

Risk Factors Associated with Hygiene and Sanitation Practices in Public Secondary Schools in Kitale Municipality Trans Nzoia County, Kenya

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ABSTRACT

Introduction: This study aimed to assess the risk factors associated with sanitation and hygiene conditions in public secondary schools within Kitale Municipality, Trans-Nzoia County, Kenya. Despite efforts to improve sanitation in schools, many secondary schools in Kenya still face challenges in maintaining adequate sanitation and hygiene facilities.

Methodology: This descriptive cross-sectional study sought to fill the existing research gap by examining the cleanliness of facilities, identifying factors affecting sanitation and hygiene, and exploring common diseases related to poor sanitation and hygiene practices in Kitale Municipality. The descriptive cross-sectional study design be used. Stratified random sampling be used to select students (385) and teachers (40) to participate in FGDs. Study tools used were observational checklist and structured questionnaires. Data analysis was performed using SPSS version 26. Descriptive statistics including mean and cross tabulations were used. Pearson's Chi-square test was used to determine relationships between the variables. P values of 0.05 or less be considered to be significant. Data was collected using structured questionnaires, interviews, and observations to assess the cleanliness of facilities and identify factors contributing to poor sanitation and hygiene practices. Additionally, the study investigated the prevalence of common diseases associated with inadequate sanitation and hygiene among pupils in these schools.

Objectives: The objectives of the study are threefold. Firstly, it assessed the cleanliness of facilities in public secondary schools within Kitale Municipality. This included evaluating the availability and functionality of toilets, handwashing facilities, waste management systems, and overall cleanliness of the school environment. Secondly, the study sought to identify the factors that affect sanitation and hygiene in these schools, such as infrastructure limitations, inadequate water supply, and lack of awareness or education on proper hygiene practices. Lastly, the research identified common diseases related to poor sanitation and hygiene that affect pupils, providing insights into the health implications of inadequate sanitation in schools.

Conclusion: The study concluded that cleanliness protocols are being adhered to but the only noncompliance noted in many of the schools is the delay in waste collection and disposal from school and the lag in ensuring sanitary facilities are kept constantly clean. Also inadequate cleaning of sanitary facilities due to poor water distribution all over the schools, inadequate funding from government and donors, and poor compliance with school health guidelines like ensuring food handlers are cleared with medical certificates. The perception of the students can be concluded as being in the right trajectory or rather informed.

Recommendations: The study recommends Ministry of Education to provide adequate funding through donors for sanitary infrastructure. The Public health department in Trans Nzoia County should ensure all schools are visited on a termly basis for sanitary inspection purposes, Public health practitioners should ensure copies of policy and guidelines are availed in all schools.

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

DEFINITION OF OPERATIONAL TERMS

- 1. 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.
- 2. 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.
3. **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.
 4. **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.
 5. **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.
 6. **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.
 7. **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.
 8. **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.
 9. **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.
 10. **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.
 11. **Facilities:** A structure or part of a structure that contains toilet, shower, diaper-changing unit, hand wash station, and dressing capabilities
 12. **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 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

This study on the assessment of sanitation and hygiene in public secondary schools in Trans Nzoia County, Kenya is of paramount importance and aligns with research methodology guidelines. It aimed to fill a crucial research gap and build upon existing studies by focusing specifically on the unique context of Trans Nzoia County.

Firstly, conducting this study in Trans Nzoia County was essential because it provided an opportunity to assess the current state of sanitation and hygiene in public secondary schools within a specific geographic region. Trans Nzoia County presents unique challenges and characteristics that may differ from other counties in Kenya or regions in Sub-Saharan Africa. By examining the sanitation and hygiene conditions in Trans Nzoia County, the study will provide localized insights and recommendations that can be tailored to address the specific needs and challenges of this particular county.

Secondly, this study is important because it adds to the existing body of research on sanitation and hygiene in educational settings. While previous studies have explored the broader challenges at the African and Sub-Saharan levels, there is limited research that focuses specifically on Trans Nzoia County. By conducting this study, we generated localized data and evidence that can contribute to a deeper understanding of the sanitation and hygiene situation in public secondary schools within the county.

Furthermore, this study is unique in its approach to building on existing research. By drawing on the findings and recommendations from previous studies at the African, Sub-Saharan, and Kenyan levels, this research aims to bridge the gap between global perspectives and local realities. It will take into account the lessons learned and best practices identified in previous research while adapting them to the unique context of Trans Nzoia County. This approach ensured that the study build upon the existing knowledge and experiences to propose context-specific solutions and interventions.

In conclusion, conducting a study on the assessment of sanitation and hygiene in public secondary schools in Trans Nzoia County is justified both in terms of research methodology guidelines and the unique characteristics of the county. The study contributed to localized insights, address specific challenges, and build upon existing research to provide tailored recommendations for improving sanitation and hygiene conditions in public secondary schools within Trans Nzoia County.

1.4 Study Objectives

1.4.1 Broad Objective

1. 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 identify the factors that influence sanitation and hygiene in public secondary schools in 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 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.

