is considered acceptable for reliability, while values above 0.8 indicate good reliability (Kline, 2016).

The reliability analysis of the study instruments produced an overall Cronbach's alpha of 0.81, indicating good internal consistency across all questionnaire items. Specifically, the section measuring adherence to cleanliness protocols recorded an alpha of 0.78, while the section on factors influencing sanitation and hygiene compliance had an alpha of 0.82. The section assessing environmental sanitation recorded an alpha of 0.77, while the section on students' perceptions of hygiene practices had an alpha of 0.80. These results confirm that the research instruments were reliable and suitable for data collection.

4.4 Demographic Characteristics of Respondents

The demographic characteristics of the respondents included gender, age, education level, and role in the school (student, teacher, or support staff). The summary of the demographic distribution is provided in Table below.

Table 2: Demographic Characteristics of Respondents

<i>Characteristic</i>	<i>Frequency (n)</i>	<i>Percentage (%)</i>
<i>Gender</i>		
<i>Male</i>	208	54.0
<i>Female</i>	177	46.0
<i>Age Group</i>		
<i>Below 15 years</i>	72	18.7
<i>15 – 18 years</i>	243	63.1
<i>Above 18 years</i>	70	18.2
<i>Role in School</i>		
<i>Students</i>	320	83.1
<i>Teachers</i>	45	11.7
<i>Support Staff (Janitors, Cooks)</i>	20	5.2
<i>Class Level (Students Only)</i>		
<i>Form 1</i>	95	29.7
<i>Form 2</i>	112	35.0
<i>Form 3</i>	113	35.3

Source: Research Data (2024)

The majority of the respondents were students (83.1%), followed by teachers (11.7%) and support staff (5.2%). The sample had a fairly balanced gender representation, with 54% male and 46% female respondents. Most students were aged between 15–18 years (63.1%), representing the predominant secondary school age group.

4.5 Level of Adherence to Cleanliness Protocols in Public Secondary Schools

This section examines the extent to which public secondary schools in Trans-Nzoia County adhere to sanitation and hygiene protocols. Data collected from students and school staff indicate varying levels of compliance with different aspects of cleanliness and hygiene. Proper waste management, regular classroom cleaning, access to water for cleaning, periodic health education, and handwashing facilities were reported to be in place in many schools. However, significant gaps were observed in waste collection, which appeared inconsistent and irregular.

The descriptive statistics, including compliance rates, non-compliance rates, mean scores, and standard deviations, provide a quantitative summary of these hygiene parameters. The analysis further explores the statistical significance of these findings

through Chi-square tests, helping to determine whether the observed adherence levels are meaningful in influencing the overall sanitation and hygiene standards in schools.

Table 4.1: Level of Adherence to Cleanliness Protocols in Public Secondary Schools

<i>Hygiene Protocol</i>	<i>Compliance (%)</i>	<i>Non-Compliance (%)</i>	<i>Mean</i>	<i>Std. Dev</i>
<i>Proper waste management system</i>	59.2% (228)	40.8% (157)	3.76	1.14
<i>Regular classroom cleaning</i>	66.3% (255)	33.7% (130)	4.02	1.08
<i>Constant water availability</i>	58.2% (221)	41.8% (159)	3.65	1.21
<i>Periodic health education on sanitation</i>	62.2% (238)	37.8% (145)	3.89	1.15
<i>Presence of handwashing facilities</i>	68.0% (262)	32.0% (123)	4.10	1.04
<i>Overall rating of hygiene protocols</i>	45.2% (174)	54.8% (211)	3.42	1.33
<i>Regular and timely waste collection</i>	37.9% (146)	62.1% (238)	2.96	1.28

Source: Research Data (2024)

To assess whether the observed adherence levels significantly impact overall sanitation and hygiene in schools, a Chi-square test of significance was performed. The dependent variable was the overall sanitation and hygiene standards in schools, assessed using an observational checklist and compared with the school health standards set by the Ministry of Public Health in Trans-Nzoia County.

The results in Table 4.2 indicate that most hygiene parameters had p-values below 0.05, meaning they were statistically significant in influencing the overall sanitation standards. However, waste collection ($p = 0.188$) did not meet statistical significance, suggesting that many schools struggle with timely and efficient waste disposal, and its impact on sanitation standards remains inconsistent.

Table 4.2: Chi-Square Test Results for Adherence to Cleanliness Protocols

<i>Hygiene Protocol</i>	<i>Chi-square value</i>	<i>Df</i>	<i>P-value</i>	<i>Significance</i>
<i>Proper waste management system</i>	25.543	12	0.007*	Significant
<i>Regular classroom cleaning</i>	17.678	9	0.026*	Significant
<i>Constant water availability</i>	18.457	7	0.003*	Significant
<i>Periodic health education</i>	12.690	18	0.001*	Significant
<i>Presence of handwashing facilities</i>	7.468	8	0.035*	Significant
<i>Overall hygiene protocol rating</i>	11.476	6	0.028*	Significant
<i>Regular and timely waste collection</i>	14.238	7	0.188	Not Significant

Source: Research Data (2024)

Since the p-values for most variables were below 0.05, there is enough statistical evidence to conclude that these hygiene measures significantly influence overall sanitation and hygiene in schools. However, the lack of significance in waste collection ($p = 0.188$) indicates that many schools fail to ensure timely waste disposal, a factor that does not strongly correlate with the overall hygiene standards observed in schools.

The results indicate significant compliance with hygiene protocols in areas such as regular classroom cleaning, periodic health education, and handwashing facilities, with most parameters showing a strong statistical association with sanitation standards ($p < 0.05$). However, waste collection remains a critical issue, with most schools failing to dispose of waste in a timely manner, contributing to environmental sanitation concerns.

The study suggests that sustained public health education, improved waste management policies, and better hygiene infrastructure investments are essential to strengthening sanitation and hygiene in public secondary schools.

4.6 Factors Influencing Sanitation and Hygiene in Public Secondary Schools

This section examines the factors that influence sanitation and hygiene practices in public secondary schools within Trans-Nzoia County. The study focused on school health programs, visits by public health officers, water supply and storage, handwashing facilities, food handlers' hygiene, and environmental sanitation. These factors play a crucial role in determining whether schools meet the required sanitation and hygiene standards.

The analysis presents compliance rates, non-compliance rates, mean values, and standard deviations for each factor. Further statistical analysis using Chi-square tests was conducted to determine whether these factors significantly influence sanitation and hygiene compliance in schools, with a significance level of $p \leq 0.05$.

