

**KNOWLEDGE, ATTITUDE AND PRACTICES OF HAND-WASHING
AMONG STUDENTS IN SELECTED SECONDARY SCHOOLS IN KAJIADO
NORTH SUB COUNTY, KENYA**

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DECLARATION AND APPROVAL

Declaration by Candidate:

This research thesis is my original work and has not been presented to any other university/research institution for any award.

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Date.....30/5/2024

DEDICATION

This thesis is dedicated to my parents, (departed Dominic Kariuki Kiguku) and Jennifer Waigwe Kariuki. Their passion and unwavering commitment to enhancing the standard of healthcare in Kenya has been as a source of inspiration for me.



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ABSTRACT

Introduction Despite the fact that the yearly campaign for Global Hand-washing Day primarily focuses on students as the most influential facilitators for transforming behavior, there is a scarcity of literature regarding the various school environments and their impact on hand-washing practices among secondary school students. The act of hand-washing with soap is widely recognized as a highly efficacious and cost-effective measure in the prevention of infectious illnesses. The purpose of this study was to assess the knowledge, attitudes, and practices of handwashing among students in selected secondary schools in Kajiado North Sub-County.

Methodology: A cross-sectional descriptive research approach was employed to collect data from a sample of 16 secondary schools and 363 students. The study made use of both quantitative and qualitative methodologies.

Results: There was a significant association between knowledge of hand-washing and handwashing ($P=0.034$) attitude and hand-washing ($P = 0.043$) hand-washing practices ($P = 0.031$) and factors influencing hand-washing ($P= 0.031$) (presence of hand-washing water), 0.025 (provision of hand-washing water and 0.042 (cleanliness of hand-washing stations). Findings revealed that 99.4% participated in the study, majority (77.8%) practiced hand-washing while 82.2% accepted that hand-washing facilities are necessary. Participants (above 80%) had a positive attitude towards hand-washing. Findings showed that presence of water for hand-washing, presence of hand-washing stations in schools, functionality of hand-washing facilities and presence of clean hand-washing stations were main factors associated with hand-washing.

Conclusion, Students had knowledge about hand-washing practices, positive attitude and they practiced hand-washing in schools, but much awareness is needed. It was recommended that hand-washing practices awareness should be done in schools. Education about handwashing was suggested for schools. This study should determine if similar factors affect hand-washing practices in other institutions.

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LIST OF ABBREVIATIONS AND ACRONYMS

AIDS - Acquired Immune Disease Syndrome

FDGs - Focus Group Discussions

HW - Hand-washing

KDHS - Kenya Demographic Health Survey

MDG - Millennium Development Goal

MOH - Ministry of Health

SPSS - Statistical Package for Social Scientists

UNICEF - United Nations Children's Education Fund

WASH - Water Sanitation and Hygiene

WHO - World Health Organization



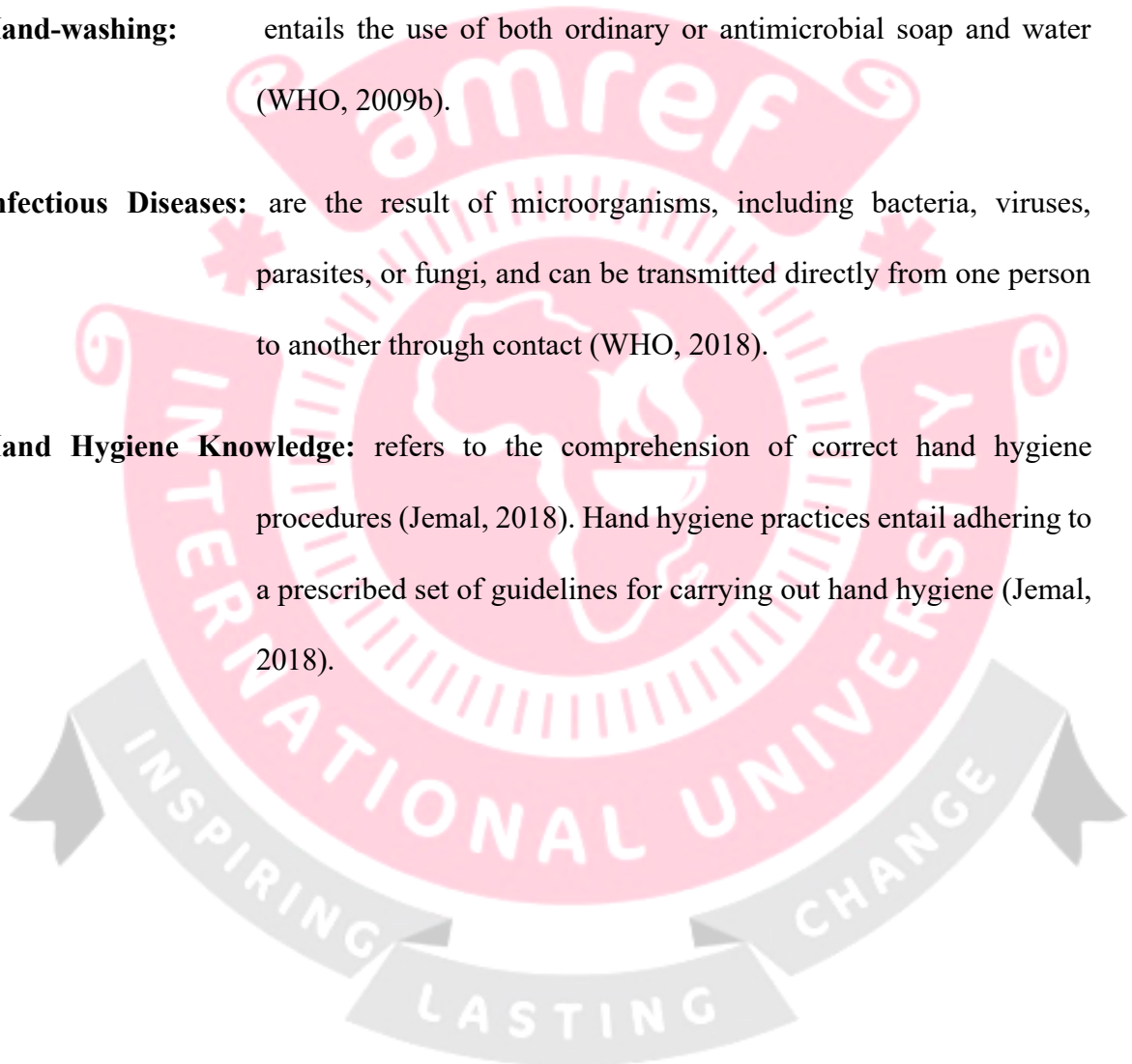
OPERATIONAL DEFINITION OF TERMS

Hand Hygiene: refers to the process of cleansing the hands, which can be done through washing them with soap and water or using hand sanitizer without water (WHO, 2009a)

Hand-washing: entails the use of both ordinary or antimicrobial soap and water (WHO, 2009b).

Infectious Diseases: are the result of microorganisms, including bacteria, viruses, parasites, or fungi, and can be transmitted directly from one person to another through contact (WHO, 2018).

Hand Hygiene Knowledge: refers to the comprehension of correct hand hygiene procedures (Jemal, 2018). Hand hygiene practices entail adhering to a prescribed set of guidelines for carrying out hand hygiene (Jemal, 2018).



CHAPTER 1: INTRODUCTION

1.1 Overview

The main aim of this study was to investigate the knowledge, attitude, and practices related to hand-washing among students from selected secondary schools in Kajiado North Sub County, Kenya. This chapter covers the study background, the problem statement, the objectives, the research questions, and the justification.

1.2 Background of the Study

Hand-washing involves using soap and water, in conjunction with a waterless hand sanitizer, to cleanse their hands effectively (World Health Organization, 2009). According to Borghi et al. (2012), hand-washing is a cost-effective and effective strategy for mitigating infection transmission and controlling disease incidence.

Numerous empirical investigations have supported the notion that adherence to appropriate hygiene protocols is pivotal in reducing the prevalence of communicable diseases across various communal environments, including healthcare establishments, childcare facilities, and primary and secondary educational institutions. Prater et al. (2016) conducted a study that revealed a significant correlation between inadequate adherence to hand hygiene protocols and elevated incidences of infectious diseases, heightened frequency of medical consultations, and increased absenteeism rates in educational or vocational environments.

The presence of infectious diseases causing absenteeism has a notable effect on the educational environment, requiring the need to teach those students who were not there again (White et al., 2003; Minnesota Department of Health, 2017). Multiple research

studies have demonstrated that individuals who do not follow proper hand hygiene practices are more likely to contract viral diseases, increasing the likelihood of needing to rest in bed (Drankiewicz & Dundes, 2013; Centers for Disease Control and Prevention (CDC), 2009).

In the setting of Jordan, scholars have done multiple studies examining the overall hygiene habits of school students, specifically focusing on dental care, tooth brushing, and hair care (AlBashtawy & Hasna, 2012; Khamaiseh, 2013). However, a prior study carried out in China by AlBashtawy (2017) briefly discussed the frequency of hand-washing in certain conditions, but it did not provide a comprehensive explanation. According to empirical research, it has been demonstrated that just 25% of students practice handwashing before eating meals, with a measly 10% continuously following this behavior.

Furthermore, distinct research conducted in India by Kosek et al. (2003) revealed that a significant proportion of fatal illnesses, amounting to 30%, might be categorized as water-related. A study conducted by Oyibo (2022) in Nigeria noted that learners within the age range of 6 to 14 exhibited substandard performance regarding their understanding and adherence to general hygiene standards. Furthermore, Oyibo (2022) discovered that a minority of students, precisely less than 30%, engage in handwashing after utilizing toilet facilities.

According to Lopez-Quintero et al. (2009), only 33.3% of the 2,024 students assessed in Colombia engaged in hand hygiene by washing their hands after using the washroom. Nandrup-Bus (2009) conducted a study in Taiwan that showed that implementing compulsory handwashing protocols in educational environments is an efficient strategy for

decreasing the occurrence of absences resulting from contagious illnesses.

One potential approach for reducing illness-related absenteeism entails developing and implementing efficient hand-washing procedures. The technique is widely acknowledged within the academic community as a crucial preventive measure against several infectious diseases (Heymann, 2018). While the morbidity and death rates of some infectious diseases, like respiratory and gastrointestinal disorders, are often low among secondary school students, these infections can nevertheless impact the total prevalence of diseases, absenteeism, and overall health outcomes.

Further intervention is required on average in the latter group, particularly in Kenya. On the one hand, educational institutions within a country serve as crucial platforms for advancing educational and health initiatives. Students could acquire knowledge, develop skills, and cultivate healthy habits about hand-washing and several other hygiene activities (WHO, 2015). Many students residing in regions characterized by marginalized communities and little access to water have a deficiency in their hand-washing practices. Many educational institutions promote hand-washing, a straightforward and economical method of hand cleanliness, among their learners. Additionally, parents' and peers' attitudes significantly impact children's behavior, particularly regarding hand-washing and hygiene practices.

Nevertheless, notable disparities exist between genders regarding secondary school students' knowledge, attitudes, and hygienic habits. The incidence of diarrhea and student absence has markedly decreased due to the implementation of hand-washing and other personal hygiene measures. In addition, the introduction of the hand-washing intervention

resulted in a significant improvement in student's comprehension and compliance with appropriate handwashing protocols, hence promoting effective communication between children and their parents (MoH, 2016).

This initiative is recommended to be extended to most schools within Kajiado County to foster student engagement as active participants in promoting hand-washing behaviors within the community. Numerous studies have been undertaken, as exemplified by this study, to examine matters about hand hygiene and overall sanitation practices among school-aged students. As stated before, hand-washing, specifically after using bathroom facilities, helps efficiently curb the transmission of parasitic diseases and is of utmost significance.

The incidence of parasitic illnesses among students in many countries has significantly increased (Dajaan et al., 2018). Multiple research studies have been carried out in Kenya to investigate the knowledge and attitudes of school-going students towards hand-washing practices in various geographical regions. However, there is a lack of studies examining the handwashing habits of students in the Kajiado North Sub-County.

Considerable scholarly research has focused on investigating educational facilities' cleanliness and food safety measures. This study was carried out to investigate the disparity in handwashing behaviors, awareness, knowledge, and attitudes among selected secondary schools in Kajiado North Sub-County, Kenya. This study aimed to evaluate the understanding, attitudes, and behaviors related to hand-washing in a subset of secondary schools in the Kenyan Sub-County of Kajiado.

1.3 Statement of the Problem

Inadequate hand-washing practice is the primary cause of diarrheal illnesses and school absences. The Government of Kenya and non-governmental organizations have implemented strategies to enhance hand hygiene and sanitation in schools situated within the communities of Kajiado sub-counties with tippy taps. According to the 2015 Human Rights Commission Report, Kajiado North Sub County in Kajiado experienced many instances due to the negative consequences of inadequate hand-washing among students and the general public. This can be attributable to a lack of information, attitude, bad behaviors, and other problems related to hand-washing. Multiple scientific searches have shown the importance of maintaining sufficient hand-washing to reduce the occurrence of infectious diseases across different populations. Moreover, these studies have uncovered that students frequently demonstrate inadequate hand-washing habits, increasing their vulnerability to such illnesses (Aiello et al., 2018). Prater et al. (2016) have highlighted the significant influence of inadequate compliance with hand hygiene protocols on the occurrence of infectious diseases among secondary school students. The World Health Organization (WHO, 2015) has provided clear and simply understandable hand hygiene practices that can be easily comprehended and implemented. Nevertheless, it is essential to acknowledge that the level of compliance with these practices among students is generally below the desired level, as indicated by the findings of Walker et al. (2014).

Assessing students' comprehension of the influence of hand-washing on infectious diseases is a stimulating research question. Rabbi and Dey (2013) believe that the successful adoption of efficient hygiene protocols, reliable sanitation systems, and the provision of accessible potable water holds the capacity to prevent around 2.4 million deaths every year.

Furthermore, the promotion of hand-washing habits is anticipated to have a large impact on saving many lives. While numerous studies have been undertaken on hand-washing behaviors, there is a lack of research examining the knowledge, attitudes, and practices about hand-washing in secondary schools.