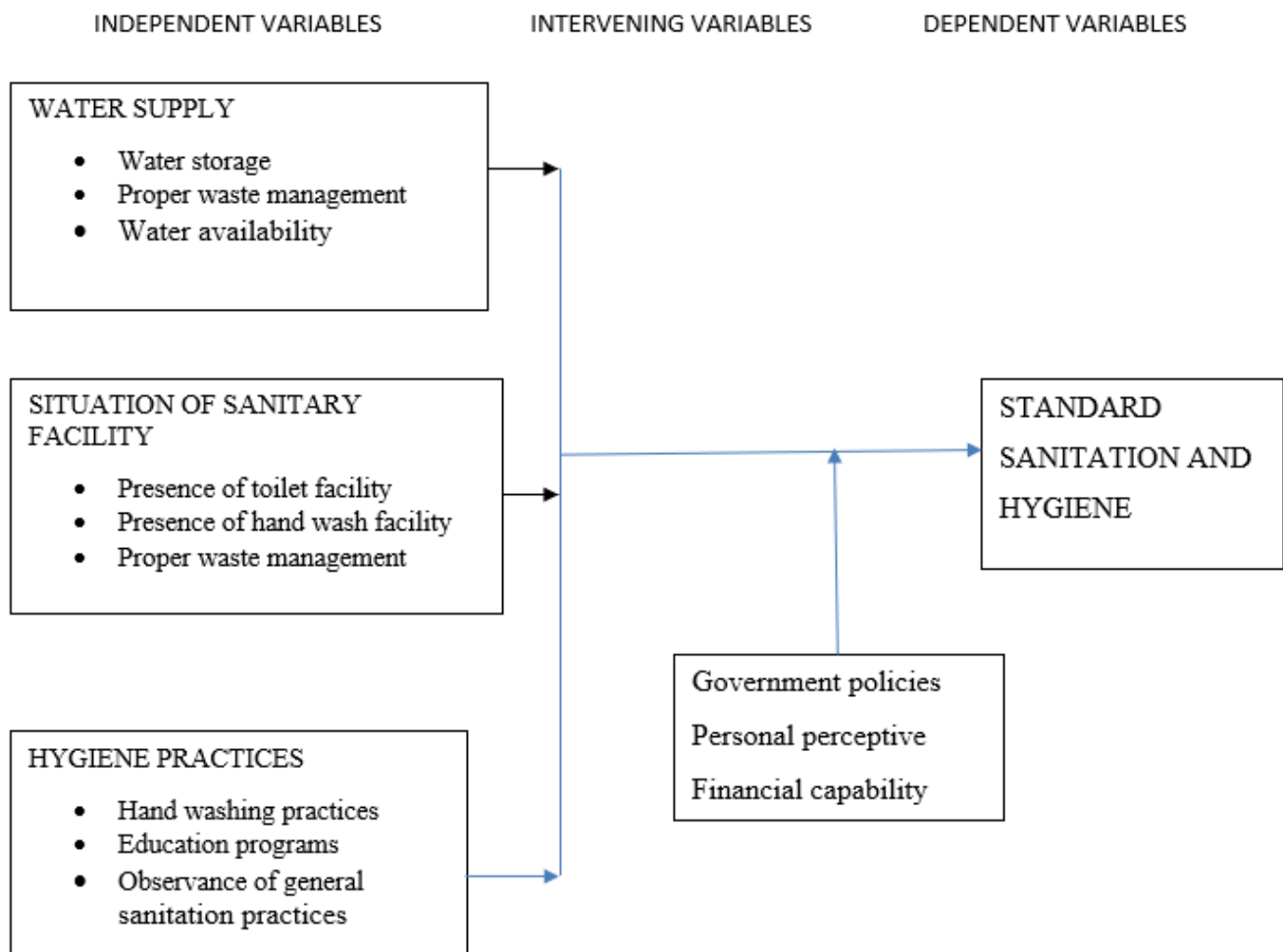


Figure1.1: Conceptual Framework

CHAPTER II: 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 Global Condition on Sanitation and Hygiene

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 (Mutegei, 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 (Mutegei, 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 are critical factors for maintaining a safe and healthy learning environment in public secondary schools. However, various factors can hinder the effective implementation of sanitation and hygiene practices in these educational settings.

Infrastructure and Facilities: The availability and condition of infrastructure and facilities significantly impact sanitation and hygiene in public secondary schools. Inadequate sanitation facilities, such as insufficient latrines, lack of handwashing stations, and limited access to clean water, pose challenges to maintaining proper hygiene practices. A study by Limboro, (2019) identified that many schools in Kenya lack functional and gender-sensitive sanitation facilities, hindering students' ability to practice good hygiene. Additionally, poor maintenance and inadequate infrastructure contribute to unsanitary conditions in schools (Almoslem et al., 2021).

Water Availability and Accessibility: Access to clean and safe water is essential for maintaining hygiene in schools. However, water scarcity and limited access to safe water sources pose challenges to ensuring proper sanitation practices. In many regions of Kenya, including rural areas, water availability is inconsistent, leading to difficulties in maintaining hygienic conditions in schools. A study by Kookana et al., (2020) found that water scarcity negatively impacted handwashing practices in schools, highlighting the importance of addressing water availability to improve hygiene.

Knowledge and Awareness: The level of knowledge and awareness among students, teachers, and school administrators plays a crucial role in promoting proper sanitation and hygiene practices (Anyango, 2019). Lack of awareness about the importance of hygiene, as well as inadequate knowledge about effective hygiene behaviours, can hinder the adoption of good sanitation practices. A study by Sharma, (2021) emphasized the need for hygiene education programs that provide students and teachers with comprehensive knowledge and practical skills to promote hygiene practices in schools.