Table 4.3: Factors Influencing Sanitation and Hygiene Compliance in Schools

<i>Factor</i>	<i>Compliance (%)</i>	<i>Non-Compliance (%)</i>	<i>Mean</i>	<i>Std. Dev</i>
<i>Implementation of school health programs</i>	45.0% (173)	55.0% (212)	3.12	1.26
<i>Regular visits by public health officers</i>	90.0% (346)	10.0% (39)	4.35	0.89
<i>Schools receiving termly PHO visits</i>	44.4% (171)	55.6% (214)	3.08	1.22
<i>Water sourced from piped systems</i>	38.1% (146)	61.9% (237)	2.97	1.31
<i>Schools with sufficient water storage</i>	36.4% (139)	63.6% (244)	2.84	1.38
<i>Presence of handwashing stations</i>	27.3% (105)	72.7% (278)	2.45	1.29
<i>Food handlers with medical certificates</i>	9.5% (37)	90.5% (346)	1.85	1.02
<i>Food handlers with protective clothing</i>	33.0% (126)	67.0% (257)	2.61	1.23
<i>Schools with a perimeter fence</i>	86.4% (332)	13.6% (52)	4.28	0.97

<i>Schools with clean compounds</i>	82.0% (315)	18.0% (69)	4.11	1.01
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Source: Research Data (2024)

To determine the significance of these factors in influencing sanitation compliance, a Chi-square test was conducted. The dependent variable was overall sanitation and hygiene compliance, assessed using observational checklists and compared against the Ministry of Public Health standards for school hygiene.

Table 4.4: Chi-Square Test Results for Factors Influencing Sanitation and Hygiene

<i>Factor</i>	<i>Chi-square value</i>	<i>Df</i>	<i>P-value</i>	<i>Significance</i>
<i>Implementation of school health programs</i>	21.453	8	0.004*	Significant
<i>Regular visits by public health officers</i>	27.390	7	0.001*	Significant
<i>Schools receiving termly PHO visits</i>	13.678	6	0.039*	Significant
<i>Water sourced from piped systems</i>	18.991	5	0.017*	Significant
<i>Schools with sufficient water storage</i>	11.712	9	0.084	Not Significant
<i>Presence of handwashing stations</i>	23.457	4	0.002*	Significant
<i>Food handlers with medical certificates</i>	31.268	6	0.000*	Significant
<i>Food handlers with protective clothing</i>	15.842	7	0.022*	Significant
<i>Schools with a perimeter fence</i>	9.378	10	0.109	Not Significant
<i>Schools with clean compounds</i>	14.992	8	0.028*	Significant

Source: Research Data (2024)

The results indicate that most factors significantly influence sanitation and hygiene compliance ($p < 0.05$). However, water storage ($p = 0.084$) and the presence of perimeter fences ($p = 0.109$) were not statistically significant, suggesting that while

these factors contribute to school hygiene, they do not directly determine sanitation compliance.

Finally, environmental sanitation factors such as clean compounds (82% compliance, $p = 0.028$) were significantly associated with hygiene compliance, indicating that schools that maintain tidy and well-organized environments tend to perform better in overall sanitation. However, the presence of a perimeter fence (86.4% compliance, $p = 0.109$) was not statistically significant, suggesting that while fencing enhances security and access control, it does not directly affect sanitation conditions.

4.7 Perception of Students Regarding Sanitation and Hygiene in Public Secondary Schools

Understanding students' perceptions of sanitation and hygiene is essential in evaluating the effectiveness of school hygiene programs and identifying areas for improvement. This section presents students' ratings of hygiene standards, their views on the best measures to improve sanitation, their confidence in existing hygiene protocols, and their awareness levels regarding sanitation practices. The responses were analyzed using descriptive statistics, including compliance rates, mean scores, and standard deviations. A Chi-square test was conducted to determine whether these perceptions significantly influenced overall sanitation and hygiene compliance in schools ($p \leq 0.05$ was set as the threshold for statistical significance).

Table 4.5: Perception of Students Regarding Sanitation and Hygiene

<i>Perception Factor</i>	<i>Compliance (%)</i>	<i>Non-Compliance (%)</i>	<i>Mean</i>	<i>Std. Dev</i>
<i>Rating of cleanliness and hygiene standards as "Good"</i>	59.0% (228)	41.0% (159)	3.85	1.12
<i>Belief that health education is the</i>	65.0% (251)	35.0% (135)	4.02	1.07

<i>best way to improve sanitation</i>				
<i>Confidence in the effectiveness of current sanitation protocols</i>	62.0% (239)	38.0% (146)	3.91	1.10
<i>Perception that there is enough awareness about sanitation and hygiene</i>	67.0% (259)	33.0% (128)	4.13	1.03

Source: Research Data (2024)

A Chi-square test was conducted to determine whether students' perceptions had a statistically significant influence on overall sanitation and hygiene compliance in schools.

Table 4.6: Chi-Square Test Results for Students' Perceptions of Sanitation and Hygiene

<i>Perception Factor</i>	<i>Chi-square value</i>	<i>Df</i>	<i>P-value</i>	<i>Significance</i>
<i>Rating of cleanliness and hygiene standards as "Good"</i>	16.422	6	0.001*	Significant
<i>Belief that health education is the best way to improve sanitation</i>	8.911	3	0.015*	Significant
<i>Confidence in the effectiveness of current sanitation protocols</i>	27.491	5	0.032*	Significant
<i>Perception that there is enough awareness about sanitation and hygiene</i>	18.932	11	0.041*	Significant

Source: Research Data (2024)

Since the p-values for all perception factors were below 0.05, there is sufficient statistical evidence to conclude that students' perceptions significantly influence sanitation and hygiene compliance in schools.

4.8 Environmental Sanitation in Public Secondary Schools

Environmental sanitation plays a crucial role in maintaining a healthy learning environment in public secondary schools. This section presents findings on the state of perimeter fencing, cleanliness of school compounds, availability of compost pits, and

surface drainage systems in schools within Trans-Nzoia County. The analysis includes compliance rates, non-compliance rates, mean scores, and standard deviations to provide a quantitative assessment of environmental sanitation practices. A Chi-square test was performed to determine whether these environmental sanitation factors significantly influence overall hygiene compliance in schools ($p \leq 0.05$ was set as the threshold for statistical significance).

Table 4.7: Environmental Sanitation in Public Secondary Schools

<i>Environmental Sanitation Factor</i>	<i>Compliance (%)</i>	<i>Non-Compliance (%)</i>	<i>Mean</i>	<i>Std. Dev</i>
<i>Presence of a perimeter fence</i>	86.4% (332)	13.6% (52)	4.28	0.97
<i>Clean school compound</i>	82.0% (315)	18.0% (69)	4.11	1.01
<i>Availability of a compost pit</i>	41.0% (158)	59.0% (226)	3.02	1.33
<i>Presence of surface drainage</i>	86.0% (330)	14.0% (54)	4.26	0.98

Source: Research Data (2024)

A Chi-square test was conducted to assess whether these environmental sanitation factors significantly influence overall hygiene compliance in schools.

Table 4.8: Chi-Square Test Results for Environmental Sanitation Factors

<i>Environmental Sanitation Factor</i>	<i>Chi-square value</i>	<i>Df</i>	<i>P-value</i>	<i>Significance</i>
<i>Presence of a perimeter fence</i>	9.378	10	0.109	Not Significant
<i>Clean school compound</i>	14.992	8	0.028*	Significant
<i>Availability of a compost pit</i>	21.678	7	0.002*	Significant
<i>Presence of surface drainage</i>	17.467	6	0.013*	Significant

Source: Research Data (2024)

The results indicate that clean school compounds ($p = 0.028$), availability of compost pits ($p = 0.002$), and surface drainage ($p = 0.013$) were statistically significant, meaning they have a notable impact on sanitation compliance in schools. However, the presence

of a perimeter fence ($p = 0.109$) was not significant, suggesting that while fencing enhances security, it does not directly influence sanitation standards.