A comprehensive research study is required to examine the attitudes, knowledge, and practices of hand-washing in a specific set of schools in the Kajiado North Sub-County.

In order to identify areas where students have limited knowledge, attitudes, and practices regarding handwashing, I conducted a study to assess the extent of comprehension, beliefs, and actions among selected secondary schools. This study aimed to assess the hand-washing practices of participants during crucial times, assess the consequences of inadequate handwashing among the participants, and observe the availability of restroom facilities for hand-washing in secondary schools. This research aims to identify areas of insufficient knowledge, negative attitudes, and inadequate practices to enhance the formulation of effective strategies for promoting handwashing in secondary schools in the future.

Studies regarding hand-washing practices and the factors linked to them in the Kajiado North Sub-County are scarce. In the absence of intervention, the prevalence of diarrheal diseases will persistently increase among students, adversely influencing their health and education and perhaps resulting in elevated mortality rates even though these diseases are preventable. Consequently, the researcher felt the need to evaluate the parameters linked to hand-washing behaviors among students in Kajiado North Sub County, located in Kajiado County.

1.4 Research Questions

- i. What are the levels of knowledge of hand-washing among students in selected secondary schools in Kajiado North Sub County, Kenya?
- ii. What are the attitudes regarding hand-washing among students in selected secondary schools in Kajiado North Sub County, Kenya?
- iii. What are the observed hand-washing practices among selected secondary school students in Kajiado North Sub County, Kenya?
- iv. What factors determine handwashing among students in selected secondary schools in the Kajiado Sub-County, Kenya?

1.5 Objectives of the Study

1.5.1 Broad Objective

The main objective of this study was to assess the knowledge, attitude, and practices of hand-washing among students in selected secondary schools in Kajiado North Sub County, Kenya.

1.5.2 Specific Objectives

- i. To assess the knowledge of hand-washing among students in selected secondary schools in Kajiado North Sub County, Kenya
- ii. To assess hand-washing attitudes among students in selected secondary schools in Kajiado North Sub County, Kenya.

- iii. To investigate the practices of hand-washing among students in selected secondary schools in Kajiado North Sub County, Kenya
- iv. To identify determiners of handwashing among students in selected secondary schools in Kajiado North Sub County, Kenya

1.6 Justification of the Study

Hand-washing is widely recognized as the major approach to avoid nosocomial infections, as it is believed that a substantial portion of these diseases are transmitted by direct physical contact. This study is significant for identifying gaps in knowledge, attitudes, and practices to improve the development of efficient strategies to promote hand-washing among secondary school students. In order to get optimal hand-washing practice, it is advised that persons follow a hand-washing protocol that lasts for a minimum of twenty seconds, utilizing soap and clean water. Subsequently, hands should be dried utilizing paper towels, and the faucet should be sealed using a paper towel to minimize direct hand contact with the surface. The combination of water and soap, along with strict adherence to established protocols, can significantly influence the effectiveness of handwashing, regardless of whether it is done with water alone or with the addition of soap.

This study aims to improve the understanding of hand-washing among secondary school students, with the goal of influencing a change in their behavior and ultimately improving their overall health status. Educational interventions aim to augment understanding hand-washing practices, enhancing students' health status and elevating their quality of life. Every secondary school student is considered a constituent of the community, and as a consequence of this alteration in policy, the community's overall well-being is inherently

improved.

Moreover, the successful implementation of handwashing procedures requires the creation of appropriate infrastructure, as well as significant cultural and behavioral changes.

These variables require a substantial amount of time for sufficient development. Furthermore, the effective implementation of handwashing standards necessitates significant resources, such as highly skilled workers, active community involvement, and the availability of water and soap.

1.7 Significance of the Study

Hand-washing is a crucial method for getting rid of or cutting down on bacteria on the hands. Consequently, there will be a decreased chance of these bacteria spreading directly to other people or surfaces where other people may be exposed. Hand-washing also reduces the chance of bringing infectious pathogens into contact with oneself. Healthcare personnel must wash their hands. "One of the main ways that infections spread in healthcare settings are through contaminated hands held by healthcare personnel." Hand-washing is equally important for young children, adults, and the elderly. In this case, it can support their continued health and help avoid common illnesses like the flu.

The common cold, flu, diarrhea, and some intestinal ailments are among the most prevalent illnesses that can be contracted via direct touch. This can affect those more susceptible to infectious infections, such as the elderly or young children and those with weakened immune systems. Younger children fall under the susceptible group of individuals considered more exposed to infectious diseases; thereby, this study identifying hand-

washing practices among school-going students will help create awareness of diseases associated with improper hand-washing and reduce the transmission of these diseases.

1.8 Scope of the Study

This study assessed knowledge, attitude, and hand-washing practices among students in selected secondary schools in Kajiado North Sub County, Kenya. The study was limited to addressing its specified objectives as outlined. Assessment of knowledge on hand-washing among students in selected secondary schools: Assessment of attitudes regarding hand-washing among students in selected secondary schools: Investigate practices of hand-washing among students in selected secondary schools, and finally, identifying determiners of handwashing among students in selected secondary schools in Kajiado North Sub County, Kenya. Further, it is crucial to acknowledge that the applicability of the study's results may be restricted to the particular circumstances under which the research was carried out, as variations in socioeconomic aspects and backgrounds across different countries or locations can influence the applicability of the results.

1.10 Assumptions of the Study

- i. Hand-washing with soap is an important way to prevent infections. The rate of hand-washing with soap and water is at an optimal level among students in secondary schools in Kajiado North Sub County, Kenya.
- ii. Students wash their hands regularly with water and soap.
- iii. Schools have provided students with hand-washing stations in every institution.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The study's main objective was to assess the level of knowledge, attitudes, and behaviors about hand hygiene in particular secondary schools. This section offers a thorough examination of the existing literature regarding hand-washing behaviors. It delves into students' attitudes towards hand hygiene practices and scrutinizes the actual hand-washing habits exhibited by students within a specific sample of secondary schools.

2.2 Theoretical Framework

Most handwashing assessments assess individuals' comprehension (cognitive domain) and behaviors (behavioral domain). The theory of planned behavior is a theoretical framework employed to assess cognition, attitudes, and actions. The Theory of Planned Behavior (TPB) states that an individual's intention to engage in a specific behavior is influenced by their evaluation of how the conduct will be carried out and the circumstances around it. Ajzen (1988) suggested that individuals' behaviors are driven by their inclination to engage in a specific behavior, which is influenced by three factors: their attitude toward the activity, subjective norms, and perceived behavioral control.

Consistent hand-washing is a simple yet crucial measure for interrupting the transmission of infection and limiting the spread of diseases, particularly in light of the COVID-19 pandemic (WHO, 2015). This theory offers a structured approach to examining attitudes by analyzing behaviors.

According to this theory, the primary factors influencing an individual's behavior are their

intentions, which are influenced by their attitudes regarding activities, subjective norms, and the perceived ability to control one's actions (Ajzen, 1988). An individual's attitudes regarding behaviors encompass behavioral beliefs, evaluation of behavioral outcomes, and subjective norms, which consist of normative views and drive to comply. In general, this paradigm emphasizes the impact of shifts in beliefs and posits that changes in beliefs result in corresponding changes in behavior.

Occasionally, students may possess adequate knowledge of the desired behavior but fail to put it into practice. As a result, to enhance the effectiveness of interventions, it is crucial to gather further information regarding the factors that influence said behavior. Choosing a suitable awareness approach that aligns with the educational content goals and the culture of the schools is a crucial step in planning for training (Omidvar & Begum, 2010).

This study aimed to assess the impact of implementing an intervention grounded in the Theory of Planned Behavior in Kajiado North Sub County, which had not previously undergone any interventions. The main objective was to assess the impact of this intervention on schools' inclination to adopt handwashing practices. The study aimed to assess the understanding, mindset, and actions related to hand-washing interventions, affected by the Theory of Planned Behavior, and how they affect schools' desire to participate in handwashing.

2.3 Review of Related Literature

2.3.1 Hand-washing Practices

Maintaining a healthy lifestyle requires regular and skillful handwashing. Hand-washing,

particularly before meals, is commonly acknowledged as a key strategy to protect individuals of all age cohorts, encompassing children, adolescents, and adults, against numerous communicable ailments. Overall, the risks associated with numerous diseases closely connected to hand hygiene are steadily rising. The following graphics depict many diseases that can be transmitted by water and food sources. The diseases include infectious conditions such as severe acute respiratory syndrome (SARS), influenza A H1N1, norovirus, cholera, malaria, dysentery, meningitis, shigellosis, and multidrug-resistant *Staphylococcus aureus* (World Health Organization, 2020). There is a distinct association between children who develop diarrhea and the practice of handwashing without soap. Contaminated hands can serve as a reservoir for infectious diseases. This transmission route commonly occurs because of activities such as manipulating the nasal passages, coughing, using toilet facilities, and managing waste. Furthermore, hand-washing is crucial in promoting the general well-being and advancement of the community.

Hand-washing is a methodical action conducted to prevent the transmission of pathogenic bacteria. It refers to the act of cleaning our hands to remove dirt, filth, and microorganisms, using either regular soap or antimicrobial soap (Strecher & Rosenstock, 1997). Hand-washing is a simple, convenient, effective, and cost-effective approach to limiting the transmission of infectious diseases among people (Setyautami et al., 2012).

Thorough hand-washing also greatly decreases the spread of conjunctivitis, trachoma, and respiratory disorders caused by bacteria. Encouraging the practice of hand-washing enhances the hygiene conditions of individuals, particularly those residing in underdeveloped nations (Rabbi & Dey, 2013). Nevertheless, the consequences of limited and unreliable water supply constitute a significant obstacle in terms of sanitation and

hygiene. They might potentially increase the likelihood of negative health effects for persons (Setyautami, 2012).

Approximately 80% of infections in underdeveloped nations are linked to inadequate hygiene, resulting in over 2 million annual deaths from diarrhea, with higher mortality rates among children. Research has shown that effective hand-washing practices can decrease the frequency of diarrhea by around 30%–40% and respiratory tract infections by 6%–44% (Sibiya & Gumbo, 2013). Moreover, an estimated 60% of the disease burden in Ethiopia can be related to insufficient sanitation and unsanitary environments. Very few schools in Ethiopia have sufficient access to water or proper toilet facilities to ensure cleanliness and hygiene. The lack of toilet facilities may be attributed to substandard design and construction. The school toilets are inadequate and challenging to maintain effectively, which may incline students towards open defecation rather than using these facilities. Moreover, the educational progress of learners might be compromised by the presence of intestinal helminth infections, diarrheal disorders, and malaria infections, leading to increased school absenteeism (Patel, 2022).

Hand-washing, even with soap, is not done properly in undeveloped countries such as Kenya, despite the ample evidence of its usefulness. There is a lack of information about the hand-washing habits of secondary school students. In addition, students face the potential danger of contracting diarrheal diseases, acute respiratory infections, and other health issues related to cleanliness.

Unfortunately, the practice of hand-washing after using restroom facilities is still not extensively adopted in many African countries despite its substantial impact on human

health and well-being. There is scant documented evidence that infrequent handwashing raises the likelihood of students contracting hand and foot disease (HFMD), especially in China and other Asian countries.

The high occurrence of diarrhea infections and other contagious diseases among learners attending school might be related to a lack of proper knowledge and use of personal and environmental handwashing methods (Koopman, 1978). Inadequate understanding and implementation of personal hygiene, including hand-washing, might have detrimental effects on a student's holistic development in the long run (GHWD 1, 2018). Therefore, for a student to survive, it is essential to practice good hand-washing (UNICEF, 2018; Curtis & Cairncross, 2003).

According to a survey by UNICEF, when students actively promote hand-washing with soap in secondary schools, they develop a feeling of ownership, which increases the likelihood of their adopting new behaviors (UNICEF, 2018). Thus, it is possible to instill critical hygiene habits, such as effective hand-washing, in millions of school-going students by encouraging them to engage in these repetitive and automatic behaviors, likely to continue into adulthood.

In the poor world, infectious diseases continue to be the predominant and most lethal category of illnesses. Each year, almost 3.5 million individuals succumb to diarrhea and severe lower respiratory tract infections. Proper hand-washing would greatly decrease the occurrence of these diseases. The initial historical documentation regarding the significance of hand-washing was unveiled in a maternity clinic in Vienna in 1847. According to Trampuz and Widmer (2004), medical professionals cleaning their hands

has been shown to decrease maternal mortality.

Subsequent studies have consistently demonstrated that handwashing is an effective measure in reducing nosocomial contagious diseases. Currently, hospital-acquired infections in the United Kingdom cost over £1 billion yearly and affect almost 10% of patients. This leads to more than 5,000 deaths annually, which is higher than the number of deaths caused by traffic accidents. Additionally, these illnesses also occupy a significant number of hospital bed days.

Implementing hand-washing recommendations can decrease the occurrence of hospital-acquired infection by approximately 15%. A meta-analysis revealed that not washing hands resulted in a 1.8-fold increase in the occurrence of diarrheal disorders (UNICEF, 2016).

Consistently practicing hand-washing can reduce the risk of serious intestinal infections and shigellosis by around 48% and 59%, respectively. Additionally, it can prevent up to one million fatalities caused by diarrhea each year. A study on interventions demonstrated that children under the age of 15 residing in families that were exposed to handwashing promotion and plain soap experienced a 53% reduction in the occurrence of diarrhea compared to the control group. A further meta-analysis found that all relevant trials demonstrated a 6.0 to 44.0% reduction in respiratory illnesses when thorough handwashing was practiced (UNICEF, 2008).

A study conducted in Turkish universities assessed the social knowledge, habits, and skills of university students regarding hand-washing, along with other relevant factors. (Vivas et al., 2010). Presently, the global implementation of thorough hand hygiene practices

falls short of the expected level of prevalence. The documented prevalence of hand-washing with soap before handling food or after using the toilet ranged from 0% to 34.0%.

The Center for Disease Control and the Association for Professionals in Infection Control and Epidemiology have jointly established guidelines for hand hygiene. Furthermore, since 2008, UNICEF has officially designated October 15 as the Global Hand Cleaning Day in order to underscore the significance of proper handwashing.