Behavior and Cultural Factors: Behavioural and cultural factors significantly influence sanitation and hygiene practices in public secondary schools. Cultural beliefs, norms, and practices related to sanitation and hygiene may vary across different regions in Kenya, impacting the acceptance and adoption of hygiene practices (Mutua & Runguma, 2020). For instance, cultural taboos surrounding menstruation can hinder menstrual hygiene management in schools. A study by Bishoge, (2021) highlighted the need for culturally sensitive approaches to address these barriers and promote positive hygiene behaviours.

Policy and Institutional Support: The presence of supportive policies and institutional frameworks is crucial for effective sanitation and hygiene practices in schools (Bishoge, 2021). Adequate policy implementation, enforcement, and monitoring are essential to ensure the provision of sanitation facilities, water supply, and hygiene education in schools (Okari, 2019). However, gaps in policy implementation and limited institutional support can hinder the improvement of sanitation and hygiene in public secondary schools. A study by Muanda et al., (2020) emphasized the importance of strong policy frameworks and institutional coordination to address the sanitation and hygiene challenges in schools.

CHAPTER III: MATERIALS AND METHODS

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 target population for this study was selected public secondary schools in Trans Nzoia county Kitale municipality. The study population for this study be the students in the selected schools from form 1 to form 3.

3.3 Study Design

A descriptive cross-sectional study design was used. This design is suitable because it explores the existing status of sanitation and hygiene in the school at a point in time.

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%.

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

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

3.5 Sampling Techniques

Selected schools within Kitale Municipality were included in the study and purposively sampled. Stratified random sampling was used to select the students within the schools to avoid bias and give each participant an equal chance of participation. Classes from which the students were be picked represent a

stratum where the appropriate number of pupils were selected randomly. They were then interviewed on various practices of hygiene and sanitation.

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 (3teachers, 3 general staff and 3 students) the students who participated in the FGDs were not included in the questionnaire

3.6 Data Collection Instruments

The data collection instruments employed in this study were questionnaires, and observational checklist and Focused Group Discussions. The research instruments were created and validated through the following processes.

Defining the research question and objectives: The research question and objectives guided the development of the research instrument. This was through clear definition and operationalization of the variables used in the study.

Review existing literature: Reviewing existing literature on the topic objectively to identify existing validated instruments or items were adapted for the study. This also provided insights into the appropriate response options, question format, and scales to be used.

Pilot test: Pilot tested the instrument with a small sample of the population to identify any issues or challenges with the instrument, such as ambiguous wording, confusing response options, or missing items.

Revise the instrument: Based on feedback from the pilot test, revising the instrument as needed to ensure accuracy and consistency.

3.7 Data Analysis

The Statistical Package for Social Sciences (SPSS Version 26) was used to analyze the data. Cross-tabulations, frequency distributions, and means were among the descriptive statistics that were employed. Subsequently, inferential statistics were used to the categorical data, utilizing Pearson's Chi-Square test to ascertain correlations between the variables and the estimated values. P values were regarded as significant if they were 0.05 or lower. The study's conclusions were then presented using the use of narrative text,

charts, and graphs. Ultimately, assumptions and findings were drawn from the data's apparent linkages and patterns.

3.8 Inclusion and Exclusion Criteria

The inclusion criteria were for those students and teachers in secondary school within Kitale municipality and those that have given consent to participate in this study. Exclusion criteria were those that are not of sound mind and have not given informed consent or those in private schools.

3.9 Validity and Reliability

Internal validity of the research instrument was accomplished through familiarization with the study tools before data collection and subjecting questionnaires to review by supervisors who facilitated the necessary corrections and moderation of the research instruments. To ensure the external validity of the study, the sample population was the representative of the study population.

Reliability was attained through the training of research assistants in introducing the research study to the participants and the administration of the questionnaires before data collection to familiarize themselves with the tools. Data collection was supervised throughout the entire exercise to ensure accuracy, uniformity, and completeness. Reliability was achieved by correcting the tool based on the data collected at every stage. The instrument's reliability was assessed through Cronbach's Alpha Coefficient which measures the internal coefficient. For a test to be termed acceptably reliable, it must be at least 0.70 at $\alpha=0.05$ level of significance

3.10 Ethical Consideration

Approval was sought from the following institutions prior to the carrying out of this study

1. Mt Kenya University graduate school and ethics committee
2. NACOSTI- National Commission for Science, Technology, and Innovation
3. County commissioner Trans Nzoia county
4. County secretary Trans Nzoia county
5. Trans Nzoia county department of health and education
6. Informed consent from all participants of the study.

In addition, informed consent will be sought from all participants of the study.

CHAPTER FOUR: RESULTS

4.0 Introduction

This chapter contains the results of the outcome documented from the data obtained through questionnaires, FGDs and observational checklist from students and staff in schools at Trans-Nzoia County. The results have been presented in line with the objectives of this study, respectively.

4.1 Level of Adherence to Cleanliness Protocols in Public Secondary Schools

From the data collected, 59 % (228) of students agree that there is a proper waste management system in the school premises. 66 % (255) of students agree that class is cleaned on a regular basis and 58 % (221) attest that there is constant water availability within the school premises to cater for cleaning. Additionally, 62 % (238) of students agree that there is periodic health education on the importance of general cleaning in the schools for both staff and students. 68 % (262) of students agree that there is a hand washing facility

close to washrooms and toilets. On a Likert scale 45 % (174) of the students rate their cleanliness and hygiene protocols at average. Finally, 62 % (238) of students attest that waste collection is not done on time and on regular basis from the school premises. The data on adherence to cleanliness protocols is presented in the Table 4.1.