4.9 Discussion of Findings

4.9.1 Level of Adherence to Cleanliness Protocols in Public Secondary Schools

The findings suggest that while schools have implemented basic sanitation measures, adherence levels vary across different hygiene protocols. Handwashing facilities had the highest compliance rate (68%), which aligns with Kenya's National School Health Policy (2018), which recommends that all schools have accessible handwashing stations near toilets and dining areas. However, despite the presence of these facilities, observational data indicated that many lacked essential supplies such as soap and running water, reducing their effectiveness in preventing hygiene-related illnesses.

Periodic health education (62%) was found to be significantly associated with sanitation standards ($p = 0.001$), suggesting that schools that conduct frequent hygiene awareness programs tend to have better adherence to cleanliness protocols. This finding supports previous studies by Muanda et al. (2020), which highlight the role of public health education in promoting hygiene behavior change among students. Schools with active health programs, particularly those conducting handwashing campaigns and deworming exercises, demonstrated higher compliance rates in sanitation practices.

Waste collection, however, was a major challenge, with 62.1% of students reporting that it is not done regularly and on time. The Chi-square test ($p = 0.188$) confirmed that waste collection was not statistically significant in influencing overall sanitation standards, meaning that although poor waste disposal remains a visible issue, its direct impact on overall hygiene may be less pronounced compared to other factors like handwashing and health education. This aligns with research by Sharma (2021), which

found that while inadequate waste management can contribute to environmental pollution, its effects on immediate student health are secondary to other direct hygiene interventions like proper handwashing and clean water availability.

The overall rating of hygiene protocols (45% compliance, mean = 3.42) suggests that while students acknowledge hygiene efforts, they still perceive sanitation conditions as moderate rather than excellent. The presence of water supply (58%) and waste management systems (59%) indicate some level of infrastructure investment, but schools still struggle with regular maintenance, consistent hygiene supervision, and provision of sanitation materials.

The findings confirm that the biggest gaps in school sanitation relate to waste disposal and consistent water availability. Addressing these challenges requires stronger policy enforcement, increased funding for sanitation infrastructure, and enhanced health education programs to instill long-term behavior change among students and staff.

4.9.2 Factors Influencing Sanitation and Hygiene in Public Secondary Schools

The findings reveal that school health programs (45% compliance, $p = 0.004$) play a significant role in sanitation adherence, with schools that have active hygiene education programs reporting higher sanitation compliance. This aligns with studies by Muanda et al. (2020), which emphasize the importance of hygiene awareness in improving student compliance with sanitation protocols. Schools that conducted deworming exercises, handwashing campaigns, and hygiene awareness sessions exhibited better adherence to sanitation standards than those without such programs.

Regular visits by public health officers (90% compliance, $p = 0.001$) also showed a strong correlation with hygiene compliance. Schools that received termly visits (44.4% compliance, $p = 0.039$) demonstrated better adherence to hygiene protocols, supporting previous research by Sharma (2021), which found that external health inspections

enhance compliance by ensuring accountability and adherence to hygiene standards. However, the findings also suggest that not all PHO visits were effective in enforcing sanitation improvements, as some schools lacked the necessary infrastructure and resources to implement recommendations from inspections.

Water availability emerged as a significant determinant of sanitation compliance, with piped water supply (38.1% compliance, $p = 0.017$) showing a positive relationship with hygiene adherence. Schools that relied on streams and rainwater faced challenges in maintaining hygiene, as inconsistent water supply limited toilet maintenance, handwashing, and general cleanliness. However, water storage (36.4% compliance, $p = 0.084$) did not significantly influence sanitation compliance, likely because storage alone does not guarantee continuous access to clean water, especially if tanks are not regularly refilled.

Handwashing facilities (27.3% compliance, $p = 0.002$) were found to be significantly associated with hygiene compliance. Schools with accessible handwashing stations near toilets had higher hygiene ratings, reinforcing findings from UNICEF (2023) that stress the importance of functional handwashing facilities in reducing disease transmission. However, many schools lacked soap and running water, reducing the effectiveness of these stations.

Food hygiene was a major concern, with only 9.5% of food handlers having valid medical certificates ($p = 0.000$) and 33% wearing protective clothing ($p = 0.022$). The lack of medical screenings increases the risk of foodborne illnesses, as unregulated food handling can introduce pathogens into the school environment. These findings support research by Kairu et al. (2021), which highlights food safety compliance as a key determinant of school sanitation standards.

4.9.3 Perception of Students Regarding Sanitation and Hygiene in Public Secondary Schools

The findings indicate that 59% of students rated the cleanliness and hygiene standards in their schools as "Good", with a mean score of 3.85 ($p = 0.001$). This suggests that a majority of students perceive sanitation conditions favorably, but 41% of students still expressed concerns, indicating that sanitation practices require further improvements. This aligns with research by Maina et al. (2021), which found that while students may acknowledge existing hygiene measures, actual compliance often depends on availability of sanitation infrastructure, maintenance efforts, and consistent hygiene enforcement.

Students' belief that health education is the best way to improve sanitation (65% compliance, $p = 0.015$) suggests that awareness programs play a key role in shaping sanitation behavior. Schools with regular hygiene education sessions, awareness campaigns, and health clubs tend to have higher levels of hygiene compliance, as students become more informed and responsible for their sanitation practices. These findings support earlier research by Siegrist and Bearth (2021), who emphasized that educational interventions significantly improve hygiene behavior among students by reinforcing the importance of proper sanitation practices.

Confidence in the effectiveness of current hygiene protocols (62% compliance, $p = 0.032$) highlights that while students generally trust existing sanitation measures, 38% remain skeptical about their effectiveness. This could be attributed to inconsistencies in waste disposal, inadequate water supply, and insufficient provision of handwashing facilities, as previously identified in Section 4.1 and 4.2. These findings echo the work of Kairu et al. (2021), who noted that student confidence in sanitation systems is influenced by both the presence and functionality of hygiene facilities.

The perception that sanitation and hygiene awareness is adequate (67% compliance, $p = 0.041$) suggests that most students recognize efforts made by teachers, public health officers, and school administrators to promote hygiene. However, 33% of students disagreed, implying that while hygiene education programs exist, they may not be effectively implemented or consistently reinforced. Similar findings were reported by Mulatya and Mutuku (2020), who found that sanitation awareness programs need continuous reinforcement through practical demonstrations and regular monitoring to achieve sustainable behavior change among students.

4.9.4 Environmental Sanitation in Public Secondary Schools

The findings reveal that 86.4% of schools had a perimeter fence, with a mean rating of 4.28. However, the Chi-square test ($p = 0.109$) showed no significant relationship between perimeter fencing and sanitation compliance. This indicates that while fencing is essential for school security, it does not directly influence hygiene and environmental cleanliness. This finding aligns with studies by Kairu et al. (2021), which found that physical barriers alone do not guarantee improved sanitation unless complemented by effective hygiene policies.