Al Nadwi et al. (2022) conducted a study in Makah City, Saudi Arabia, to assess the influence of health education on the comprehension and implementation of hand-washing among secondary school students.

This research conclusion emphasizes the necessity of enhancing student education, conducting awareness campaigns, and providing frequent training to guarantee the adoption of proper hand hygiene practices. The findings align with Watson et al. (2019), indicating that hand-washing programs typically result in enhancements in practice. In Obudu Local Government Area, Cross River State, Nigeria, a study by Olatunji and Taiwo (2023) investigated the relationship between hand-washing practices specific to schools and the well-being of students. 200 students were included in the sample. According to the statement, the well-being of students is positively influenced by practicing proper hand-washing.

The significance of the study undertaken by Olatunji and Taiwo (2023) lies in its focus on a specific local government context in Nigeria. Nevertheless, this study encompasses a greater scope than Olatunji and Taiwo's research; however, it fails to examine the relationship between hand hygiene and the well-being of students. Dangis et al. (2023)

Conducted research to assess the efficacy of a gamified intervention that offers real-time feedback enhancing handwashing practices among students in secondary school settings in Turku and Bamberg, Germany. Researchers used "gamification" to describe incorporating game characteristics into a non-game setting. This study was predicated on the premise that using games tends to enhance the motivation of students to engage in a specific endeavor. The researchers determined that augmenting the experiences of infants and young individuals through constructive and pleasurable methods can facilitate their development into robust adults. (Dangis et al., 2023).

The study suggests that promoting effective hand hygiene can be achieved by implementing various measures, including educating children, installing hand-washing facilities with water and soap, and utilizing digital technologies like computer games, videos, and video cameras to enhance and monitor the hand-washing habits of school students.

Hand cleanliness is a fundamental and vital practice that can effectively reduce nosocomial infections. Hand hygiene is considered a highly effective preventive strategy for children, which contributes to a decrease in the demand for antibiotics among this group. (World Health Organization, 2020). Moreover, it acts as a preventive strategy against illness dissemination through indirect routes, such as contamination during food manipulation and transmission by lifeless entities (Katz, 2004).

Several studies have examined how often people wash their hands and how important it is to practice good sanitation to lower the incidence of infectious diseases in various community settings (Aiello et al., 2018). Prater et al. (2016) emphasized that the decrease

in infectious infections among middle school students can be attributable to the substantial impact of inadequate hand hygiene. Rabbi and Dey (2013) state that implementing efficient hygiene practices, reliable sanitation infrastructure, and ensuring access to safe drinking water can prevent around 2.4 million deaths per year. One approach to reducing illness-related absenteeism entails promoting and fostering proper hygiene practices. Hand-washing is a commonly used prophylactic measure for various infectious diseases. The research illustrates that proper hand hygiene is pivotal in diminishing illness and school absenteeism.

The education of students is vital in implementing an infection control program. Just as in healthcare settings, education is crucial in reducing the spread of illness in educational institutions (Arem, 2012). It is essential for school children and young individuals to actively participate in handwashing campaigns in order to promote the achievement of the Sustainable Development Goals (SDGs) related to improving health and education and eliminating poverty and hunger (Adams et al., 2009). Without a doubt, the adoption of handwashing ideas and practices at the secondary school level will result in rapid assimilation. This will guarantee uniform compliance with these standards and the provision of hygienic facilities and hygiene education initiatives.

Nevertheless, it is imperative to acknowledge that this particular approach, as emphasized by Arem (2012), lacks complete comprehensiveness. The Nigeria Demographic and Health Survey 2018 (NDHS) has uncovered that secondary schools in Nigeria frequently experience episodes of diarrhea and cholera, which can be attributed to inadequate compliance with hygiene protocols. The presence of illness among students poses a significant obstacle to the educational progress of scholars, as it results in frequent

absences, below-average academic performance, and early discontinuation of schooling. This confluence impedes attaining top-notch, all-encompassing primary education (White et al., 2001). Multiple global studies have examined overall cleanliness and handwashing practices among school-aged children.

Problems with water supply are responsible for over 30% of all fatalities in India, according to research (Kosek et al., 2003). Oyibo's (2022) study conducted in Nigeria found that children between the ages of 6 and 14 showed insufficient performance in general cleanliness and their understanding and adherence to handwashing routines. The mean scores for these features were 74.6% and 54.9%, respectively. A study conducted in Colombia, with a sample size of 2,024 learners, found that only one-third of the participants practiced handwashing after using the bathroom (Lopez-Quintero et al., 2009).

Regularly practicing proper hand-washing is an essential skill for maintaining good health. Handwashing, particularly prior to consuming food, is widely regarded as one of the primary methods to safeguard individuals of all ages, including toddlers, children, young adults, adults, and the elderly, against a multitude of contagious illnesses. In Kajiado, there is a clear correlation between handwashing and an elevated risk of various diseases, like water- and foodborne illnesses (MoH, 2016). Regrettably, washing hands after using the lavatory is not commonly observed in many communities in Kajiado despite its substantial impact on human health. Similarly, irregular handwashing is shown as a significant contributing factor linked to head, foot, and mouth diseases (HFMD) among students in Kenya (WHO, 2020).

2.3.2 Levels of Knowledge of Hand-washing Practices

As a simple and effective way to promote health, washing one's hands with a running water stream can minimize or eliminate germs (Mbakaya, 2017). Every person has the fundamental right to access WASH, water, sanitation, and hygiene.

However, a large portion of the global population continues to encounter persistent obstacles when trying to obtain even the most fundamental services, such as places to wash their hands (UNDP, 2018). Managing hygiene and sanitation programs globally, particularly in educational institutions, remains a substantial issue (Chatterley et al., 2018). In less developed countries, insufficient hand hygiene practices are prominent concerns and persist as high-risk behaviors in secondary schools (Assefa & Kumie, 2014). According to USAID (2018), installing handwashing facilities or implementing handwashing initiatives in secondary schools can effectively raise handwashing rates among students.

Schools are widely recognized as key settings for health education and health promotion programs. (ALBashtawy, 2015). Healthcare practitioners, school nurses, and instructors can impart accurate information, practical skills, and a favorable mindset regarding handwashing to students (Scott et al., 2007). Although handwashing is a straightforward and inexpensive method that is made available to all students in every school, many students, particularly in developing countries, do not adequately wash their hands due to insufficient understanding of handwashing (Lopez-Quintero et al., 2009).

Multiple global studies have examined the issue of overall cleanliness and handwashing practices among students in schools. A study conducted in Nigeria and South Africa

found that approximately 33% of all fatalities are attributed to infectious diseases. Another study conducted in India (Kosek et al., 2023) suggested that 30% of all illnesses can be classified as waterborne infections. Oyibo (2022) discovered that school learners in Nigeria aged 14-18 had subpar levels of knowledge and adherence to general hygiene practices, with average scores of 74.6% and 54.9%, respectively.

Furthermore, Oyibo's research uncovered that fewer than 30% of students engaged in hand hygiene by washing their hands after using the restroom (Oyibo, 2022).

A study conducted in Colombia analyzed a sample of 2024 school learners and discovered that merely one-third of them engaged in hand hygiene by washing their hands after using the bathroom (Lopez-Quintero et al., 2009). Nandrup-Bus (2009) argued that enforcing mandatory handwashing protocols in schools can substantially reduce the incidence of absenteeism resulting from contagious diseases.

In 2007, the Centers for Disease Control and Prevention (CDC) and the Center for Health and Health Care in Schools (CHHCS) determined that hand-washing is the most effective measure an individual can take to minimize the transmission of infectious diseases. Moreover, they assert that insufficient hand hygiene is accountable for nearly half of all instances of foodborne disease outbreaks. A study conducted by Cha and Borchgrevink (2019) revealed that a mere 5% of individuals effectively eliminated infectious pathogens and disease-causing microorganisms by washing their hands enough after using the restroom. Most people tend to engage in a superficial hand-washing technique known as "splash-and-go." Additionally, the survey revealed that 33% of individuals who washed their hands did not utilize soap, and 10% completely neglected to engage in hand-

washing.

Crucial instances of hand-washing include using the toilet, engaging in personal hygiene activities, and handling food (GHWD 1, 2018). Significant occurrences arise specifically for young individuals following participation in outdoor activities, utilization of toys, and interaction with pets (McDonald, 2021). Handwashing with soap is a cost-effective approach to reducing global diarrheal illnesses and pneumonia, the primary causes of student mortality. Nevertheless, despite its life-saving potential, promoting it is not widely adopted and can be challenging to implement (GHWD 1, 2018, GHWD 2, 2018). Lopez-Quintero et al. (2009) discovered that the lack of soap and clean towels had a detrimental impact on compliance. This finding is supported by the School Sanitation and Hygiene Education study, which reported that schools in various developing countries consistently face challenges with the lack of soap and clean water availability (Lopez-Quintero et al., 2009).

The likelihood of developing diarrhea, respiratory infections, and, as a result, missing school can be reduced by adhering to appropriate hand-washing practices (Luby et al., 2020; Zhang et al., 2013). Implementing effective hand cleansing programs on a global scale, particularly in schools in developing countries, can potentially reduce the incidence of disease and save the lives of numerous students. The most effective method for reducing the transmission of disease-causing microbes within the school community is widely recognized as hand cleansing (Ayoade, 2019; World Health Organization [WHO], 2019; Lee et al., 2023). However, young learners frequently fail to maintain proper hand-washing, as they frequently lack a comprehensive understanding of the significance of hand cleansing for their overall health and well-being (Lopez-Quintero et

al., 2009). Public health awareness is a widely utilized and successful method for infection prevention, as highlighted by Shrestha et al. (2022).

Infections associated with handwashing provide a persistent risk of both mortality and morbidity among the high school student population. The issue of hospital-acquired infections has garnered significant attention, mostly due to the increasing recognition that most infections can be prevented.

Hand-washing with soap can help avoid most transmission, including pneumonia and diarrhea, primarily spread by contaminated hands. For example, studies have shown that less than 40% of people visiting national parks wash their hands after leaving areas where they interact with animals. A survey conducted in 54 countries in 2015 found that, on average, 38.7% of families utilized soap for handwashing. Research findings suggest a notable discrepancy in adherence to handwashing protocols among healthcare professionals, with just 40% demonstrating compliance.

Moreover, it has been shown that physicians are more prone to exhibiting noncompliance, thus identifying their professional status as a risk factor in this regard. The education and assessment of handwashing during undergraduate training may be influenced by disciplinary variations, which in turn might impact the behavior of graduates once they enter the industry (Van De Mortel et al., 2012).

Hand-washing compliance among healthcare professionals continues to be a prevalent concern within the field of medicine. Physicians are widely recognized for their suboptimal adherence to guidelines and protocols (WHO, 2016).

Noncompliance with proper hand hygiene protocols might facilitate the transmission of pathogens acquired in both the community and school environment, hence heightening the susceptibility of scholars to infection. Unfortunately, despite concerted attempts to effect change, compliance levels remain suboptimal. While inadequate hand hygiene is frequently observed in educational institutions, there is a possibility of the same pattern among pre-hospital providers.

Bucher et al. (2015) state that the World Health Organization (WHO) has issued guidelines for handwashing procedures to reduce the frequency of nosocomial infections. Insufficient awareness among healthcare providers has been associated with less-than-ideal adherence to these standards. An alarming discovery reveals that there was a decrease in compliance before carrying out high-risk treatments. Although empirical data and professional consensus support the usefulness of hand-washing in decreasing the transfer of infections and antibiotic-resistant organisms, healthcare workers continue to face difficulties in consistently adhering to hand hygiene recommendations and proper hand-washing techniques, even after receiving education (Maheshwari, 2014).

Implementing a school-wide hand-washing regimen ensures that both students and instructors maintain optimal physical health. School-based hand-washing procedures connect with the healthcare delivery system within a certain academic department (Ghanim et al., 2016). These activities are intended to promote and maintain students' physical well-being to provide them with an excellent quality of life. The objective of the faculty-based hand-washing exercise, as a component of the faculty fitness program, is to enable faculty members to attain optimal physical fitness to reap the benefits of

their education fully. School fitness programs that incorporate hand hygiene protocols encompass the management of contagious diseases, fitness assessments, fitness training, data storage, and monitoring staff and student fitness levels (Amoran & Kuponiyi, 2016).

Insufficient education and physical activity make students more susceptible to neglecting fundamental personal hygiene habits such as regular hand-washing (Vivas et al., 2010). There is a pervasive deficiency in the adequate understanding, application, and mindset regarding personal hygiene, particularly hand-washing. Rabie and Curtis (2016) discovered that enhancing awareness of fitness education and hand hygiene habits among students has successfully decreased respiratory and gastrointestinal tract infections by as much as 50%. These two disorders are the main factors leading to illness and mortality among college students globally.

Moreover, research has shown that faculty learners who possess more extensive knowledge and maintain superior personal hygiene also experience fewer instances of illness and school absences and get higher academic marks (Vivas et al., 2010). Dongre et al. (2017) assert that schools are platforms for imparting fitness education on crucial subjects about sanitation, hygiene, and the environment. In addition to demonstrating consistent commitment and academic success, good health is essential for faculty entrance. The instructor plays a crucial role in the fundamental preventative system and serves as a parental figure to the student (Deb et al., 2010).

Due to the frequent involvement of students in the spread of communicable illnesses and faculty identification as a crucial factor in health promotion (Varu, 2018). It is

imperative to restrict the research scope. A well-planned and implemented instructional program, such as a comprehensive hand-washing exercise conducted in schools, can help create a safe and protected atmosphere for educational institutions. This measure is taken to ensure your protection against contagious illnesses. Developing nations worldwide have the formidable task of preventing infectious diseases.

An important obstacle arises in managing and preventing infections among a community of students living near each other within an educational institution. According to Galiani et al. (2016), maintaining good hand hygiene is crucial when hands significantly spread illnesses.

Educational institutions exhibit a notable deficiency in fundamental amenities, encompassing substandard classrooms, inadequate restroom facilities, insufficient waste disposal receptacles, inadequate water dispensing mechanisms, the absence of cleaning agents, disinfectants, air fresheners, tissues, suboptimal recreational areas, and a dearth of waste incineration facilities.