Table 4.1: Level of Adherence to Cleanliness Protocols

Inquiry	Outcome
Proper waste management system	59%(228) said yes
Cleaning class on regular	66%(255) said Yes
Constant water available	58%(221) said Yes
Periodic health education	62%(238) said Yes
Hand washing facilities	68%(262) said Yes
Cleanliness and hygiene protocols	45%(174) (average)
Waste collection	62%(238) said No

The above inquiries have been compared and run through a chi square test of significance to determine the significance through a cutoff point from the p value of ($P \leq 0.05$). The dependent variable used for comparison is the standard sanitation and hygiene in the schools’ average which was determined through an observation checklist checked and compared with school health standards from the ministry of public health in Trans Nzoia County to determine if the schools are either up to standards of sanitation and hygiene. This observation yields that 55% of the sampled schools are up to standard on sanitation and hygiene. The inquiries with (*) on their p value indicate enough evidence to depict significance. The significance in this setup indicates that since the values are below the ($P \leq 0.05$) then we fail to reject and conclude that from the inquiries done on adherence to sanitation and hygiene protocols, the schools are actually in adherence. However, on the inquiry of waste collection, it registered that its cut-off was above the ($P \leq 0.05$) thus shows that it’s not significant. This indicates that majority of school are not in adherence to waste disposal protocols that should be done periodically and on time once the bins are filled. These results are indicated below in Table 4.2.

Table 4.2: Chi Square Values for Inquiries on Sanitation and Hygiene Protocols

Inquiry	Chi square value	Df	P value
Proper waste management system	25.543	12	0.007*
Cleaning class on regular	17.678	9	0.026*
Constant water available	18.457	7	0.003*
Periodic health education	12.690	18	0.001*
Hand washing facilities	7.468	8	0.035*
Cleanliness and hygiene protocols	11.476	6	0.028*
Waste collection	14.238	7	0.188

4.2 Factors That Influence Sanitation and Hygiene in Public Secondary Schools

4.2.1 School Health Programs

From the results collected from the questionnaire it is observed that 45% of schools do actually have implemented a number of health programs that actually are geared towards the improvement of sanitation

and hygiene within the schools. Those schools that did not have a program protested that at least there was a plan to ensure that implementation of such programs are put in place the next academic year and a good number towards the middle of the term. Majority of school programs included of deworming exercises and hand washing campaigns within their schools and regions at large. All these were to be implemented through the registered health clubs in the various schools. The chart below Figure 4.1 shows the representation of the schools that had implemented health programs against those that had not during the time of this study.

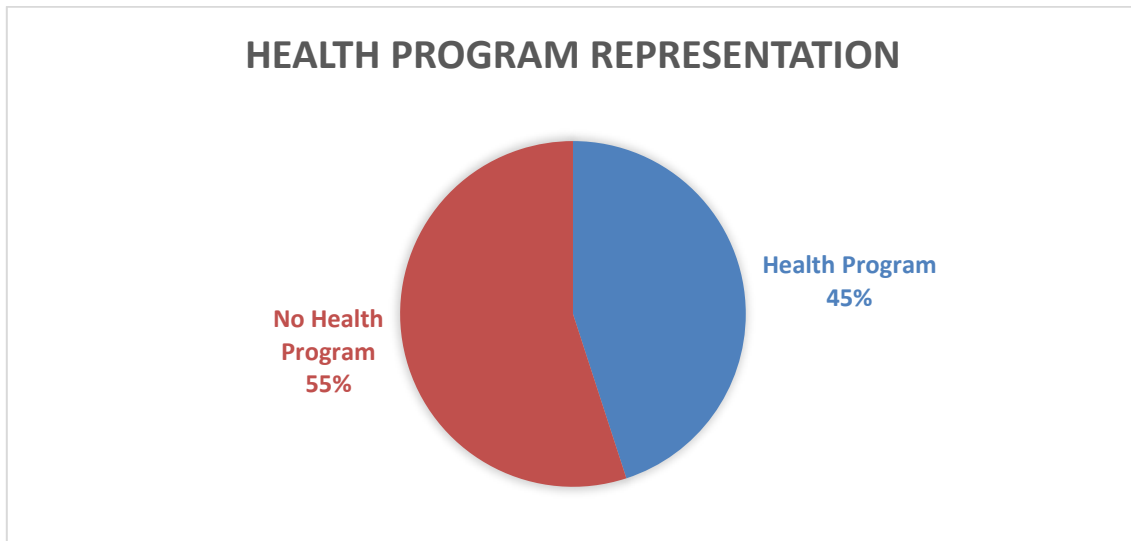


Figure 4.1: School Health Programs

4.2.2 Visit by Public Health Officers

The vast majority of schools (90% of them) reported that public health officers had visited them, as shown in Table 4.3 below. Throughout the academic year, visits to forty-four percent (44.4%) of the schools were made on a termly basis. As seen in Figure 4.2 below, the public health officials conducted sanitary inspections in 47.4% of the schools, administered deworming medications in 36.8% of the schools, and administered vaccinations in 5.3% of the schools.