A clean school compound was reported in 82% of schools, with a mean rating of 4.11 ($p = 0.028$), suggesting that schools with clean compounds tend to have better sanitation compliance. This supports findings by Sharma (2021), which indicate that maintaining a clean environment reduces health risks, promotes hygiene awareness, and minimizes disease outbreaks in school settings. Schools that prioritized regular cleaning schedules and student participation in sanitation activities were more likely to maintain higher hygiene standards.

Availability of compost pits was significantly associated with sanitation compliance ($p = 0.002$), yet only 41% of schools had compost pits, with a mean rating of 3.02. This

suggests that many schools struggle with proper waste disposal methods, leading to open dumping and burning of waste. Compost pits play a critical role in solid waste management, particularly for biodegradable waste, and their absence increases environmental pollution and hygiene risks. This finding aligns with research by Onencan et al. (2019), which emphasizes the importance of proper waste management in achieving sanitation sustainability in schools.

Surface drainage was present in 86% of schools, with a mean rating of 4.26 ($p = 0.013$), indicating a significant association with hygiene compliance. Schools with effective drainage systems were more likely to have cleaner environments, reduced water stagnation, and minimized mosquito breeding sites, which are crucial for preventing vector-borne diseases such as malaria and dengue fever. These findings are consistent with the work of Mulatya and Mutuku (2020), who reported that schools with poor drainage often experience flooding, waste accumulation, and increased disease prevalence.

4.10 Qualitative Analysis of Sanitation and Hygiene in Public Secondary Schools

This section presents the qualitative analysis of sanitation and hygiene practices in public secondary schools within Trans-Nzoia County. Data was collected through Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) with students, teachers, and subordinate staff. Thematic analysis was employed to identify key patterns and insights from the discussions, allowing for a deeper understanding of hygiene compliance, challenges, and perceptions. The findings are organized into key themes, supported by direct quotes from respondents, and interpreted in relation to existing literature.

4.10.1 Thematic Analysis of Qualitative Data

A recurring theme from the FGDs was the perception of cleanliness and hygiene in schools. While some students expressed satisfaction with hygiene conditions, others highlighted persistent challenges, such as inadequate waste management and inconsistent water supply. A majority of students agreed that regular cleaning was done in classrooms but reported that sanitation in washrooms remained poor.

A Form 3 student expressed dissatisfaction with the state of school toilets:

"The classrooms are cleaned every morning, but the toilets are often dirty, especially in the afternoons. Sometimes there is no water, and this makes the situation worse."

Teachers also acknowledged the efforts made to maintain hygiene but pointed out that limited resources made it difficult to sustain high standards. One teacher emphasized:

"We encourage students to clean their environment, but without enough water, soap, and proper waste bins, maintaining hygiene is challenging."

These findings align with Sharma (2021), who found that infrastructure and resource constraints significantly affect sanitation compliance in schools.

Waste disposal emerged as a critical challenge in most schools. Respondents highlighted poor waste collection schedules, lack of proper waste bins, and indiscriminate dumping of garbage. Some schools burn waste due to the lack of proper disposal mechanisms.

A school janitor described the challenges in managing waste:

"We collect garbage, but the problem is where to take it. The school does not have a designated dumping site, so sometimes we have to burn it, which is not good for the environment."

A student leader also raised concerns about waste segregation:

"We have dustbins, but many students do not use them properly. Some throw plastics and food waste in the same bin, making it difficult to manage the waste properly."

These findings reflect previous studies by Onencan et al. (2019), who emphasized that effective waste disposal requires both infrastructure and behavioral change interventions. Schools need structured waste management programs, including waste segregation and timely collection.

Access to clean water was identified as a major determinant of hygiene compliance. Many students and staff reported frequent water shortages, which affected handwashing and general cleanliness.

A Form 2 student described the situation:

"Sometimes we go to the washroom and find there is no water for flushing or handwashing. We are forced to bring water in buckets, which is inconvenient."

A teacher also commented on the effect of water shortages on hygiene education:

"We teach students about handwashing, but when there is no water, they cannot practice what they learn. It makes our hygiene programs less effective."

The absence of functional handwashing stations was also raised as a concern. In some schools, the stations existed but lacked soap or running water. A Form 4 student explained:

"We have handwashing stations, but most of the time there is no soap. Some students just rinse their hands with water, which is not effective."

This finding aligns with UNICEF (2023), which emphasized that availability of handwashing stations alone is not enough soap and water must always be accessible to ensure proper hygiene practices.

The issue of food hygiene in school kitchens and canteens was another critical concern. Many respondents reported that food handlers often lacked protective clothing and medical certification, raising concerns about food safety.

A teacher responsible for health programs stated:

"Many schools do not enforce strict food hygiene rules. Some food handlers do not wear gloves or aprons, and very few have medical certificates."

A canteen worker also admitted:

"We try to maintain hygiene, but sometimes it is difficult when there is no running water. The storage conditions for food are also not ideal in some cases."

These concerns are supported by Kairu et al. (2021), who found that poor food hygiene practices in schools contribute to outbreaks of foodborne diseases such as diarrhea and typhoid. Proper enforcement of food safety regulations is crucial to addressing these risks.

Many respondents emphasized the importance of school health programs in promoting sanitation and hygiene. Schools with active health clubs and regular health education sessions reported better hygiene compliance among students.

A Form 3 student who was a health club member stated:

"Our health club conducts hygiene campaigns and reminds students to wash their hands and keep the toilets clean. It helps, but not all students take it seriously."

However, some students noted that sanitation topics were not covered consistently in the curriculum. A Form 2 student remarked:

"We are taught about hygiene in science lessons, but not regularly. It would be good if hygiene education was emphasized more."

Visits by Public Health Officers (PHOs) were also identified as influential in improving hygiene compliance. A head teacher highlighted:

"When public health officers visit, they inspect the hygiene conditions and provide recommendations. Schools that take their advice seriously tend to have better sanitation standards."

These findings align with research by Mulatya and Mutuku (2020), which highlights the role of external health inspections in enforcing hygiene policies.

The qualitative findings reveal that:

Perceptions of sanitation vary, with some students rating hygiene as good while others highlight chronic issues in washroom cleanliness and waste management.

Waste disposal remains a major challenge, with many schools lacking proper collection and disposal mechanisms.

Access to water and functional handwashing facilities is inconsistent, which undermines hygiene compliance.

Food hygiene is often neglected, with many food handlers lacking medical certifications and proper protective gear.

School health programs and visits by PHOs play a critical role in improving hygiene awareness and compliance.

The qualitative analysis highlights critical sanitation challenges in public secondary schools, including poor waste management, inconsistent water supply, and gaps in food hygiene enforcement. However, health education programs and external health inspections contribute positively to hygiene compliance. To improve sanitation conditions, schools must strengthen waste management policies, ensure consistent access to water and handwashing supplies, and enforce food safety regulations.

Hygiene education should also be integrated more consistently into the curriculum, and student-led health clubs should be empowered to promote hygiene awareness and behavior change.