2.3.3 Attitudes Regarding Hand-washing

Hand-washing is a crucial practice that helps maintain the cleanliness of hands and is widely recognized as a vital approach to minimizing the spread of infectious diseases, especially in healthcare environments (Zakeri et al., 2017). Creating a favorable setting for handwashing in schools can greatly impact student's attitudes, resulting in improved handwashing habits at school, at home, and in the community (UNICEF, 2018). In 2017, the hand wash facility coverage in Sub-Saharan Africa (SSA) was a mere 27%, despite the acknowledged advantages of regular hand-washing. In addition, according to WASH

Watch (2017), around 15% of individuals in Sub-Saharan Africa participate in handwashing using soap and water. Moreover, a meager proportion of Sub-Saharan Africa (SSA) schools provide crucial handwashing facilities (WHO/UNICEF, 2018).

Research has shown that a lack of understanding of proper hand-washing techniques is a significant factor in the prevalence of communicable diseases in economically disadvantaged nations (Alyssa & Lowe, 2013; Sibiya & Gumbo, 2013). Various research undertaken in schools throughout Sub-Saharan Africa (SSA) has revealed that learners' inadequate understanding of hand-washing has a detrimental impact on their practice, mostly due to their adverse disposition. A study conducted in Ebonyi State, Nigeria, aimed to assess the prevalence of handwashing behaviors among secondary school students. The findings revealed that the student's adherence to handwashing protocols was insufficient. The researchers found that the learners' limited understanding notably influenced their hand-washing habits (Azuogu et al., 2016).

A study conducted in Kintampo, Ghana, revealed that more than 53% of the learners lacked instruction on handwashing, and less than 25% demonstrated the correct handwashing method (Dubik et al., 2018).

On one side, schools play a crucial role in promoting health education and implementing programs aimed at enhancing the mindset of students. This initiative will help students acquire information, expertise, and favorable conduct about handwashing and other hygiene habits (Dajaan et al., 2018). Al-Bashtawy (2015) found that numerous students in poor nations demonstrate a lack of positive attitude towards handwashing skills, as where other schools promote the habit of handwashing, a straightforward and cost-effective

strategy for maintaining hand cleanliness.

In addition to teachers, the attitudes of parents and classmates substantially impact the handwashing and hygiene behaviors and habits of learners (WHO, 2019). However, there are notable differences across genders regarding students' knowledge, attitudes, and habits about hand-washing (Twinomuhwezi, 2021). Research has demonstrated that adopting handwashing and personal hygiene behaviors among secondary school students has resulted in a noteworthy decrease in diarrhea and student non-attendance. Moreover, adopting handwashing procedures has significantly improved the mindset of students, allowing them to successfully communicate their ideas and emotions to their parents (Sobel & Stricker, 2023).

In Ghana, a substantial portion of the population faces inadequate access to sanitary facilities, with schools, particularly secondary schools, being particularly affected by this issue (Akpakli et al., 2018). According to the Ghana Statistical Service (2019), the Multiple Indicator Cluster Survey (2017/2018) revealed that a mere 20% of households in Ghana possess upgraded hand-washing facilities, such as septic tanks or pit latrines, flush/pour flush pipe sewage systems, composting toilets, or ventilated improved pit latrines. According to the research conducted by Suresh and Cahill (2007), the existence of conveniently located and visible handwashing facilities that are easily reachable positively influences an individual's inclination to engage in handwashing. In secondary school settings, students imitate the conduct and demeanor of their teachers. Furthermore, it is recommended that individuals possess a robust aptitude for logical reasoning to make well-informed assessments (Acar & Runco., 2019; Frenzel et al., 2018). The teacher's handwashing practices are vital in encouraging positive hand-washing behavior among

secondary school students. Snow et al. (2015), as referenced by Appiah-Brempong et al. (2018), argue that when teachers urge students to take action and combine it with an educational intervention on hand-washing, it effectively promotes the habit of hand-washing among school students.

Ravichandran et al. (2019) at a medical college in Tanzania and Appiah-Brempong et al. (2020) among secondary school students in Ghana both reached the same conclusion: Engaging in hand hygiene does not automatically lead to the actual act of handwashing or foster favorable intentions or attitudes towards handwashing. The association between hand-washing and a favorable disposition towards proper handwashing is generally acknowledged.

The adherence to hygiene practices is mostly impacted by the perceived vulnerability to disease transmission and the perceived severity of the outcomes. These components have a significant impact, even in the presence of obstacles. According to Appiah-Brempong et al. (2018), interventions promoting hand-washing in schools should prioritize addressing particular characteristics associated with individuals. The determinants encompass their expertise and proficiency in hand-washing, their perception of susceptibility to diseases and the gravity of such infections, their disposition towards hand-washing, and the societal norms that shape their behavior.

In economically disadvantaged areas of Kajiado, the prevalence of illnesses is high due to the persistent absence or inadequate adherence to handwashing practices and attitudes (Shrestha et al., 2022). Despite being a cost-effective and easily implemented method, handwashing is not generally practiced during important events in schools and

communities (Saboori et al., 2013). A study conducted in Kenya has identified a direct correlation between persons' level of knowledge or awareness regarding handwashing and their actual practice of handwashing (Chittleborough et al., 2012; Global et al., 2018).

While there are fewer research studies on teachers' handwashing behavior in Kenya, it is widely recognized that they play a vital role in influencing the handwashing behaviors of school students (Setyautami et al., 2012). Therefore, when implementing strategies to encourage handwashing in schools in Kajiado North Sub County, it is essential to consider the influence of teachers on students' handwashing behaviors within the school setting, as influenced by their individual perspectives and societal norms (Appiah-Brempong et al., 2018).

2.3.4 Hand-washing Practices Among Students

The practice of thorough hand-washing represents a straightforward, cost-effective, and highly efficacious measure for mitigating the transmission of infections from fecal matter, bodily fluids, and inanimate surfaces. The practice of hand-washing holds particular significance for children, preteens, and secondary school students due to their heightened vulnerability to illnesses resulting from inadequate washing of hands (Shrestha & Angolkar, 2015). Moreover, the proximity of schools and school-going students significantly increases the likelihood of transmitting contagious diseases. Research has demonstrated that implementing effective hand-washing favors both the learning and teaching processes, primarily by decreasing absenteeism.

Hand-washing has effectively decreased absenteeism rates, as evidenced by various global studies. Specifically, a study conducted in China reported a reduction of 54% in

absenteeism, while similar studies in Egypt, Kenya, the Philippines, and Colombia demonstrated reductions of 40%, 35%, 27%, and 20%, respectively. In addition, it has been reported that an estimated 443 million school days are forfeited annually due to water-related illnesses, establishing water as a prominent factor contributing to the prevalence of school absenteeism in developing nations (White et al., 2001).

Approximately half (50%) of hospital visits and almost one-eighth (12%) of hospitalizations among children aged 0 to 14 years are caused by infectious diseases. Respiratory tract infections and intestinal infectious illnesses accounted for 48% and 29% of the cases among the learners evaluated at medical facilities (UNICEF, 2018).

In underdeveloped nations, a significant proportion of illnesses, around 80%, can be attributed to inadequate personal and household hygiene practices. Consequently, the mortality rate associated with these diseases amounts to approximately 2.2 million individuals. An equal number of individuals have succumbed to acute respiratory illnesses. Furthermore, it is worth noting that around 400 million students across the globe are afflicted with parasitic worms as a consequence of inadequate hand-washing practices. These parasitic worms eat the host's nutrition, resulting in gastrointestinal pain and malfunction. This, in turn, hampers the child's cognitive abilities, decreasing their educational performance and attendance. In the country of Ethiopia, an annual mortality rate above 250,000 students is attributed to diseases directly linked to inadequate sanitation and hygiene conditions (UNICEF, 2018).

Approximately 60% of the overall illness burden can be attributed to inadequate hygiene practices. Despite the challenges, the global prevalence of adequate hand-washing

practices remains suboptimal. World Health Organization (WHO, 2015) It has been established that the percentage of individuals who wash their hands with soap before making meals or after using the restroom ranges from 0% to 34.0%. This is a considerable amount of variation.

Hand-washing is essential for maintaining proper hygiene standards in secondary schools and has been proven to have significant benefits in preventing and reducing certain infectious diseases. Adopting hand-washing practices and chemical disinfection techniques is widely acknowledged as a universally accepted strategy for preventing and controlling hospital-acquired infections. Proper hand-washing is essential to thoroughly dry one's hands. Bacteria can adhere to and spread from moist hands (Nadakavukaren, 2011).

Implementing effective hand-washing practices is of utmost importance in reducing the incidence of nosocomial infections. Therefore, both healthcare facilities and educational establishments must give high priority to this intervention. Elements beyond individual characteristics alone influence adherence to hand-washing protocols. To cultivate a comprehensive understanding of hand-washing significance among secondary students, it is imperative to conduct suitable research to ascertain the underlying causes of non-compliance.

Healthcare facilities and hospital infection control committees play a crucial role in promoting adherence to proper hygiene measures, including hand-washing, among students involved in patient care. Enhancing handwashing behaviors and adherence can be achieved by employing multidisciplinary and multi-modal strategies, including

facilitating the convenient availability of soap dispensers and handwashing stations, providing comprehensive instruction on proper handwashing techniques, and implementing regular soap changes.

According to McMichael (2019), school hygiene and water sanitation is a comprehensive strategy covering the software and hardware components required to alter students' and the community's hygiene practices. Therefore, the strategy focuses on offering water sanitation and hygiene infrastructure, including garbage points, handwashing stations, and latrines, while educating students about cleanliness. This method strongly emphasizes imparting to students fundamental life skills based on their existing knowledge, attitudes, and behaviors.

Modifying their hygiene habits and those of their family and the larger society is intended to enhance their quality of life (Mooijman, 2022). This strategy was implemented into practice in Tanzanian schools, where Antwi-Agyei et al. (2017) observed that important stakeholders were actively involved. However, the main obstacles to improving hygiene and water sanitation practices in Tanzanian schools were inadequate funding and budget, a lack of supplies for maintenance and repair, and a lack of planning and coordination. McMichael (2019) concurs that this option is somewhat costly, considering the infrastructure supply, teacher training, and instructional materials.

Inadequate sanitary environments and inadequate hygiene practices contribute greatly to the rise in the burden of infectious illnesses in developing nations. Safe hygiene procedures like hand-washing minimize morbidity and enhance health outcomes. For example, research suggests that hand-washing in secondary schools reduces diarrhea occurrences by

30% (Ejemot et al., 2008). Greene et al. (2017) demonstrate that a significant, randomized study conducted in Western Kenya improved sanitary conditions at several intervention schools compared to control schools.

Freeman et al. (2012) found that implementing water and sanitation measures decreases female absenteeism. These researches elucidate the positive results of implementing safe hygiene practices but do not establish a direct correlation between the findings and a particular technique for promoting cleanliness. However, it is crucial to have access to a properly functional water sanitation and hygiene infrastructure.

According to research by Mekonnen et al. (2018), 40% of school-going students do not wash their hands after school, and 90% do not use soap to clean their hands. According to this study, the absence of soap at the school water faucet and inadequate water supply at home decreased the likelihood of students adequately washing their hands. According to Ogola (2010), restrooms are either lacking or poorly maintained and not found in schools. These studies provided evidence for the choice of sanitation infrastructure as safe hygiene practices and targeted hygiene initiatives.

Handwashing with soap, according to the Infectious and Tropical Diseases Department in London, can reduce fatalities from diarrhea and acute respiratory infections (ARI) by 42 to 47 percent. According to these studies, hand-washing is expected to save one million children's lives globally. Since students have no soap-washing habit, health education should be utilized to develop their understanding and awareness of the necessity of hand-washing in everyday life. Learners are more vulnerable to diseases because of poor behavior.

According to Prater et al. (2016), employing an alcohol-based hand sanitizer can be a more efficient and skin-friendly approach in areas with high school workloads. To promote proper hand-washing, instructional posters and encouraging high school students to serve as role models for their younger peers are suggested.

2.3.5 Determinants of Handwashing Practices

Water, sanitation, and hygiene (WASH) services are crucial for attaining optimal health and meeting the objectives of the Sustainable Development Goals (SDGs). The SDGs prioritize the importance of guaranteeing universal, sufficient, and fair access to clean water and sanitation facilities. This involves ensuring that all individuals have equal access to affordable and safe Water, Sanitation, and Hygiene (WASH) facilities while also eliminating the act of openly defecating, especially among secondary school students. Although the World Health Organization (WHO) has advised that hand-washing should be a top priority for all countries in terms of policy and practice, many schools lack the necessary resources and support to encourage good hand-washing. The main emphasis has been on enhancing water provision and hand-washing amenities.

Handwashing encompasses intentional actions and behaviors to preserve optimal health and reduce the probability of acquiring illnesses (Kumwenda, 2019). By assuring the availability of affordable handwashing equipment and providing information, we can reduce suffering and prevent loss of life. Although handwashing is crucial for maintaining cleanliness, more than 2.3 billion people cannot access clean water and soap in their homes (UNICEF, 2021). Approximately 670 million individuals lack access to hand-washing facilities. Numerous schools and other venues suffer from a deficiency in

the quantity of handwashing facilities.

In 2020, the World Health Organization (WHO) reported that in Sub-Saharan Africa (SSA), Kenya had a significant proportion of students, namely 295 million out of a total of 818 million, who lacked access to fundamental hand-washing facilities in schools. Water and other essential supplies, including soap, are in short supply. This elevates the likelihood of contagious, developing, and reoccurring illnesses, such as gastrointestinal disorders and acute respiratory infections, among students in educational institutions.

A study conducted in 2023 by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) revealed that washing hands with soap had the potential to decrease school absenteeism due to diarrhea and inflammation by up to 50%. Therefore, washing hands without soap is an essential component in preserving a sanitary school environment.

Funding guarantees that those schools have the essential infrastructure required to facilitate students' carrying out hand-washing (WHO, 2019). In order to achieve compliance with hand-washing among secondary school students, schools must guarantee the presence of appropriate infrastructure and a consistent, uninterrupted provision of hand-washing products at the correct times and in the appropriate areas (WHO, 2019). Multiple investigations have confirmed that the experimental group was provided abundant resources, including alcohol-based hand rubs, soap, and water, to facilitate hand-washing and ensure its ease and convenience. For instance, in research conducted in Pakistan, workers provided households with soap as and when required (Luby et al., 2020). All three initiatives in Kenya received funds from an international organization to implement the

handwashing campaign in their country, which greatly assisted in financing most of the required resources.