Table 4.3: Schools Visited by Public Health Officers

Visit by public health officers	90% of schools said yes
Termly visits	44.4% agreed

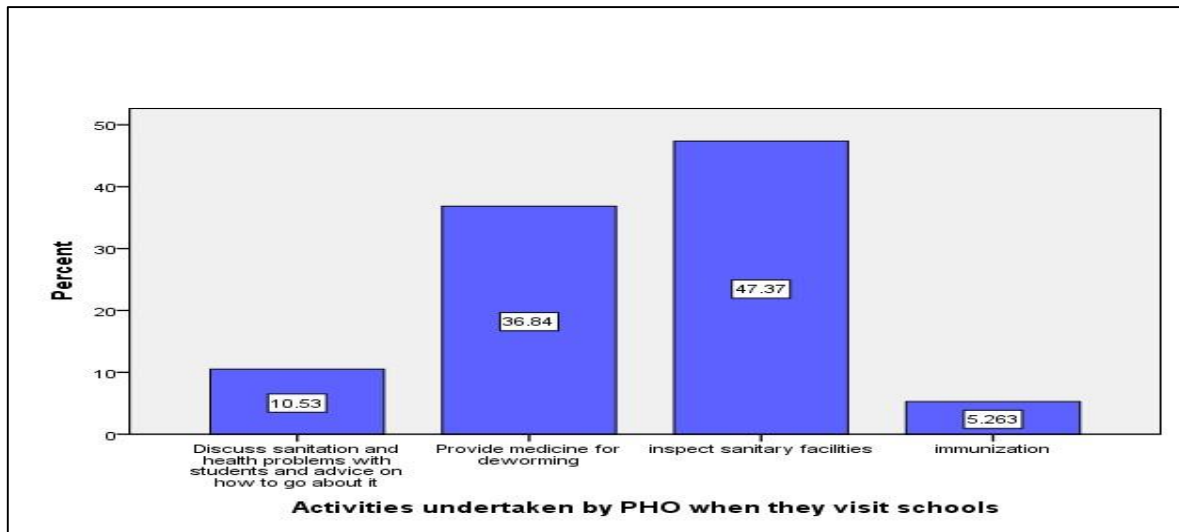
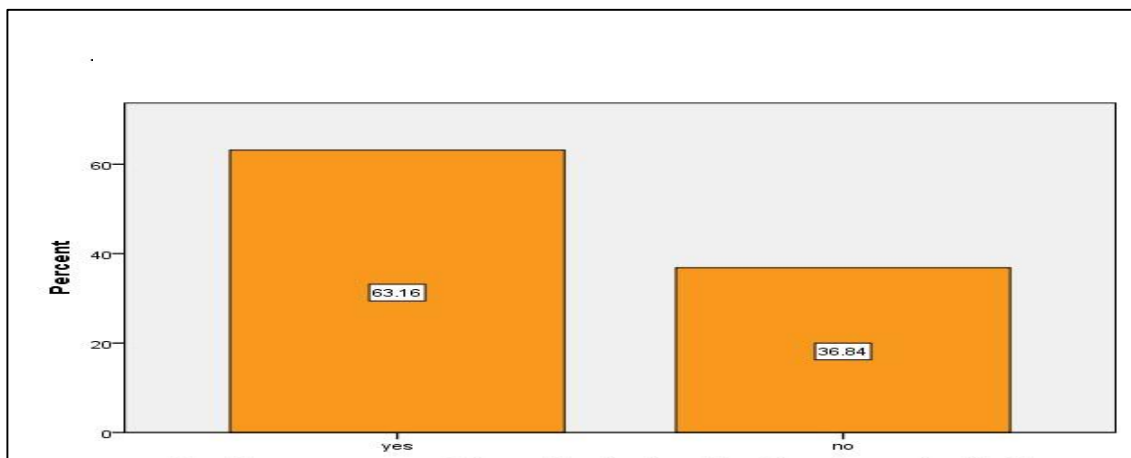


Figure 4.2: Activities Undertaken by PHO When They Visit Schools

As seen in Figure 4.3, the majority of teachers (63.2%) said they were aware of the National School Health Policy, while the remaining percentage (34.8%) said they were not. Nonetheless, 42.1% of the schools had copies of the National School Health Policy available.



Awareness of Teachers on the National School Health Policy and Guidelines

Figure 4.3: Awareness of Teachers on the National School Health Policy and Guidelines

4.2.3 Water Supply, Storage, Hand Washing Facilities and Food Handlers

As seen, thirty-eight percent (38.1%) of schools get their water from piped systems, although a sizable portion (23.8%) get their water from neighbouring streams. When storage tanks were compared to schools' primary water supplies, there was no correlation (Pearson's $R=0.352$). The majority of schools using tanks got their water mostly from pipes. Water tanks versus the primary source of water supply Twenty-seven percentage four of the school buildings, 27.4% had gutters on every roof, 63.6% had gutters on some but not all of the roofs, and 9% had none at all. 36.4% of the gutters that were already in place were found to be in good condition. The findings are depicted in Figure 4.4 that follows.