CHAPTER FIVE: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the study findings, highlighting key insights into sanitation and hygiene practices in public secondary schools within Trans-Nzoia County. It also provides conclusions drawn from the study and recommendations for improving sanitation conditions in schools. Additionally, areas for further research are suggested to enhance understanding and inform policy interventions. The study findings are structured according to the research objectives, focusing on the level of adherence to cleanliness protocols, factors influencing sanitation and hygiene, environmental sanitation conditions, and students' perceptions of hygiene practices in schools.

5.2 Summary of Study Findings

The study found that while many public secondary schools have implemented basic sanitation and hygiene measures, there are still significant gaps that hinder full compliance with hygiene standards. The findings on adherence to cleanliness protocols revealed that while regular classroom cleaning (66.3%) and periodic health education programs (62.2%) were well maintained, waste collection and disposal remained a major challenge, with 62.1% of students reporting that waste was not collected regularly. The Chi-square test results ($p > 0.05$) confirmed that waste management was not statistically significant in influencing overall hygiene compliance, indicating that waste disposal remains inconsistent despite other efforts to maintain cleanliness.

The study also established that several factors influence sanitation and hygiene compliance in schools, including the presence of school health programs, visits by public health officers, access to water, handwashing facilities, and food hygiene

measures. Schools that had active health programs (45% compliance) and received regular visits from public health officers (90% compliance, $p = 0.001$) exhibited better sanitation compliance compared to those without structured hygiene initiatives. Water availability was a major determinant, with only 38.1% of schools relying on piped water, while others depended on streams and rainwater, leading to frequent water shortages that affected handwashing and toilet maintenance. The absence of soap and water in handwashing stations (72.7% non-compliance) further reduced the effectiveness of hygiene measures.

Environmental sanitation was also assessed, revealing notable variations across different sanitation aspects. Most schools had a perimeter fence (86.4%) and surface drainage systems (86.0%), but fewer (41.0%) had compost pits for proper waste management. The availability of compost pits ($p = 0.002$) and surface drainage systems ($p = 0.013$) were found to be statistically significant, confirming their impact on overall hygiene standards. Schools that lacked structured waste disposal mechanisms experienced higher levels of environmental pollution, affecting both student health and the learning environment.

Students' perception of sanitation and hygiene was generally positive, with 59% of students rating their school's hygiene as good and 65% believing that health education is the most effective intervention for improving sanitation. However, qualitative analysis revealed that many students expressed dissatisfaction with toilet cleanliness, waste disposal, and food hygiene. Issues such as food handlers lacking medical certifications (90.5% non-compliance) raised concerns about the risk of foodborne illnesses. Despite hygiene awareness campaigns, 33% of students believed there was still insufficient sanitation awareness, indicating the need for more structured hygiene education programs.

Overall, the study confirmed that sanitation and hygiene practices in public secondary schools are influenced by a combination of infrastructure availability, institutional policies, and student behavior. While some schools have made commendable efforts to promote hygiene, resource constraints, inadequate waste management, and water shortages continue to pose challenges. Strengthening policy implementation, investing in sanitation infrastructure, and fostering hygiene education are crucial to addressing these gaps and ensuring sustainable hygiene compliance in schools.

5.3 Conclusion

The study concluded that adherence to sanitation and hygiene protocols in public secondary schools within Trans-Nzoia County remains inconsistent, with significant challenges in waste management, water supply, and hygiene infrastructure. While regular classroom cleaning and periodic health education programs were relatively well implemented, waste collection remained irregular, contributing to poor environmental hygiene in many schools. The absence of structured waste management policies and inadequate disposal facilities resulted in open dumping, burning of waste, and litter accumulation around school compounds. These findings highlight the urgent need for improved waste collection strategies to ensure schools maintain clean and healthy environments.

Water supply was identified as a critical determinant of hygiene compliance, with schools relying on unreliable water sources experiencing lower sanitation adherence. The lack of functional handwashing stations (72.7% non-compliance) and insufficient soap supplies further hindered hygiene efforts, increasing the risk of disease transmission among students. Schools that had consistent access to piped water and sufficient water storage capacity demonstrated better hygiene compliance, reinforcing the need for investment in water infrastructure to support sanitation programs.

Environmental sanitation in schools was found to be partially compliant with hygiene standards, with most schools having perimeter fences (86.4%) and surface drainage systems (86.0%), but many lacking compost pits (59% non-compliance) for proper waste disposal. The absence of structured waste segregation and disposal mechanisms increased the risk of environmental contamination, suggesting that schools need improved solid waste management policies. Schools that prioritized regular cleaning, proper drainage, and designated waste disposal sites exhibited better hygiene outcomes, emphasizing the role of school policies in maintaining environmental sanitation.

Students' perceptions of hygiene varied, with some recognizing improvements in sanitation facilities, while others highlighted persisting challenges such as poor toilet hygiene, inadequate waste disposal, and limited access to food safety measures. The absence of proper medical screening for food handlers (90.5% non-compliance) raised concerns about the risk of foodborne illnesses, necessitating stronger enforcement of food hygiene policies. The study affirmed that sanitation and hygiene compliance in schools require a holistic approach involving infrastructure improvements, consistent policy enforcement, and behavior change initiatives. Addressing these challenges will be crucial in creating safer and healthier learning environments for students.

5.4 Recommendations of the Study

- i. **Strengthening School Hygiene Policies and Infrastructure.** The Ministry of Education and school administrations should invest in adequate sanitation facilities, including clean and accessible toilets, reliable water supply systems, and functional handwashing stations. Schools should also enforce strict waste disposal policies to prevent litter accumulation and environmental pollution.
- ii. **Enhancing Hygiene Education and Behavior Change Programs.** Schools should integrate structured hygiene education into their curriculum and conduct regular

sanitation awareness campaigns to encourage proper hygiene practices among students. Student-led health clubs and peer hygiene monitoring systems should be established to promote sanitation responsibility within schools.

- iii. **Regular Public Health Inspections and Compliance Monitoring.** Public health officers should conduct frequent inspections to ensure food handlers have valid medical certifications, hygiene facilities are maintained, and waste disposal systems meet public health standards. Schools that fail to comply with hygiene regulations should face penalties to encourage adherence to sanitation policies.

5.5 Suggestions for Further Research

- i. **Assessment of the Impact of Hygiene Education on Student Behavior.** Future research should explore how hygiene education programs influence student attitudes and practices towards sanitation in schools. This can help design more effective hygiene awareness campaigns and intervention strategies.
- ii. **Longitudinal Study on the Effectiveness of School Sanitation Policies.** A long-term study should be conducted to assess whether improvements in school sanitation policies lead to sustained hygiene compliance and reduced disease outbreaks among students.

Comparative Study on Sanitation Practices in Public and Private Secondary Schools. Future studies should compare hygiene compliance in public versus private schools to identify differences in resource allocation, policy implementation, and student hygiene behaviors. This would help inform policy adjustments to address disparities in sanitation standards.