As an illustration, they successfully implemented handwashing facilities and built toilets in schools in Kajiado and Machakos (Patel, 2022; Saboori et al., 2013). In Kenya, the situation is equally lamentable, even though the Ministry of Education (MOE) has recommended a ratio of one water station for every 50 people. A survey by the School Sanitation and Hygiene Task Force in Machakos, Nairobi, and Kiambu Public Schools has revealed that 90% of schools in rural Kenya lack crucial hand-washing amenities and lack access to water. In 10% of schools with available water facilities, a minority of students failed to adhere to proper hand-washing protocols after using the lavatory. In a study conducted by Onsomu et al. (2017), it was discovered that out of 400 students in a school where safe drinking water was available, only 20 practiced hand-washing after using the restroom. A study by Mbula (2014) found that many students in public schools in Machakos do not follow handwashing standards by failing to wash their hands after using the restroom. He found a limited number of handwashing stations near the facilities assigned to teachers and none near the ones assigned to students.

According to studies conducted by UNICEF, promoting handwashing with soap in schools gives children a sense of ownership. It enhances the probability that they will continue practicing this new habit (UNICEF, 2018). Thus, by promoting the participation of numerous students in these beneficial, repetitive, automatic activities, fundamental hygiene practices such as thorough handwashing can be promoted. These activities are expected to continue until adulthood.

By promoting these positive repeating behaviors across thousands of learners, such as practicing appropriate hand-washing techniques, we can develop basic hygiene practices that will likely continue into adulthood. These strategies can also contribute to achieving Sustainable Development Goals (SDGs 5 and 6) related to education and health. Bennell (2022) asserts that promoting excellent hygiene and hand-washing practices among school students is not only essential but also of the utmost importance, particularly in poor nations where learners comprise up to half of the population (Bennell, 2017).

The main objective of the National Water and Sanitation Program in Ghana, as stated by GPPPHW Ghana (2015), is to increase the percentage of school-going students who follow proper hand hygiene practices by washing their hands with soap after using the restroom. The primary objective of the Ghana School Health and Education Program (SHEP) is to ensure that schools have adequate access to and utilize water and sanitation facilities to promote proper handwashing practices. In addition, SHEP strives to offer extensive health education and services. It is crucial to emphasize that providing suitable and efficient handwashing and sanitation facilities in schools is necessary for encouraging excellent handwashing behaviors (Tay, 2015).

In order to decrease the incidence of hospital-acquired illnesses, it is imperative to enhance compliance with hand-washing protocols. Monitoring the causes of non-adherence in educational institutions, implementing comprehensive, long-term, effective campaigns, and developing methods backed by school management are crucial for improving hand-washing adherence among secondary school students. Before the inauguration, the administration must deliver training on hand-washing practices to the students, and it is crucial to ensure the ongoing nature of this training.

According to Siwolo (2014), improving hand-washing practices can be achieved through various measures, such as providing education to students, implementing reminders in the workplace, simplifying hand-washing monitors, promoting active participation at both individual and institutional levels, preventing crowded environments and excessive workload, providing alcohol-based agents, and using administrative sanctions and rewards. These measures aim to increase adherence to hand-washing protocols and subsequently reduce the occurrence of school-acquired infections.

Cairncross et al. (2010) assert that the act of washing hands with soap can decrease the likelihood of contracting diarrhea by 42-48 percent. According to Mihalache et al. (2021), the act of washing hands with soap and water can decrease the amount of fecal bacteria found on hands significantly. Ejemot et al. (2008) discovered that using soap to wash hands can greatly decrease diarrhea and respiratory diseases. However, in socio-economic settings with scarce financial resources and a high prevalence of diseases, hand-washing with soap is not commonly practiced, as evidenced by Curtis and Cairncross (2003) and Pickering et al. (2016).

Aiello et al. (2018) present empirical evidence demonstrating that washing hands with soap decreases the likelihood of acquiring gastrointestinal sickness by 31 percent and respiratory infections by 21 percent. A study conducted in 13 economically disadvantaged nations revealed that a mere 17 percent of individuals responsible for childcare practice proper hand hygiene by washing their hands with soap after handling feces. Despite ongoing endeavors to promote this conduct as a means of averting the consumption of pathogenic germs in excrement (Curtis & Cairncross, 2003).

Although strong evidence supports the positive effects of handwashing with soap on health, the practice is still not widespread enough, especially in low-income nations.

Countries with improved access to basic water supply services are likelier to have adequate hand-washing facilities. To maintain proper hand-washing, it is crucial to have a reliable and sufficient supply of water that satisfies the required criteria for regular handwashing with soap and water. Furthermore, the expense associated with obtaining soap or detergents can significantly impact the adoption of personal hygiene practices, specifically about handwashing with soap and water. The objective of this study is to assess the preparedness of people or households to implement self-protection measures to avoid the transmission of Covid-19. Since there is a lack of data from secondary sources at the person or household level, it is imperative to apply this technique nationwide. Per capita income is crucial in evaluating the affordability of water services and the ability to purchase soaps and detergents.

Nevertheless, the correlation between per capita income and access to hand-washing facilities might be intricate, considering the prevailing notion that the government is responsible for furnishing fundamental water supply and sanitation as public amenities. The cost recovery components of water services are crucial as they significantly influence the achievement of universal access to the service and ensure the long-term financial sustainability of the services (Mukherjee & Leflaive, 2018).

As water supply and sanitation services are classified as public goods, governments frequently need to implement stringent procedures to ensure the complete recovery of the costs associated with providing these services. Moreover, water and sanitation services are

universally recognized as fundamental human rights. Consequently, governments fulfill their political obligation by ensuring the provision of these facilities (Mukherjee & Chakraborty, 2017). Inadequate allocation of public funds for water services infrastructure, particularly in developing nations, can often fail to fulfill the expectations of all citizens adequately and consistently deliver the required resources, owing to financial limitations and growing demands for alternative public goods and services. Hence, the involvement of private investment and public-private investment is crucial for the progress of water services infrastructure. Nevertheless, the current amount of private investment in water services is sufficient. The volatile revenue stream, especially in developing countries, has led to a lack of full financial recovery.

Consequently, private investors hesitate to invest in public utility services such as water supply, sanitation services, and power transmission and distribution services (Mukherjee & Chakraborty, 2017). Given the significant benefits to public health and human development, governments must allocate resources to water supply and sanitation services, which are inherently public goods. The COVID-19 pandemic has unquestionably forced governments to recognize the crucial necessity of public investment in ensuring public health security.

2.4 Summary Gaps in Literature Review

Multiple studies have examined the hand-washing habits of secondary school students. However, certain aspects still have not been well addressed, leading to research gaps that need further exploration. These features include comprehension of students, factors that either facilitate or impede hand-washing among students, and current policy recommendations for

promoting hand-washing. Research on students about hand-washing awareness has revealed that most learners engage in hand-washing practices after using the restroom and before eating. Unfortunately, there is a lack of data regarding whether students practice hand hygiene after coughing, eating, or being in contact with sick individuals or deceased animals.

Studies investigating the factors influencing hand-washing behavior among students have shown that the presence of water, tippy taps, and easy access to hand-washing facilities significantly affect hand-washing behaviors. Nevertheless, these studies have failed to consider the variables contributing to a lack of adherence to hand hygiene, such as the negligence of school principals and instructors in recognizing the importance of hand hygiene as a significant institutional matter. Other neglected factors include significant workloads, such as being overwhelmed with academic responsibilities and student knowledge deficits. Studies show that many educational institutions follow specific protocols and standards for hand hygiene. They have found that practicing good hand-washing effectively reduces the number of bacteria on hands, thereby reducing the risk of disease. However, these studies have not shown the specific manner in which these practices can improve the health status of students.

To achieve the global development objective of reducing the proportion of people without access to improved water and sanitation by 50% by 2015, approximately 1.5 billion individuals will require access to clean water, while around 2.2 billion individuals will require access to adequate sanitation facilities (WHO, 2015). Additional vital facilities needed in schools include an adequate number of classrooms, functioning flush toilets, trash bins, water dispensers, cleaning supplies, sanitizers, air fresheners, tissue dispensers, well-maintained recreational spaces, sanitary napkins, and waste disposal devices (UNICEF, 2008).

2.5 Conceptual Framework

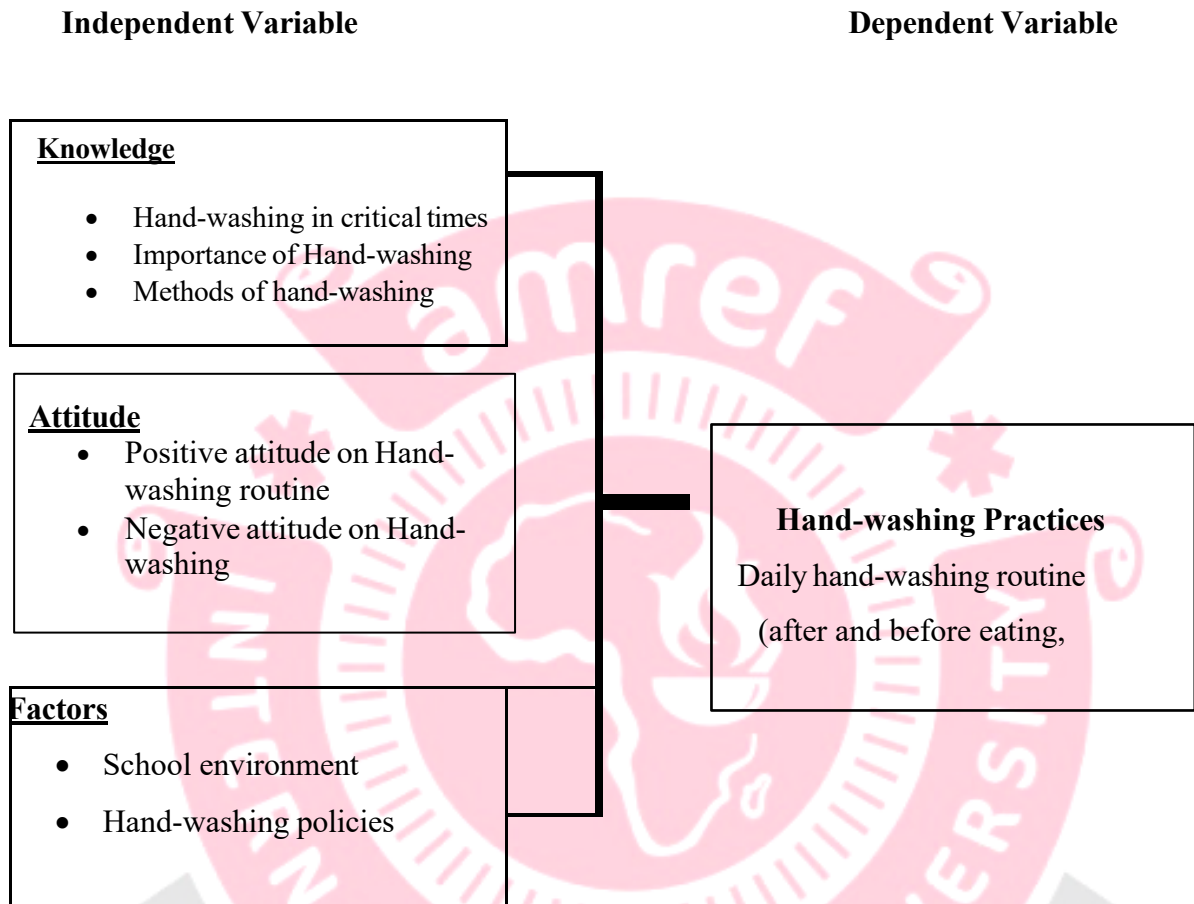


Figure 2. 1: Conceptual Framework

The study focuses on the dependent variable of handwashing practices among secondary school students, as illustrated in Figure 2.1. In order to achieve effective and accurate hand-washing, it is crucial to develop knowledge, attitude, and habits. Without sufficient facilities and a lack of comprehension regarding fundamental hand-washing protocols, these programs will not provide the intended outcomes in secondary schools. The lack of sufficient hand-washing facilities and awareness of proper practices contribute to the prevalence of diseases connected to hand hygiene, as indicated in the literature review.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This study aimed to assess the knowledge, attitude, and practices about hand-washing in selected secondary schools in the Kajiado North Sub-County. In this chapter, I examined the research topics, study methods, participant characteristics, and instruments used, and provided a comprehensive account of the data gathering and analysis procedures

3.2 Research Design

The research method used in this study was cross-sectional, integrating both qualitative and quantitative methodologies. This specific design was chosen due to its capacity to enable the collection of quantitative data related to multiple parameters (Bryman, 2012). One of the benefits of employing a cross-sectional design is its capacity to facilitate the examination of numerous outcomes that can be readily examined. Additionally, this design simplifies characterizing the population under investigation and identifying correlations between variables. The utilization of this design offers notable cost savings and time efficiency due to the absence of any tracking loss. Estimating the prevalence of the outcomes of interest is feasible due to the frequent utilization of samples from the entire population. Moreover, the practicality of this study design for public health planning lies in its ability to measure the outcomes and determinants associated with handwashing habits. The main limitation of cross-sectional study designs is that they make it hard to find causal relationships. This is because the outcomes might differ if a different timeframe was applied.

3.3 Target Population

The study sample consisted of 4,000 students from both public and private institutions. Of the 56 high schools chosen for the study, 16 schools were selected in the sample. The choice of 16 high schools aligns with the findings of Mugenda and Mugenda (2015), who recommend that a sample size of 30% of the population is suitable for smaller target populations. Consequently, I utilized this proportion when selecting educational institutions in the Kajiado North Sub-County. The study applied Slovin's formula to select the student sample. 363 students were selected out of 4000 students to collect data. 363 students agreed to participate in the study, but 360 questionnaires were returned out of 363 questionnaires.