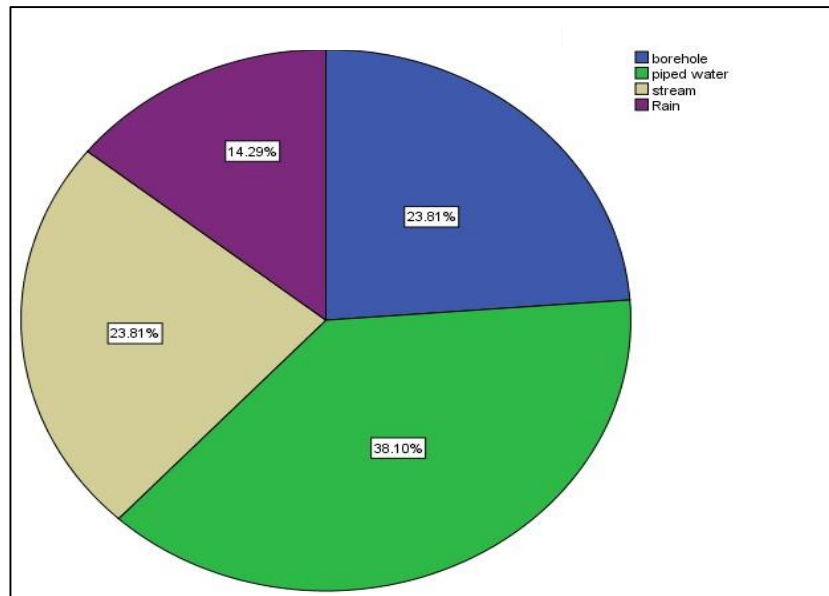


Figure 4.4: Water Supply

Three quarters of eight percent 34.8% of schools used municipal water supplies to get their water. Sixty-seven percent (60.7%) of the students reported getting their water from sources other than the school. The results of the chi-square test revealed a significant $P < 0.05$. One third, or 12.3%, of the water sources were deemed to be distant. Regarding hand washing stations, 72.7% of schools lacked such stations, whilst 27.3% had them close to the restroom. A considerable ($P < 0.05$) proportion of schools lacked basic supplies including soap, water, and faucets. 13.6% of hand washing stations had taps, while 9.1% of hand washing stations had water. The school did not supply tissue paper or soap. Figure 4.5 below shows the results of the handwashing facilities in schools.

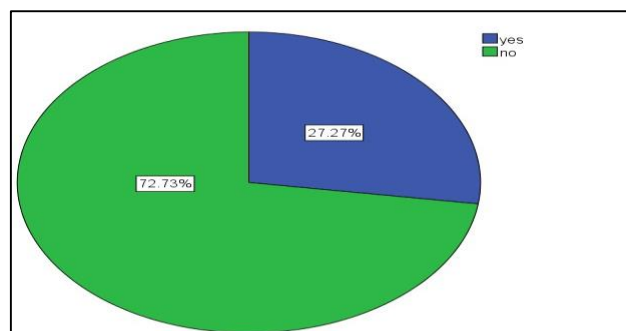


Figure 4.5: Handwashing Facilities

In schools, there were 21 food handlers on average. Sixty-seven percent of them lacked protective clothes, and ninety-point five percent (90.5%) lacked medical examination certificates. Food handlers with medical certificates and those without protective clothing showed a substantial link, according to Pearson's correlation ($R = 0.684$). A large proportion of food workers did not possess medical certifications, as indicated by the chi square test ($P < 0.05$).

4.2.4 Environmental Sanitation

Table 4.4 below lists the conditions that were observed in order to evaluate the environmental sanitation of schools.

Table 4.4: Environmental Sanitation of Schools

Condition observed	Present	Absent	P value
Perimeter fence	86.4%	13.6%	P<0.05
Clean school compound	82%	18%	P<0.05
Compost pit	41%	59%	P<0.05
Surface drainage	86%	14%	P<0.05

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

From the statistics got from the questions it is clear that 59% of the respondents rate their hygiene standards as good which shows a good perception on their side of the standards in place. 65% also believe that health education is the best tool to use when trying to improve sanitation in their school. 62% of the respondents are also confident in the effectiveness of the current sanitation and hygiene protocols. The respondents also agree that at 67% there is enough awareness among students, teachers, and staff regarding sanitation and hygiene. Table 4.5 below shows these results on the perceptions of students regarding sanitation and hygiene.

Table 4.5: Perception of Students Regarding Sanitation and Hygiene

Question	Outcome
1. How would you rate the cleanliness and hygiene standards in your school?	Good (59%)
2. What measures do you believe are necessary to improve sanitation and hygiene in public secondary schools?	Health Education (65%)
3. How confident are you in the effectiveness of the current sanitation and hygiene protocols?	Confident (62%)
4. Do you think there is enough awareness among students, teachers, and staff regarding sanitation and hygiene?	Yes 67%

The chi square values below indicate that the P values are below the cut-off of 0.05. This indicates that we fail to reject the values meaning that there is enough evidence to indicate that the perception among the respondents shows that they have a good understanding on sanitation and hygiene. Values being significant also indicate that the respondent’s perception on sanitation and hygiene can be termed as standard. This can be attributed due to the fact that there are educational topics within the term for majority of the respondents in school. Equipping one with knowledge builds the right perception towards matters surrounding them. The values with the * in Table 4.6 below shows the values that are significant and below the 0.05 value.

Table 4.6: Chi Square Values on Perception of Sanitation and Hygiene

Question	Chi square value	Df	P value
Cleanliness & hygiene standard rate	16.422	6	0.001*
improve sanitation and hygiene	8.911	3	0.015*
Effectiveness of current protocols of hygiene	27.491	5	0.032*
Enough awareness	18.932	11	0.041*

CHAPTER FIVE: DISCUSSIONS CONCLUSION & RECOMENDATIONS

5.0 Introduction

This section discusses the findings of the study in relation with the objectives of this study in a respective order from the first to the third objective.