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APPENDICES

Appendix I: Consent Form

I am Douglas Doyle Kebati Pursuing a Master of Public Health at Mount Kenya University. The study I am undertaking is on “**Risk Factors Associated with Hygiene and Sanitation Practices in Public Secondary Schools in Kitale Municipality Trans Nzoia County, Kenya** ”. The information you will give will be important to the relevant ministries e.g. Ministries of Education and Health in ensuring that they put forth intervention from the recommendations of this study. Participation in this study is voluntary and you are allowed to ask for clarification on any section of this study that you have not understood. You are also allowed to decline from answering any questions that feel unsuitable. Withdrawal from this study is also voluntary at any time you wish to not participate anymore.

Benefits

The benefits of this study not be directly felt but the recommendations that this study will put forth from the obtained data interventions will be put forth by the relevant ministries to ensure that objectives have been achieved. There will be no direct incentives awarded to the participants of this study.

Confidentiality of the study

The filling of this questionnaires will be filled at a place you feel convenient within the school premises. After the questionnaires have been filled, they be kept safe and only used for the purpose of this study.

Participant’s Declaration

As a voluntary participant in this study, I have fully understood what is required of me. I have also been made aware of my rights prior to taking part in this study. I have understood that the benefits of this study and that there are no direct incentives awarded in participating in this study. I, therefore, offer my signature as evidence of my informed consent.

Name:

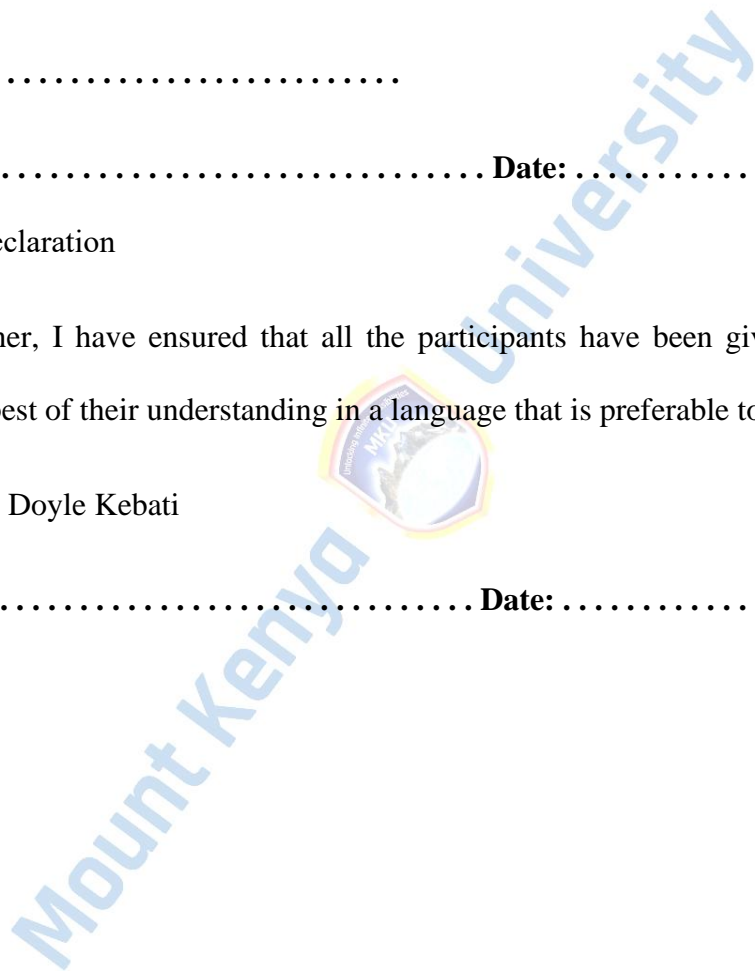
Signature: Date:

Researcher’s declaration

As the researcher, I have ensured that all the participants have been given informed consent to the best of their understanding in a language that is preferable to them.

Name: Douglas Doyle Kebati

Signature: Date:



Appendix II: Questionnaire

Section A: Demographic Characteristics

1. Gender:
 - Male
 - Female

2. Age Group:
 - Below 15 years
 - 15 – 18 years
 - Above 18 years

3. Role in School:
 - Student
 - Teacher
 - Support Staff (Janitor, Cook, etc.)

4. For Students Only: Current Class Level
 - Form 1
 - Form 2
 - Form 3
 - Form 4

5. For Teachers Only: Years of Teaching Experience
 - Below 2 years
 - 2 – 5 years
 - 6 – 10 years
 - Above 10 years

6. For Support Staff Only: Primary Responsibility in School
 - Janitor (Cleaning staff)
 - Cook/Food handler
 - Security personnel
 - Other (Please specify) _____

7. General Facility Cleanliness:

a) On a scale of 1 to 5, how would you rate the overall cleanliness of the school premises?

(1 - Very Poor, 2 - Poor, 3 - Average, 4 - Good, 5 - Excellent)

b) Are the school buildings (classrooms, hallways, offices) generally free from dust, dirt, and debris?

(Yes / No)

c) Are the floors, walls, and ceilings clean and well-maintained?

(Yes / No)

d) Are the restrooms clean and adequately maintained?

8. (Yes / No)

9. Waste Management:

a) Is there a proper waste management system in place within the school premises? (Yes / No)

b) Are there sufficient and conveniently placed trash bins throughout the school? (Yes / No)

c) Are the trash bins regularly emptied and waste disposed of properly?

(Yes / No)

10. Classroom Cleanliness:

a) Are the classrooms clean and organized? (Yes / No)

b) Are the desks, chairs, and blackboards clean and well-maintained? (Yes / No)

c) Are the windows, curtains, and blinds clean and in good condition? (Yes / No)

11. Dining/Cafeteria Area:

- a) Is the dining/cafeteria area clean and hygienic? (Yes / No)
- b) Are the dining tables, chairs, and utensils clean and well-maintained? (Yes / No)
- c) Is the food preparation area clean, with proper storage and handling of food items? (Yes / No)

12. Outdoor Areas:

- a) Are the school grounds, including sports fields and play areas, clean and well-maintained? (Yes / No)
- b) Are there adequate dustbins or trash receptacles available in outdoor areas? (Yes / No)
- c) Are the sidewalks and pathways within the school premises clean and clear of debris? (Yes / No)

13. Staff and Student Awareness:

- a) Are the staff and students educated about the importance of cleanliness and hygiene? (Yes / No)
- b) Are there any programs or initiatives in place to promote cleanliness within the school? (Yes / No)

14. Suggestions:

- a) How do you think the cleanliness of the school facilities could be improved?
:.....:.....
:.....
:.....

b) Are there any specific areas that require immediate attention or improvement?

c) Any additional comments or suggestions related to the cleanliness of public secondary schools within Kitale Municipality?

.....:.....:.....

.....:.....:.....

.....:.....:.....

.....