The population included form three and form four secondary school students. Since all students are at risk of contracting infectious diseases due to the lack of handwashing practices in Kajiado County, only three or four students were selected for this study. Indeed, the majority of Form Three and Form Four students have a clear understanding of the handwashing process, have developed knowledge of it, and are mature enough to practice it with or without supervision.

Given that students have gone to school even during the COVID-19 period and have been able to develop the habit of washing their hands, it is better to evaluate them based on the hand-washing methods they developed during this period. Therefore, the period within which the students are in school is sufficient to provide clear information on whether they have practiced hand-washing over the past few years. As a result, I can effectively collect data about their knowledge, attitudes, and practices. The school comprises both private

schools and public schools.

Among private schools, there are schools owned by individuals, such as CBOs and FBOs. The parameters assessed were knowledge, attitude, and handwashing practice. There were two key informant interviews in each school for data collection: the principal and the health officer. Key informants' interviews were conducted for those who consented to the study. Consent forms were distributed to students and returned to me for interviews to be carried out.

3.4 Sample and Sampling Procedures

3.4.1 Sampling Procedure

The study utilized both simple-random and selective sampling methodologies. The sampling sites encompassed both public and private secondary schools. The researcher used a simple random sampling method to select a sample of 16 secondary schools from the overall population of 56 Kajiado North Sub County schools. The selection procedure was hierarchical, with schools being classified into several strata according to their population quota within a specific zone. As specified, students from Forms 3 and 4 were randomly picked from the schools included in the sample. Therefore, 363 participants were chosen as the sample to respond to the study instruments. Slovinc's formulae were a useful tool in situations where there is limited knowledge of the characteristics of a population or the distribution of behavior, which makes it challenging to estimate the appropriate sample size.

3.4.2 Sample Size Determination

Slovins' formula (Slovoin 1960) was used in determining the number of sample schools.

The formula used was as follows.

$$n = \frac{N}{1 + Ne^2}$$

Where n was the sample size

N was the total population of students

E = margin of error (error tolerance)

$$n = \frac{4000}{1 + 4000 \times 0.05^2}$$

$$n = 363.63$$

$$n = 363$$

Therefore, the study sampled 363 respondents to for the study as illustrated in Table 3.1.



Table 3.1: Sampling Grid

Respondents	Total	Sampled	Total number	Sample	Form 3	Form 4
	number of schools	schools	of students	size		
Private schools	36	10	1700	200	100	100
Public schools	20	6	2300	163	100	63
Total	56	16	4000	363	200	163

3.4.3 Training of Data Collectors

Research assistants helped me during the data collection process. I provided customized training designed to address research inquiries, ethics, and topics through Google Meetings. Only two research assistants received training. It took three days to complete the training and ensure the assistants understood the subject, students' knowledge, attitudes, and handwashing practices. Because of the sensitivity of the data collected from students, the assistants were required to maintain a high level of ethics when conducting research. They received training in providing comprehensive support to students with special needs, encompassing considerations such as pace, teaching style, empathy, and supplementary resources to ensure their complete engagement. The assistants were educated to uphold high standards of confidentiality, ensuring the protection of gathered data and respecting students' right to privacy. Administering research tools was key in explaining the required

feedback and how well they can be handled.

3.5 Data Collection

Data was collected in all selected schools during a typical school day. I familiarized myself with the principals, presented them with a study summary, and then requested their permission to conduct the study in their schools. The consent form was provided to the school administration for their signature. The data-gathering process involved the use of interviewer-administered questionnaires and structured observation checklists.

3.6 Data Collection Instruments

The data collection methods included self-administered questionnaires, interview schedules, and observation approaches. In addition, key informant interviews were employed to collect data from the student participants. Secondary school students completed questionnaires.

The questionnaire utilized in this study comprised three distinct elements, namely knowledge, attitude, and practices, which jointly assessed respondents' understanding, attitudes, and behaviors regarding hand-washing. A section pertaining to demographics was incorporated into the questionnaire to gather data regarding the participants' age, gender, and education level. Additionally, inquiries were made regarding the participants' exposure to formal handwashing training.

The key informants' interview method was employed to gather data regarding the objectives, attitudes, and factors influencing handwashing. The interviewing methodology was employed to gather data on the practices, knowledge, and attitudes toward

handwashing. The researcher utilized semi-structured questionnaires that were specifically customized to gather quantitative data. The questionnaire comprised a combination of closed-ended and open-ended questions. Utilizing closed-ended questions facilitated the collection of precise and targeted responses, whereas open-ended questions gave participants the freedom to express themselves without limitations. The questionnaires were administered by the researcher with assistance from his research assistants.

3.6.1 Hand Hygiene Knowledge Scale

The measurement of handwashing practice was conducted by a self-reporting method, utilizing a set of 10 questions. Participants were presented with three response options: "always," "sometimes," and "never." In the evaluation of self-reported handwashing behavior, a response indicating "always" was assigned a score of 3 points, a response indicating "sometimes" was assigned a score of 2 points, and a response indicating "never" was assigned a score of 1 point for all relevant inquiries.

3.6.2 Handwashing Attitude Scale

The attitudes towards hand hygiene were evaluated using a seven-point semantic differential scale. This scale included seven specific descriptors that represented participants' feelings about the act of handwashing. The researchers evaluated the level of inconvenience, discomfort, frustration, and convenience linked to handwashing at appropriate intervals and the impression of handwashing as an optional or beneficial activity. The attitude score was calculated by aggregating the individual item scores, with higher scores indicating a more positive attitude toward hand hygiene.

3.6.3 Handwashing Practices Scale

The measurement of handwashing practice was conducted by a self-reporting method, utilizing a set of 10 questions. Participants were presented with three response options: "always," "sometimes," and "never." In the evaluation of self-reported handwashing behavior, a response indicating "always" was assigned a score of 3 points, a response indicating "sometimes" was assigned a score of 2 points, and a response indicating "never" was assigned a score of 1 point for all questions.

3.7 Inclusion and Exclusion Criteria

Form three and four students were included to be part of those who participated in the data collection process because they were senior students and had information about the handwashing process in the school compared to Form One and Form Two. The fact that they had also stayed in school for a long they understood the importance of handwashing, attitudes, and knowledge.

3.8 Data Analysis and Presentation

The study employed both qualitative and quantitative methodologies for analysis. The data processing and analysis encompassed several tasks, such as data preparation, editing, coding, classification, and analysis. The data analysis technique included descriptive statistics, notably frequency tables, and cross-tabulation. The Statistical Package for Social Scientists program (SPSS) examined the quantitative data using descriptive statistics, specifically frequency analysis. The main handwashing strategy implemented by each school was determined based on the most prevalent approach reported by the students

(independent variable).

The frequencies of the independent factors were documented in a cross-tabulation, which included the dependent variables, namely the students' hand-washing practices. Subsequently, these frequencies underwent the Chi-square test of independence. The Chi-square test is used to evaluate the impact of intervening variables on the choice of handwashing procedures, which is considered the independent variable. The Chi-square tests produced p-values to determine the statistical significance.

Any p-value below the stipulated significance level of 0.05 was considered statistically significant. The analysis of variance test was employed to assess the presence of a correlation between students' test scores in handwashing knowledge, attitude, and factors and the independent variable of handwashing behaviors. The results are reported using percentages, averages, frequencies, and P-values. The qualitative data underwent theme coding and further analysis.

3.9 Validity and Reliability of Instruments

The researcher utilized quality control methodologies, such as validating the proper sequencing of the questionnaires, precisely identifying the respondents, and doing on-site editing of the questionnaires. Furthermore, the researcher provided instructions to the research assistant, who assisted in gathering the necessary data. During the data-collecting phase, the researcher and her research assistant supervised the participants in obtaining the necessary data. Before conducting the study, a preliminary test of the research questionnaire was conducted. The researcher selected a sample of 10 students by a random process from schools that were not part of the study. The students were provided with the

same questions to evaluate whether the questionnaires would yield comparable responses, thereby ensuring their reliability. The researcher was tasked with rectifying the mistakes identified in the questionnaire to ensure its reliability.

3.10 Ethical Considerations

The university approved the study before being submitted to the Amref – Ethical and Scientific Review Committee. The Ethical and Scientific Review Committee (ESRC) then gave ethical approval to visit schools and collect student data.

The National Commission for Science, Technology, and Innovation (NACOSTI) and the Sub-County Education Officer will issue the research data collection permit to allow me to collect field data in the Kajiado North Sub-County. Upon arrival at the selected secondary schools, each principal or relevant representative sought permission to conduct the research. Once granted, a consent form was signed, and interviews and observations commenced. Students, especially those under 18, are given a consent form for their parents/guardians to complete. The consent form demonstrated a high level of confidentiality, allowing me to move on to the interview phase of the study, sending questionnaires to students for data collection. The form also details how research is intended to benefit students and, therefore, requires participation. I conducted private interviews to build participants' credibility and give them a sense of freedom of expression. They are given numbers instead of real names to ensure their privacy. For parents who did not give consent due to being busy at work, teachers called on behalf of the students and signed the consent form after approval. This was approved by the school administration, which oversaw the distribution of consent forms.

CHAPTER 4: RESULTS

4.1 Introduction

The present chapter is divided into two primary sections. The initial section analyzes the participants' demographic characteristics. In contrast, the subsequent section investigates the factors associated with hand-washing in selected Kajiado North Sub County secondary schools.

4.2. Students' Demographic Information

Data on gender and type of school were collected for Forms three and four students. The findings obtained for every attribute are summarized in Table 4.2.

Table 4. 2: Selected School Demographic Information

Variable	Category	Frequency	Percentage
Gender	Male	194	54.8
	Female	166	46.1
Age in years	13-14	90	25
	15-17	230	63.9
	Above 18	40	11.1
Class	Form 3	200	55.6
	Form 4	160	44.4

Data obtained showed that more male (54.8%) than female (46.1%) students took part in the study. These findings are consistent with the demographic distribution of students by gender, in which there is a comparable distribution of students registered by gender.

Results obtained based on age distribution shows that the majority of the respondents were aged 15-17 years (63.9%), followed by students aged 13-14 (25%), and lastly, those who were above 18 years 40(11.1%). Similarly, information on the distribution of the students based on the class in which they are placed showed that more students were from Form three (55.6%), followed by Form four students (44.4%). All students under 18 years of age participated in the study by filling in a consent form from their guardians and parents.

4.3 Questionnaire Return Rate

The questionnaires were distributed to 363 students in different selected secondary schools. A total of 360 questionnaires were returned, and 360 students were interviewed. Of the above respondents, 194 (53.3%) male and 166(46.1%) female students participated in the data collection process. Upon realization after data collection, I the questionnaires and went through them with my team to confirm if they were well answered. It was already late to give the three questionnaires to three students to fill, so I had to fill my data using a sample of 360.

Table 4. 3 : Questionnaire Return Rate Table

Instruments	Target	Number returned	Percentage
Male	200	194	53.3%
Female	163	166	46.1%
Total	363	360	99.4%

The study's findings, as shown in Table 4.3, established that 99.4% of the students returned their questionnaires. This return rate was considered quite positive for the study.

Table 4. 4: Effect of Student Knowledge on Hand-washing Practices

Knowledge about hand-washing		Frequency	Percent
Hand-washing actions that prevent transmission of germs are done before eating and touching anything	True	280	77.8
	False	80	22.2
Regular hand-washing facilities is important and required in schools	True	296	82.2
	False	64	17.7
Hand-washing facilities are not necessary in schools	True	80	22.2
	False	280	77.8
Cold water should be used for hand-washing	True	320	88.9
	False	40	11.1
Hand-washing practices prevent an individual from getting infected	True	330	91.7
	False	30	8.3
Hands need to be washed at least 15 seconds	True	290	80.6
	False	70	19.4
Hands should be dried after washing	True	296	82.2
	False	64	17.8
Warm water should be used for hand-washing	True	315	87.5
	False	45	12.5
Hand-washing is part of hygiene	True	319	88.6
	False	41	11.4
There is need to remove rings and watches when washing hands	True	308	85.5
	False	52	14.4

The participants underwent an assessment to evaluate their understanding of hand-washing practices in selected secondary schools within the Kajiado North Sub County. The majority of over 70% of the participants reported engaging in hand-washing practices to avoid the spread of germs before eating and touching objects. However, less than 25% of respondents said it was not essential.

Over 80% of participants expressed the importance and necessity of having regular hand-washing facilities in schools, while less than 20% disagreed.

More than 25% of the respondents indicated that hand-washing facilities were not necessary in schools, compared to more than 80% who believed that they were. On whether cold water should be used for hand-washing, above 80% indicated that it was good to use, while below 20% indicated that it was not right to use cold water.

According to the findings, more than 90% reported that hand-washing practices prevent an individual from getting infected, while less than 10% indicated that it did not. On the issue of hands being washed for at least 15 seconds, more than 80% of the respondents stated that it was necessary, while less than 30% indicated it was not. More than 80% noted that hands should be dried after washing, while less than 20% stated that it was not. On whether warm water should be used for washing hands, more than 80% indicated that it should be used for hand-washing, while less than 15% reported that it was not.

Above 80% of participants reported that hand-washing is part of hygiene, while less than 15% noted that it was not. Finally, more than 80% of the participants said it was right to remove watches and rings when washing hands, while less than 15% believed it was not necessary. The study's results showed that most secondary school students engaged in the

practice of hand-washing.

Furthermore, it was observed that the majority of handwashing instances occurred after their use of restroom facilities. This suggested that the participants understood the efficacy of handwashing in eliminating potential pollutants acquired in toilet facilities. Consequently, it is imperative to promote the practice of hand hygiene among students to ensure consistent cleanliness of their hands. This pertains to the health belief model underpinning the study, positing that individuals are more likely to engage in preventative behaviors, such as hand-washing, if they perceive related advantages.