5.1 Level of Adherence to Cleanliness Protocols in Public Secondary Schools

On the results found from the questionnaire it is evident that majority of schools in Trans-Nzoia county do not adhere to cleanliness protocols within their premises. This was established from the p value cut off point of less than 0.05. This realization is from the fact that schools have a major problem with handling waste specifically with collection timelines from the school premises. This creates a problem with aesthetics within the school that could lead to potential food and water borne diseases (Vinti et al., 2021). Another problem that depicts non adherence to cleanliness protocols in schools is the issue of cleaning toilets periodically. Despite, having enough toilet facilities there is a lag in cleaning the toilets well, probably due to under staffing of cleaning employees that is caused by inadequate funds in the school budget. Such setbacks are the leading concerns of diseases in schools not only in Trans Nzoia County but the country at large (Ahmed et al., 2020).

The findings in this study are consistent with another study (Manetu et al., 2021) that indicates noncompliance to sanitation and hygiene in schools is a leading problem in causing food and water borne diseases. Another study (Roswita, 2020) indicates that such problems usually rise due to lack of adequate funding in the school budget, which actually is also reflected in this particular study. Results from FGDs also reflect that the non-adherence issues are actually caused from waste collection and maintaining toilet facilities in the schools. Also the discussions mentioned that lack of health education programs in schools is also causing deterioration in sanitation and hygiene in schools. This is evident as it is reflected in a study (Pulimeno et al., 2020) that health education programs in schools play a crucial role in adherence to sanitation and hygiene. These findings are further cemented in the discussions that health education does the most in improving cleanliness standards. A public health study by (Webster et al., 2020) says that health education to populations is the best mode of prevention control when it comes to preventive health.

5.2 Factors That Influence Sanitation and Hygiene in Public Secondary Schools

5.2.1 School Health Programs

As a public utility, sanitation can only be improved with the cooperation of the entire community (Anthonj et al., 2021). Kenya acknowledges that educating elementary school students about health issues will help them live healthier lives (Anthonj et al., 2021). The community can enhance its overall health status by imitating the sanitation and hygiene standards set by schools. Among the health initiatives implemented in certain schools were the "deworming program" and "life buoy hand washing," which both had a 42.1% success rate. As no school was documented to have started a program on its own, it was presumed that funding for sanitation initiatives came from donors.

Notwithstanding the poor condition of their sanitary facilities, sixty-three point six percent (63.6%) of the schools had no plans to start a health program. These results are in line with the report by Illés et al. (2021), which notes that a lack of institutional capacity and sufficient legal backing is the main reason why schools typically do not plan for the health of their students (UNICEF/WHO, 2023). It was discovered that a significant obstacle to the installation of sanitary facilities in roughly 47.4% of the schools was a lack of

funding. According to the KESSP 2020 study, community members provide the majority of funding for public schools. It follows that the less fortunate areas won't be able to finance

5.2.2 Visit by Public Health Officers

Ensuring the appropriate and acceptable design and construction of school buildings is the responsibility and obligation of health officials. The schools should be regularly inspected in order to do this. While public health officers visited the majority of schools, 10% were not visited. Of all the schools, 44.4% were visited on a termly basis. The National School Health Guidelines (NSHG), which mandate that public health officers visit schools once every term, were followed in this instance. Sanitary inspections were the primary purpose of the school visits, and the schools were visited and inspected appropriately. The NSHG's guidelines for sanitary inspections must be followed, as stated (Kairu et al., 2021).

The majority of the facilities were in appalling condition when the survey was conducted. Therefore, it was presumed that neither the implementation nor the following-up of the public health officers' recommendations had occurred. Nonetheless, it was noted that a significant amount of the officers' school visits were attributed to national school health initiatives including the immunization and deworming programs. It was known by most teachers that the National School Health Policy existed.

5.2.3 Water Supply, Hand Washing Facilities and Food Handlers

One way to guarantee that schools have an adequate supply of water is to practice water conservation. Planners, however, would rather use groundwater to develop hand pumps or piped water supply systems (UNICEF/IRC, 2020). This method of supplying water is very costly for certain communities. Since it has been shown that schools lack the funding to enhance sanitation, collecting rainwater could give students access to inexpensive drinking water (Casey, 2022). Due to the significant amount of roof space that buildings give, schools have a lot of possibilities for water saving. Rainwater collecting could lower the cost of water in schools while meeting their water demands.

According to a study conducted in western Uganda in 2021, rainwater collected in schools has the potential to be sufficiently large and could reduce the cost of water supply (Maina et al., 2021). 52.4% of schools had water tanks, 14.3% collected rainwater, and 38.1% kept piped water on hand, according to the study's findings. This suggested that even though schools had water storage tanks, they weren't always used to conserve water. The Kenya Water Development Report (2020) aligns with the results that students carry water from adjacent water systems to school for drinking and washing, and that water conservation measures are not commonly implemented in schools (UN-Water, 2023). To lessen the resulting tension Rainwater harvesting would significantly lower the cost of water for schools because Trans-Nzoia receives an average of 2500ml of rain annually (Maina et al., 2021). According to the 2020 Kenya Water Supply Report, many schools' water systems are broken. Most schools deal with leaking storage tanks and malfunctioning water pumps on a regular basis (UN-Water, 2020). Despite these flaws, hand pumps were erected and all boreholes in the study schools were secured. The fact that all of the tanks were operational was positive.