1. General Infrastructure:

a) Are there adequate toilet facilities available for students and staff? (Yes / No)

b) Are the toilet facilities well-maintained and in good working condition? (Yes / No)

c) Are there handwashing stations with soap and water available near the toilets? (Yes/No)

2. Water Supply:

a) Is there a reliable and sufficient water supply within the school premises? (Yes/No)

b) Are there any challenges related to water availability or quality that affect sanitation and hygiene practices in the school? (Yes/No)

3. Waste Management:

a) Is there a proper waste management system in place within the school premises? (Yes / No)

b) Are there sufficient and conveniently placed trash bins throughout the school? (Yes / No)

c) Are the trash bins regularly emptied and waste disposed of properly? (Yes/No)

4. Cleaning and Maintenance:

a) Are there designated staffs responsible for cleaning and maintenance in the school? (Yes / No)

b) Are cleaning materials and equipment readily available and in good condition? (Yes/No)

c) Is there a regular cleaning schedule in place to ensure cleanliness throughout the school premises? (Yes/No)

5. Student and Staff Behavior:

a) Are students and staff encouraged to maintain cleanliness and hygiene within the school? (Yes / No)

b) Is there a system in place to enforce proper hygiene practices, such as handwashing and waste disposal? (Yes/No)

c) Are there any specific challenges or issues related to student and staff behavior that impact sanitation and hygiene in the school? (Yes/No)

6. Health and Hygiene Education:

a) Are students provided with education and awareness programs on health and hygiene practices? (Yes / No)

b) Are there any specific topics or areas covered in the health and hygiene education curriculum? (Yes/No)

7. Community Engagement:

a) Is there involvement from the local community or relevant stakeholders in promoting sanitation and hygiene practices in the school? (Yes / No)

b) Are there any collaborative efforts between the school and the community to improve sanitation and hygiene conditions? (Yes/No)

8. Challenges and Solutions:

a) What are the main challenges faced in maintaining proper sanitation and hygiene standards within the school? :

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.....
.....
.....
.....
.....
.....

b) What potential solutions or improvements can be implemented to address these challenges? :

.....
.....
.....
.....
.....
.....
.....

1. General Health Conditions:

a) Are there any reported cases of diseases or illnesses among the students in the school? (Yes / No)

b) If yes, please specify the common diseases or illnesses observed:
.....
.....
.....
.....
.....
.....
.....
.....

2. Hygiene Practices:

a) Are students educated about proper hygiene practices, such as handwashing and personal cleanliness? (Yes/No)

b) Are there any specific programs or initiatives in place to promote hygiene practices within the school? (Yes/No)

3. Sanitation Facilities:

a) Are the toilet facilities clean and well-maintained? (Yes/No)

b) Are there handwashing stations with soap and water available near the toilets? (Yes/No)

4. Water Supply:

a) Is there a reliable and sufficient water supply within the school premises? (Yes / No)

b) Are there any challenges related to water availability or quality that affect hygiene practices in the school? (Yes/No)

5. Common Diseases:

a) Based on your observations or records, which diseases are commonly prevalent among pupils in the school?

.....
.....
.....
.....

b) Are there any specific diseases that can be linked to poor sanitation and hygiene practices?

.....
.....
.....

c) If yes, please specify the diseases and explain their association with poor sanitation and hygiene practices:

.....
.....
.....

6. Reporting and Monitoring:

a) Are there systems in place to monitor and report student health conditions in the school? (Yes / No)

b) If yes, how are these health conditions documented and reported?

.....
.....
.....

Appendix III: Focus Group Discussion Questions

1. What are your general observations regarding the cleanliness of the facilities in public secondary schools within Kitale Municipality? Please share your experiences and any specific instances that come to mind.
.....:.....:.....
.....:.....
.....:.....
.....
2. In your opinion, what factors contribute to the current state of sanitation and hygiene in these schools? Are there any specific challenges or obstacles that hinder the maintenance of cleanliness?
.....:.....:.....
.....:.....:.....
.....:.....
.....
3. How do you perceive the availability and functionality of sanitation facilities, such as toilets and handwashing stations, in public secondary schools? Are there any issues or concerns you have noticed regarding these facilities?
.....:.....
.....:.....:.....
.....:.....:.....
.....
4. From your interactions with students and staff in these schools, what are some common behaviors or practices related to sanitation and hygiene? Do you believe these practices positively or negatively impact the overall cleanliness of

the schools? :
..... :
: :
..... :

5. In your view, how effective are the existing health and hygiene education programs in public secondary schools? Are there any specific areas that require more attention or improvement?
: :
..... : :
..... : :
.....

6. What are the potential health risks associated with poor sanitation and hygiene practices in these schools? Have you observed any instances of students falling ill due to these factors? :
..... :
..... : :
..... : :
..

7. Based on your understanding and experiences, what measures or strategies could be implemented to improve the level of cleanliness and promote better sanitation and hygiene practices in public secondary schools within Kitale Municipality? :
..... :
: :
..... :

Appendix IV: Observation Check List

1. Overall School Environment:

- Are the school premises free from litter, debris, and visible dirt?
.....:.....
- Are the pathways and walkways clean and clear of obstacles?
.....:.....
- Are the school grounds well-maintained and free from overgrown
vegetation?:.....
.....

2. Classroom and Learning Spaces:

- Are the classrooms clean, with organized desks and chairs?
.....:.....
- Is the flooring in good condition, without dust or stains?
.....:.....
- Are the walls and ceilings free from dirt, dust, and visible damage?
.....:.....

3. Sanitation Facilities:

- Are the toilets clean, with functioning flushing systems?
.....:.....
- Are the sinks and handwashing stations equipped with soap and running
water?:.....
.....
- Are there signs of proper waste disposal in the toilet facilities?
.....:.....

4. Waste Management:

- Are there designated trash bins or containers available throughout the school premises?
.....
- Are the trash bins regularly emptied and maintained?
.....
- Is there evidence of proper segregation and disposal of waste materials?
.....

5. Dining/Cafeteria Area:

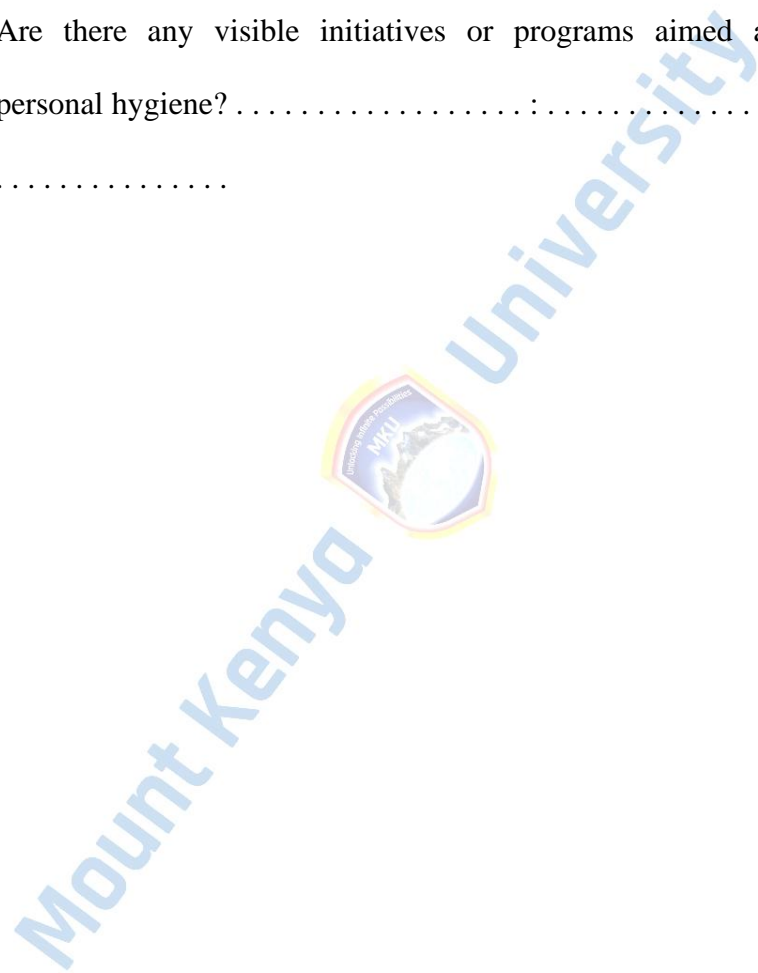
- Is the dining area clean and well-maintained?
.....
- Are the tables, chairs, and utensils clean and properly arranged?
.....
- Is there proper storage and handling of food items, ensuring hygiene standards?
.....