Table 4. 4: *Attitude and Hand-washing*

Attitude and hand-washing N=360		Frequenc	Percent
I adhere to hand-washing practices all times	Good attitude	330	91.7
	Poor attitude	30	8.3
I review informative material on hand hygiene frequently	Good attitude	326	90.6
	Poor attitude	34	9.4
I refuse to wash my hands after using washrooms	Good attitude	17	4.7
	Poor attitude	343	95.3
I am reluctant to ask others to wash their hands	Good attitude	30	8.3
	Poor attitude	330	91.7
Sometimes I have important things to do than hand-washing	Good attitude	30	8.3
	Poor attitude	330	91.7
I strictly adhere to hand-washing practices	Good attitude	332	92.2
	Poor attitude	28	7.7
School activities make hand-washing difficult	Good attitude	10	2.8
	Poor attitude	350	97.2

According to Table 4.4, participants were required to respond to questions about the

attitude of students toward hand-washing practices in school. Most respondents (91.7%) of students had a good attitude in adhering to hand-washing practices at all times, followed by those with poor attitudes (8.3%).

On whether students had good or poor attitudes towards reviewing informative material on hand-washing hygiene frequently, (90.6%) had a good attitude, while a minority (9.4%) had a poor attitude.

Most respondents (95.3%) expressed that refusing to wash their hands after using the toilets is a negative attitude, stating that it is an incorrect habit. Only a small percentage (4.7%) believed it was acceptable. 8.3% of individuals were reluctant to request others to wash their hands, perceiving this attitude as positive. Conversely, 91.7% considered this reluctance a negative attitude towards asking others to wash their hands. 8.3% of individuals believed that they occasionally prioritize other tasks above hand-washing, considering it a positive mindset. In comparison, 91.7% of participants argued that it was a bad practice with poor attitude to avoid washing hands due to many things they have. Of most participants, 92.2% felt it was a good attitude to strictly adhere to hand-washing practices, while 7.7% felt it was a poor attitude. The majority of respondents, 97.2%, pointed out it was a poor attitude to fail to wash hands due to other school activities, while 2.8% had a good attitude. Overall, the majority of respondents, according to these findings, have a good attitude towards proper handwashing practice. The study participants possess sufficient information, and over 50% have a favorable attitude. The general practice of hand-washing is commendable but using soap and hand-washing after using the toilet is insufficient.

Table 4. 5 : Practices of Hand-washing

Practices	N=360	Frequency	Percent
I wash my hands after meals	Always	230	68.9
	Sometimes	100	27.8
	Never	30	8.3
I wash my hands before taking meals	Always	295	81.9
	Sometimes	50	13.9
	Never	15	4.16
I wash my hands when I come home	Always	70	19.4
	Sometimes	250	69.4
	Never	40	11.1
I wash my hands after using public transportation	Always	243	67.5
	Sometimes	90	25
	Never	27	7.5
I wash my hands after shaking hands	Always	89	24.7
	Sometimes	233	64.7
	Never	38	10.6
I wash my hands after using restrooms	Always	301	83.6
	Sometimes	61	16.9
	Never	8	2.2
Sometimes I miss out hand hygiene simply because I forget	Always	110	30.6
	Sometimes	235	65.3
	Never	15	4.2
Handwashing is essential part of my role	Always	267	74.2
	Sometimes	80	22.2
	Never	13	3.6
I wash my hands only if they are soiled	Always	300	83.3
	Sometimes	47	13.1
	Never	13	3.6

Participants responded to the questions on the third variable about hand-washing practices in secondary schools in Kajiado North Sub County. The majority of respondents (68.9%) indicated that after every meal, they always washed their hands; 27.8% believed that they sometimes wash their hands, at 27.8%, while 8.3% indicated that they never wash their hands.

Participants also reacted to the question of whether they wash their hands before eating any meal. 81.9% of the respondents said that they always wash their hands, 13.9% sometimes wash their hands, and those indicated that it was never done were at 4.16%.

69.4% of respondents said that they wash their hands when they return home, while those believed they always do it at 19.4%, and those who indicated that it was never done at 11.1%.

In addition, 25% indicated that they sometimes washed their hands after using public transportation, while those who indicated that they always wash their hands after transportation were 67.5%, and those who never washed their hands were 7.5%. 24.7% of participants indicated that students always wash their hands after shaking hands, 64.7% reported that they sometimes wash their hands, and 10.6% never wash them. In responses on whether students wash their hands after visiting the restroom, 83.6% indicated that they always wash their hands, followed by 16.9% who reported that they sometimes wash their hands and % who never did it, 2.2%. 65.3% reported that they sometimes miss out on hand hygiene because they forget, while 30.6% indicated that they always wash their hands, and those who never did it were 4.2%. 74.2% noted that washing hands was an essential practice, 22.2% indicated it is sometimes essential while 3.6% reported that it was never essential. 83.3% of participants indicated that they always wash their hands only when soiled, while 13.1% indicated that they sometimes wash their hands when soiled, and 3.6% never did so.

The study participants are well-informed, and more than 50% have a positive outlook. The overall habit of hand-washing is commendable but relying only on soap and hand cleaning

after using the toilet is inadequate.

Cross Tabulations and Chi-Square Tests for Various Variables



Table 4. 6 : Determinants of Handwashing

Demographic factors	Category	Hand-washing Practices		Chi-square test	
		Wash (%)	Not wash (%)		
Age	13-14 (n=90)	66.7	33.3	$\chi^2 = 0.351$, df=2 P=0.056	
	15-17 (n=230)	87.0	13.0		
	Above 18 (n=40)	75.0	25.0		
Gender	Male (n=194)	89.7	12.4	$\chi^2 = 0.242$ df=1 P=0.012	
	Female (n=166)	96.4	1.7		
Class	Form Three (n=200)	90.0	10.0	$\chi^2 = 0.803$ df=1 P=0.011	
	Form Four (n=160)	87.5	12.5		
Handwashing attitudes					
Knowledge about handwashing		Good attitude (%)	Poor attitude (%)	Chi-square test $\chi^2 = 0.392$ df=4 P=0.034	
	Yes (n=275)	94.5	5.5		
	No (n=85)	80.0	20.0		
Attitude towards handwashing	Yes (n=304)	95.6	6.8	$\chi^2 = 0.330$ df=1 P=0.043	
	No (n=56)	89.3	28.6		
Practices of handwashing					
Practices of handwashing		Always %	Sometimes %	Never%	Chi-square test $\chi^2 = 0.499$ df=4 P=0.028
	Yes (n=310)	98.4	1.6	0	
	No (n=55)	90.0	10.0	5.6	
Factors influencing handwashing practices					
			Always %	Sometimes %	Chi-square test $\chi^2 = 0.211$ df=2 0.031
Presence of water for handwashing		Wash (n=320)	95.3	4.7	
		Not wash (n=40)	75.0	25.0	
Provision of water for handwashing		Wash (n=310)	93.5	6.5	$\chi^2 = 0.346$ df=2 0.025
		Not wash (n=50)	80.0	20.0	
Cleanliness of stations		Wash (n=310)	90.3	9.7	$\chi^2 = 0.176$ df=1 0.042
		Not wash (n=50)	60.0	40.0	

Key:

Good attitude: washing hands without supervision.

Poor attitude: avoiding handwashing intentionally.

According to Table 4.6, the findings showed the relationship between demographic factors and hand-washing practices and dependent variables against independent variables. The findings showed age with a significant P value in relation to handwashing of 0.056, gender 0.012, and class 0.011). The findings showed a significant value, and therefore, demographic factors were significantly associated with handwashing practices. The relationship between independent factors and dependent factors showed knowledge about handwashing was significantly associated with handwashing practices due to a P value of $0.034 < 0.05$. The study results indicated a significant relationship between the attitude toward handwashing and the actual hand-washing practice, with a P-value of 0.043. The act of handwashing was strongly associated with the practice of handwashing, as indicated by a P value of 0.028.

Factors affecting handwashing were significantly related to handwashing practices with a P value of 0.031 (presence of handwashing water), 0.025 (provision of handwashing water in schools, and 0.042 (cleanliness of handwashing stations).

The results obtained from the questionnaires and interviews indicated that most (80%) of the schools examined in this study had implemented hand-washing faucets to encourage efficient hand hygiene among students. Moreover, 60% of these schools possessed an adequate water supply in the sinks for handwashing. Nevertheless, it was noted that 60%

of the schools examined lacked soap for students to use during hand-washing exercises.

All the educational institutions analyzed in the research maintained a dependable water supply that was particularly earmarked for hand hygiene. In addition, the educational institutions were furnished with both inverted and sealed taps conveniently situated within the school premises. According to the researcher's observations, most of the facilities were kept in a sanitary state, except one school, where a corroded tippy tap was identified.

Based on the results of the interviews conducted with key informants, one of the deputy principals participating in the study found that a significant proportion of students exclusively engage in hand-washing practices while their teachers and prefects are in attendance during lunch periods at their designated dining establishments.

In addition, while conducting interviews with key sources, it was discovered that many hand-washing facilities at the two schools under investigation were not operational despite being present. A person expressed their viewpoint:

“it is true that we have hand-washing facilities in our school but they are not functional at all because we do not have a reliable source of water” The individual in question holds the position of deputy principal at School E.

According to a key informant at school five, there are concerns over the provision of soap for handwashing. “ ***the truth is that we do not provide soap to our students, maybe to the teachers. This is because we find it costly to buy soap for all students; maybe if the government can provide free soaps; there we can be in position of doing that***”. [Educator responsible for sanitation and hygiene at school D].

The data indicated that the majority of students possessed information regarding hand-washing habits and positive attitudes towards it due to the consequences brought about by the failure to observe the proper hand-washing practices, but the schools had not developed consistent hand-washing practices among their students. A reason that forced prefects and teachers on duty to stand near the hand-washing facilities to ensure most students observe the condition.



CHAPTER 5: DISCUSSIONS

5.1 Introduction

This chapter provides a comprehensive analysis of the results in relation to the study's objectives, the conclusions derived, the recommendations made, and the potential areas for future research.

5.2 Discussions

This segment of the discussion thoroughly analyzes the demographic characteristics, knowledge about handwashing, attitudes, and habits in the Kajiado North Sub-County. The study investigated the knowledge, attitudes, and practices about hand-washing in selected schools within the Kajiado North Sub-County.

5.2.1 Knowledge about Hand Washing Practices

The findings revealed that 99.4% of the participants were actively involved in the study in the data collection process. As indicated by the study's results, a significant proportion of the participants (77.8%) demonstrated the ability to both perform and recognize hand-washing procedures designed to prevent the spread of germs and should be performed before touching or ingesting. 82.2% of respondents noted that hand-washing facilities are necessary in schools.

These data indicate that the respondents were aware that practicing hand cleanliness helps to remove germs they may have encountered in restroom facilities. Furthermore, the findings indicated that most participants had information about the correct method, timing,

and materials for hand hygiene. The findings of this study align with the health belief, which posits that individuals are more inclined to partake in preventative behaviors, such as hand-washing when they hold the idea that doing so will lead to favorable outcomes (World Health Organization, 2015).

The findings align with the study conducted by the World Health Organization (WHO) in Nigeria in 2017, which revealed that the primary instances when students washed their hands were immediately before meals, after using the restroom, and after engaging in play activities. Hand-washing is an uncomplicated and economical method to prevent the spread of microorganisms.

5.2.2 Attitude towards Hand Washing Practices

Additionally, it revealed that most participants had a positive inclination towards engaging in hand hygiene practices. The study aligns with research conducted by Twinomuhwezi (2021) in Kabale, Uganda, which examined the adherence to appropriate hand-washing practices among secondary school students. The results revealed that students with favorable attitudes towards hand-washing were six times more likely to practice proper hand-washing than those with unfavorable attitudes. These results also carry substantial policy ramifications, as health policy mandates that hand-washing with detergent is crucial for eradicating potentially harmful microorganisms. It has been determined that hepatitis A infection can be prevented by washing hands with soap and utilizing all available hand-washing facilities, including those available at critical periods such as meals and after using the restroom, according to the WHO (2015).

5.2.3 Practices of Handwashing in Schools

In addition, the findings of this research study indicate that a substantial number of participants were recruited from secondary educational institutions located in the Kajiado North Sub-County, and they consistently practiced hand-washing. The results of this study are consistent with the research conducted in Ghana by Sibiya and Gumbo (2013), which demonstrated that none of the students observed in their households followed the established handwashing protocol, which involves wetting hands, vigorously rubbing them together for approximately 20 seconds under flowing water with neutral soap. However, only 7% of the entire student body was observed practicing appropriate hand hygiene by washing their hands with soap before eating in educational institutions. Similarly, Steiner-Asiedu et al. (2011) reported that only 5% of students followed the precise protocol of washing their hands with soap after eating.

This observation implies a deficiency in comprehending the crucial function of soap in eradicating and sanitizing potential microorganisms residing on one's hands. Furthermore, this discovery challenges the premise of the Health Belief Model, which proposes that an individual's perception of personal vulnerability to an illness or disease and their belief in the efficacy of the recommended health behavior will determine their likelihood of adopting said behavior.

Consistent with the findings of a study conducted by Sibiya and Gumbo (2013), a significant proportion of students in Ghana were found to have inadequate compliance with handwashing habits involving soap use. Moreover, most of these students encountered difficulties obtaining crucial hand hygiene materials such as soap, towels, and

uncontaminated running water. The present study's results confirm the argument made by Eicher-Miller (2012) that the mere existence of learners in a dining hall does not ensure their adherence to hand hygiene measures utilizing soap. This indicates a necessity to offer knowledge to secondary school students regarding the optimal moment for engaging in hand hygiene. The finding has significant policy ramifications for health interventions. It reinforces the notion that distributing handwashing detergent to all schools could aid students in mitigating the spread of diseases transmitted through unclean hands.

5.2.4 Determinants Affecting Hand Washing Practices

This study investigated the determinants of handwashing behavior among students at educational institutions. The results indicated that various factors influenced handwashing behaviors in schools, such as the accessibility of water for handwashing, the existence of handwashing stations within educational premises, the student's proficiency in using these facilities, and the hygiene conditions of these stations. In addition, a significant proportion of the participants observed a convenient water supply for handwashing at the secondary school premises.

This phenomenon can be ascribed to multiple factors, such as the provision of financial resources by governmental and private school administrators. These resources facilitate the establishment of hand stations equipped with an ample water supply in schools where students have reported inadequate access to water for hand hygiene.