According to studies, washing your hands can stop 30% of acute respiratory infections and 47% of diarrheal illnesses (Cronk et al., 2021). Additionally, it has been shown that schoolchildren's poor hand washing habits are a result of a scarcity of supplies like soap and water (Kairu et al., 2021). When hand washing facilities are situated away from restrooms, some students might also neglect to wash their hands (Illés et al., 2021). It was determined that in 27.3% of the schools, hand washing stations were located close to the restroom. Nevertheless, no school gave its students soap for washing their hands, and only 9.1% of handwashing stations had water and 13.6% had taps.

As a result, there was no habit of washing hands after using the restroom. As a result, due to inadequate cleanliness, there was a higher chance that students would contract diarrheal illnesses while they were in school. This was demonstrated by the fact that 10.4% of students reported having typhoid illness. Insufficient hand washing facilities were discovered in primary schools by a similar study conducted in Nakuru Municipality (Manetu et al., 2021). According to WHO estimates, diarrheal illnesses brought on by contaminated water supplies, poor sanitation, and poor hygiene kill close to two million children under the age of five annually (Pulimeno et al., 2020).

All around the world, foodborne infections brought on by contaminated food continue to be a major public health concern. Foodborne illness outbreaks frequently originate in schools (Cronk et al., 2021). Foodborne outbreaks have been documented in Kenyan schools. Food handlers should be free of communicable diseases because of this. Before handling food intended for public consumption, all food handlers must get a medical examination, have the required vaccinations, and wear protective clothes, according to Kenya's Food, Drugs, and Chemical Substances Act Cap 254 rules.

Of the food handlers in the schools surveyed, 66.7% lacked protective clothes and 90% (90.5%) lacked medical certifications. This suggested that handling and preparation of food by individuals who were not certified could potentially contaminate it. It implied that food-borne infections, particularly typhoid, were likely to arise. Among the students whose samples were taken, typhoid was found to cause serious infections. Additionally, it's estimated that 80% of food poisoning cases originate from food cooked in establishments or companies, and 97% of cases are caused by inappropriate food handling (Ross et al., 2021). These results point to noncompliance with the National School Health Guidelines, which mandate that catering staff members undergo a medical examination and receive a vaccination at the start of every term. The rules and regulations pertaining to the handling and preparation of food appeared to be loosely enforced. The public health authorities' oversight of the schools wasn't up to par.

5.3 Perception of Students Regarding Sanitation and Hygiene

Perception is a deeply sort after factor when it comes to not only sanitation but in the prevention of infection and diseases in public health (Siegrist & Bearth, 2021). From the data recorded, it gives a clear indication that the perception of the respondents can be described as the right perception or rather the respondents demonstrated to have the right thoughts on the sanitation and hygiene standards within their schools. The data indicates that this right perception towards standards of sanitation and hygiene have been brought about by the health educational programs that are being done in schools. Even for the schools that are not consistent in discussing topics on sanitation and hygiene also did record a positive impact on advocacy and ensuring the school are getting informed. This result is consistent with another study (Zheng et al., 2022) that describes the importance of health advocacy within the community. Periodic training and talks has been seen to equip and improve the perception of populations towards environmental management issues (Zheng et al., 2022). Another study (Guo et al., 2021) also agrees with the findings of this study that proper knowledge on matters equates to a good perception on the same matter. This study also did find out that the respondents on this study were practically knowledgeable on matters of sanitation and health. This good knowledge is attributed to the fact that there are visits by public health officers who from time to time teach on school health hygiene. This attribution is in agreement with another study that in regions where public health officers participate in school health talks, students and staff show good levels of knowledge and informed perception on matters of health (Ross et al., 2021). Findings from the FGDs also indicates that the perception is right which is being fueled by knowledge from educational talks

given in school by teachers and periodic visits from the department of public health in the region (Anthonj et al., 2021).

5.4 Conclusions

From the findings and discussions put forth from this study the following conclusions can be made:

5.4.1 Level of Adherence to Cleanliness Protocols in Public Secondary Schools

On this objective it can be concluded that cleanliness protocols are being adhered to but the only noncompliance noted in many of the schools is the delay in waste collection and disposal from school and the lag in ensuring sanitary facilities are kept constantly clean due to inadequate funding leading to shortage of staff and contractors.

5.4.2 Water Supply, Hand Washing Facilities and Food Handlers

It is evident that water supply in schools is not entirely a major problem, the issue arises from the Factors that affect sanitation and hygiene in schools were as follows: inadequate cleaning of sanitary facilities due to poor water distribution all over the schools, inadequate funding from government and donors, and poor compliance with school health guidelines like ensuring food handlers are cleared with medical certificates.

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

The perception of the students can be concluded as being in the right trajectory or rather informed. This concludes that sanitation issues are witnessed due to external factors like government laxity and lack of consistent funding from donor groups and stakeholders.

5.5 Recommendations for Study

1. The Ministry of Education should secure sufficient financing from donors for hygienic facilities in schools, like restrooms and classrooms, in order to create the best possible learning environment. Along with ensuring that students apply their understanding of sanitation and hygiene appropriately, this would also involve coordinating with county governments to ensure proper garbage collection and maintain attractive school environments.
2. For the aim of sanitary inspections, the Trans Nzoia County public health department ought to guarantee that every school is visited once every term. This would increase compliance and aid in the prevention of diseases linked to poor sanitation and hygiene.
3. Public health professionals should see to it that all schools have copies of the policies and guidelines available. They should also be extra watchful to make sure that rules and legal requirements are followed. This would make it possible for school administration systems to give school health projects that address issues like funding priority.

5.6 Recommendations for Further Research

1. There should be more research done on the variables influencing how school health policies and guidelines are implemented.

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