6. Outdoor Areas:


- Are the outdoor play areas and sports fields clean and well-maintained? .
.....
- Are there designated areas for waste disposal in outdoor spaces?
.....
- Is there evidence of regular cleaning and maintenance in outdoor areas? .
.....

7. Personal Hygiene Promotion:

- Are there visible reminders or posters promoting handwashing and hygiene practices?:.....
.....
- Are there hand sanitizers available in key locations, such as entrances and classrooms?:.....
.....
- Are there any visible initiatives or programs aimed at promoting personal hygiene?:.....
.....



Appendix V: ERC Clearance



Mount Kenya University

REF: MKU/ISERC/3417 Date: 10 January 2024
TO: DOUGLAS DOYLE KEBATI REG: MPH/2022/58358

Dear Sir/Madam,

RE: RISK FACTORS ASSOCIATED WITH HYGIENE AND SANITATION PRACTICES IN PUBLIC SECONDARY SCHOOLS IN KITALE MUNICIPALITY TRANSNZOIA COUNTY, KENYA


This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **2461**. The approval period is **10/01/2024 - 09/01/2025**.

This approval is subject to compliance with the following requirements:

- i. Only approved documents including informed consents, study instruments, MTA will be used
- ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal
- vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://researchethicsnacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,


Dr. Alfred Owino, PhD
Chairman, Mount Kenya University ISERC

Stamp: Mount Kenya University Ethics Review Committee, P.O. Box 342-0100, Thika

Main Campus, General Kago Road, P.O. Box 342-01000 Thika.
Tel: 020-2878 050, Cell: +254 708 153 000
Email: info@mku.ac.ke, Web: www.mku.ac.ke
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Unlocking Infinite Possibilities

Appendix VI: Research permit from NACOSTI

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 444007	Date of Issue: 16/January/2024
RESEARCH LICENSE	
	
<p>This is to Certify that Mr., Douglas Doyle Kebati of Mount Kenya University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Transnzoia on the topic: RISK FACTORS ASSOCIATED WITH HYGIENE AND SANITATION PRACTICES IN PUBLIC SECONDARY SCHOOLS IN KITALE MUNICIPALITY TRANSNZOIA COUNTY, KENYA for the period ending : 16/January/2025.</p>	
License No: NACOSTI/P/24/32503	
444007 Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code 
<p>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</p>	
See overleaf for conditions	

Appendix VII: Research Authorization from County Director Ministry of Education



**REPUBLIC OF KENYA
Ministry of Education
State Department for Basic Education**

Telegrams:
Telephone: Kitale 054-31653 - 30200
Fax: 054-31109
Email: transzoiaacde@gmail.com
When replying please quote:

**County Director of Education
Trans Nzoia
P.O. Box 2024 - 30200
KITALE.**

Ref. No. TNZ/CNT/CDE/R.GEN/1/VOL.III/161

Date: 18th January, 2024

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION - MR.DOUGLAS DOYLE KEBATI

This office acknowledges receipt of Research License No. **NACOSTI/P/24/32503** dated 16th January, 2024 from National Commission for Science Technology & Innovation.

Douglas Doyle Kebati of Mount Kenya University has been authorized to carry out research on "Risk Factors Associated with Hygiene and Sanitation Practices in Public Secondary Schools in Kitale Municipality, in Trans-Nzoia County" for a period ending 16th January, 2024.

The purpose of the letter is to request you to accord her the necessary assistance.

**COUNTY DIRECTOR OF EDUCATION
TRANS - NZOIA COUNTY
P. O. Box 2024 - 30200,
KITALE.**

**PAMELA AKELLO, HSC
COUNTY DIRECTOR OF EDUCATION
TRANS-NZOIA COUNTY**

Appendix VIII: Research Authorization from County Commissioner



OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION

Telegrams:
Telephone : 054-30020
E-mail: cctransnzoiacounty@yahoo.com
When replying please quote our Ref

COUNTY COMMISSIONER
TRANS NZOIA COUNTY
P.O. BOX 11-30200
KITALE

Ref. No: TNZC/CONF/ED.12/2VOL.V/156

18th January, 2024

Deputy County Commissioner
TRANS NZOIA WEST SUB-COUNTY

RE: RESEARCH AUTHORIZATION

This is to inform you that Mr. Douglas Doyle Kebati of Mount Kenya University has been authorized by National Commission for Science, Technology and Innovation to carry out research on "Risk Factors Associated with Hygiene and Sanitation Practices In Public Secondary Schools in Kitale Municipality" in Trans Nzoia County for the period ending 16th January, 2025.

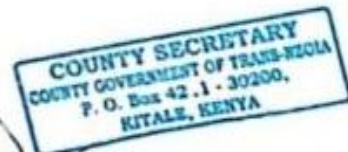
Kindly accord him the necessary assistance that he may require.



BEATRICE LUKOKO
FOR: COUNTY COMMISSIONER
TRANS NZOIA COUNTY

C.C.

1. County Director of Education
TRANS NZOIA COUNTY
2. County Secretary
COUNTY GOVERNMENT OF TRANS NZOIA



Approved
18/1/24
CEON Educ
TDX

Appendix IX: Map of Trans Nzoia County



Mount Kenya

Appendix X: Similarity Index

**RISK FACTORS ASSOCIATED
WITH HYGIENE AND
SANITATION PRACTICES IN
PUBLIC SECONDARY SCHOOLS
IN KITALE MUNICIPALITY TRANS
NZOIA COUNTY, KENYA**

by user user

Submission date: 14-Apr-2025 09:07PM (UTC+0900)

Submission ID: 2598279233

File name: DOUGLAS_DOYLE_KEBATI_-_Thesis_-_Mar_2025a.docx (1.12M)

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Mount Kenya 

RISK FACTORS ASSOCIATED WITH HYGIENE AND SANITATION PRACTICES IN PUBLIC SECONDARY SCHOOLS IN KITALE MUNICIPALITY TRANS NZOIA COUNTY, KENYA

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Publication

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