The research by Setyautami et al. (2012) investigated the hand hygiene behaviors of secondary school students in the Selat sub-district of Indonesia. The survey found that around 65.9% of the participants reported having access to washing stands that provided

uncontaminated water. Moreover, a substantial majority of 68.5% of the participants reported that soap was available at these booths, while 73.7% confirmed the presence of hand-washing stands at their educational institutions. Although many students have reported the presence of hand-washing stations in their schools, it would be beneficial for private school owners and government authorities to require the supply of these facilities at schools that currently do not have them.



CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This section presents the conclusions and recommendations drawn from the findings.

6.2 Conclusion

6.2.1 Knowledge on Hand Washing Practices

A significant proportion of the study participants possess sufficient information regarding hand cleaning, whereas over 50% of secondary school students exhibit a positive attitude towards hand-washing habits. Most students neglected to utilize soap, although they claimed that it was available in schools.

6.2.2 Attitude on Hand Washing Practices

The results on the impact of attitude on hand-washing routines indicated that nearly all participants demonstrated a strong understanding of hand-washing. Therefore, it is recommended that future training programs prioritize reinforcing the significance of practicing hand hygiene as a crucial strategy to mitigate the adverse consequences of inadequate handwashing. However, during the assessment phase, the level of understanding and application of accurate identification of the main source of illness, the principal method of infection transmission, and the five occasions for adhering to hand hygiene is less than one hundred percent.

6.2.3 Practice of Handwashing

According to the research outcomes it can be deduced that a considerable number of

secondary school students practice hand hygiene after utilizing restroom facilities, engaging in food consumption, and experiencing episodes of flu. Hand-washing was predominantly performed after individuals utilized the bathroom facilities. Based on the observations, it was found that a significant proportion of students engaged in handwashing; however, it was noted that the use of soap, particularly before consumption, was not commonly practiced.

6.2.4 Determinants of Handwashing

The findings suggested that the adherence of students to hand-washing practices while at school was influenced by the availability of water for hand-washing, the presence of hand-washing stations in schools, the functionality of hand-washing facilities used by students, and the presence of clean hand-washing stations. Additionally, most participants reported that secondary school students have access to the requisite resources to obtain water for hand-washing in their educational institutions. This can be attributed to the availability of financial resources from the local government and private school administrators. In schools where students have reported a lack of access to water for handwashing, these resources would enable the establishment of handwashing stations and the provision of a sufficient water supply. Most secondary school students had access to hand-washing facilities in their institutions. According to the students, hand-washing stations have been implemented in the preponderance of schools.

However, it would be advantageous for both the government and private school owners to provide these amenities to schools currently lacking.

6.3 Recommendations

- a) The management of secondary schools in Kajiado North Sub County should ensure the provision of sufficient WASH facilities, by the Ministry of Education requirements, to promote the practice of handwashing among learners.
- b) The management of secondary schools in Kajiado North Sub Counties should establish school health clubs since they can enhance handwashing behaviors among students.
- c) To successfully execute hygiene promotion programs in schools, it is crucial for any organization or individuals involved to actively engage the school's management and health teacher in all aspects of the project. This collaboration is essential to achieve the desired behavioral changes among the students.
- d) Non-governmental organizations and government ministries responsible for health and education should try to assist school health teachers in choosing suitable methods to promote handwashing in Kajiado North Sub County secondary schools.

6.4 Recommendations for Further Research Study

The following recommendations were made:

- a) Tertiary institutions: A comparable study is recommended to determine if similar characteristics are linked to hand-washing practices at these institutions.
- b) The importance of oversight from educators, parents, and caregivers in enhancing adherence to hand hygiene practices among secondary school students.

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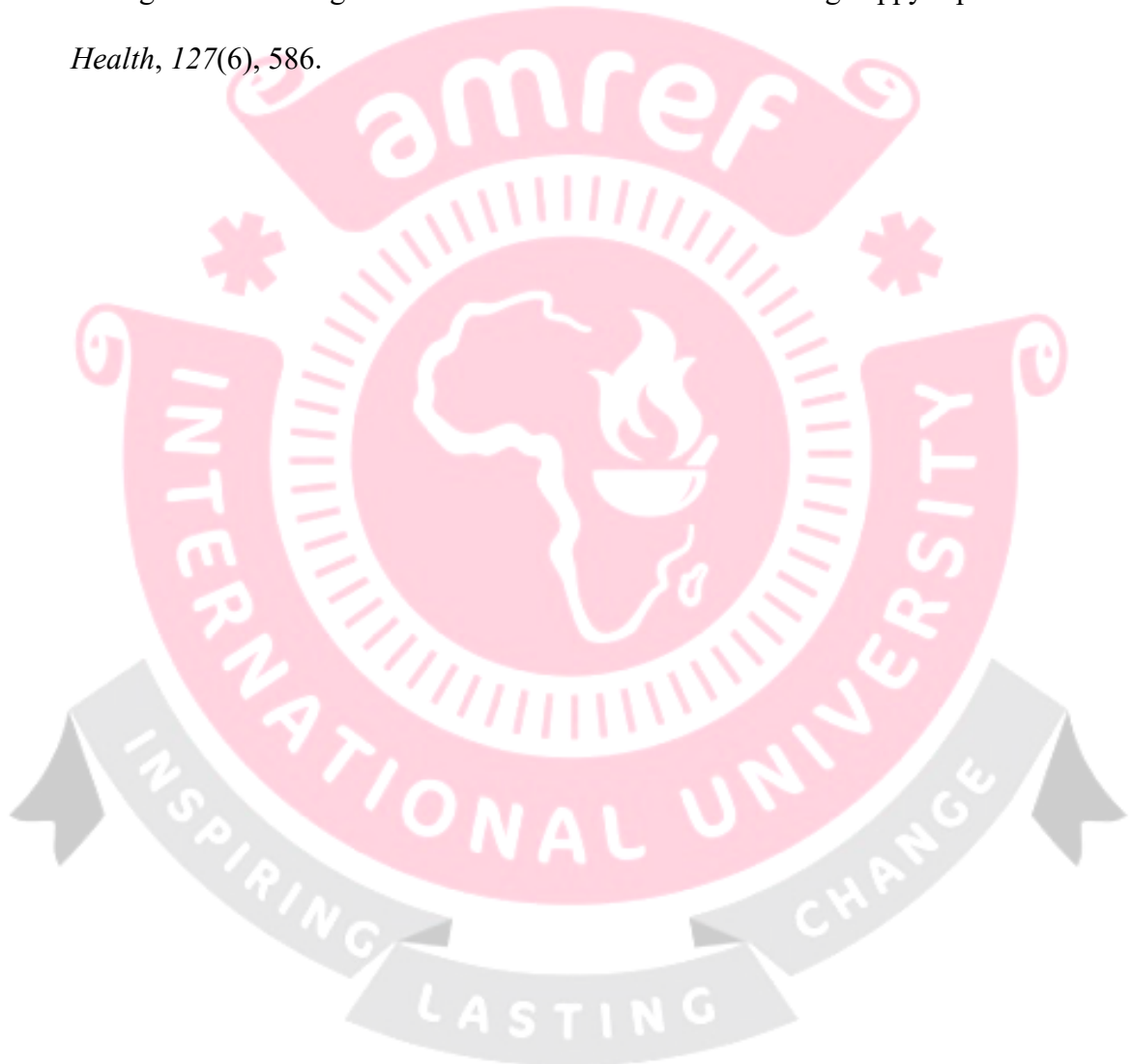
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APPENDICES

Appendix 1: Consent form

PARENTAL CONSENT FORM

We request you to accept our invitation for your child to take part in a research study being conducted by Ivy Kariuki, a student from AMREF International University on Knowledge, attitude and practices of hand washing among students in selected secondary schools in Kajiado North Sub-County, Kenya. The study, as well as rights of a participant, is described below.

Description: This study will assess knowledge, attitude and practices of hand washing among students in selected secondary schools in Kajiado North Sub-County. Your child will be required to participate in an interview and also fill the questionnaires that will be explained in their language of understanding (both English and Kiswahili). Your child's interview will be recorded for use in standard research procedures (e.g. analysis of responses, presentation at professional conferences, etc.) Your child's identity will not be revealed to anyone but the principal investigator(s) and her designated research associates.

Confidentiality: Participants' answers will be not be associated with their name. Rather, each student will be given an identification number on the interviewer's sheet.

I consent to my child being interviewed in this research and any publications of results from the research.

Signature _____

Risks & Benefits: There are no risks to your child's safety. The study data collected raises no sensitive or controversial issues and does not contain elements typically frightening to participants. Nevertheless, a copy of the research questions and interview questions has been reviewed by the ESRC and approved for use in this research. Because the interview engages students to give their knowledge, attitudes and practices on handwashing, there are potential benefits to your child's ability to create awareness to others and observe handwashing practices in real-life situations.

Freedom to Withdraw or Refuse Participation: I understand that my child has the right to fail to participate in data collection process, or to refuse to answer any of the interviewer's questions without prejudice from the investigator.

Questions? Please feel free to ask the investigator any questions before signing the consent form or at any time during or after the study. Principal Investigator: Ivy Kariuki, AMREF International University, Phone Number, +254706377963, Email: Ivykariuki49@gmail.com or ivy_kariuki@mcampus.amref.ac.ke.

Informed Consent Statement

I, _____, give permission for my child, _____ to participate in the research project entitled, "knowledge, attitude and practices of hand washing among students in selected secondary schools in Kajiado North Sub-County." The study has been explained to me and my questions answered to my satisfaction. I understand that my child's right to withdraw from participating or refuse to participate will be respected and that his/her responses and identity will be kept confidential. I give this consent voluntarily.

Parent/Guardian Signature: _____

Signature

Date

Investigator Signature: _____

Signature

Date

Appendix 2: Approvals and authorization licenses


REPUBLIC OF KENYA
 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION


NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Date of Issue: **17/October/2022**

RESEARCH LICENSE



This is to Certify that Ms. Ivy wanjiru kariuki of Amref International University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kajiado on the topic: Knowledge, attitude and practices of handwashing among students in selected secondary schools in Kajiado North sub county, Kenya, for the period ending : 17/October/2023.

License No: **NACOSTI/P/22/20580**

911045
 Applicant Identification Number


 Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)

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Amref International University

Office of THE DEAN, SCHOOL OF GRADUATE STUDIES

June 21, 2022

Dr. KARIUKI StL'i/MPH/3419-1/21121

TITLE: KNOWLEDGE, ATTITUDE AND PRACTICES OF HAND WASHING AMONG STUDENTS IN SECONDARY SCHOOLS IN Kaji North Sub County, KENYA.

Following your proposal submitted on April 13, 2022, and your review of your proposal, the School of Graduate Studies has approved your work for submission for ethical review and commencement of fieldwork.

You are advised to update the progress of your research every three months by submitting progress reports using the forms enclosed.

Alice Lakati

Dr Alice Lakati

Director, Research and Postgraduate Studies

cc: *alice.lakati*

REF: AMREF – ESRC P1257/2022

September 16, 2022

Amref International University
 P.O. Box 30125-00100 Nairobi
 Tel: +254706377963
 Email: jyvkariki49@gmail.com

RESEARCH PROTOCOL: KNOWLEDGE, ATTITUDE AND PRACTICES OF HANDWASHING AMONG STUDENTS IN SELECTED SECONDARY SCHOOLS IN KAJIADO NORTH SUB

Thank you for submitting your protocol to the Amref Ethics and Scientific Review Committee (ESRC)

We are pleased to inform you that the ESRC has revised and approved your protocol. The approval period is from 14th September 2022 to 14th October 2022. The approval is subject to the following conditions:

- a) Only approved deductibles (refueling, informed consent, study insurance, and other necessary items) are submitted for review and approval by Amref ESRC before implementation.
- b) All changes including (amendments, deviations, violations etc.) are submitted for review and approval by Amref ESRC before implementation.
- c) Death and life-threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the Amref ESRC within 72 hours.
- d) Submission of request for renewal approval at least 30 days prior to expiry of the approval period. Attach a comprehensive progress report.
- e) In case of a fatal or life-threatening event, the responsible party must hold themselves responsible for the event and report it to the ESRC immediately.
- f) Submission of request for renewal approval at least 30 days prior to expiry of the approval period. Attach a comprehensive progress report.
- g) In case of a fatal or life-threatening event, the responsible party must hold themselves responsible for the event and report it to the ESRC immediately.
- h) Submission of request for renewal approval at least 30 days prior to expiry of the approval period. Attach a comprehensive progress report.
- i) All participants must be provided with personal protective equipment (PPE) including gloves, masks, and hand sanitizer. This should be provided to all participants at the start of the study. The ESRC will not be held responsible for any injury or damage to participants or staff.

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

Board Members: Mr P Kasimu | Mrs E Mathu | Prof P Kiama | Mrs M Kuyoh | Prof Z Qureshi | Prof J Wang'ombe | Dr D Soti | Dr G Gitahi

P.O. Box 30125-00100 Nairobi, Tel: +254 (0)20 699 4000, Fax: +254 (0)20 699 2531, www.amref.org

Winner of the Gates Award for Global Health

Please do not hesitate to contact the ESRC Secretariat (esrc.kenya@amref.org) for any clarification or query.

Yours sincerely,

 Prof. Mohamed K. Juma
 Chair, Amref ESRC

CC: Samuel Muhula, Monitoring & Evaluation and Research Manager, Amref Health Africa in Kenya.

Appendix 3: Similarity Report

IVY 909

ORIGINALITY REPORT

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Appendix 4: Questionnaires

Please tick against the correct answer

Section A: Demographic Status.

1. What is your age?

13-14 years (). 15-17 years (). Above 18 years ()

2. What is your gender?

Male (), Female ()

3. Which class are you ?

Form 3 (), Form 4 ()

Section B: Questionnaire on knowledge about hand-washing

1. Hand-washing actions that prevent transmission of germs are done before eating and touching anything True () False ()

2. Regular use of hand-washing facilities is important and required in school.
True () False ()

3. Hand-washing facilities are not necessary in schools True. () False ()

4. Cold water should be used for hand-washing. True () False ()

5. Hand-washing practices prevent an individual from getting infected True ()

False ()

6. Hands need to be washed for at least 15 seconds. True () False ()

7. Lukewarm water should be used for hand-washing. True () False ()

8. There is no need to remove rings and watches when washing hands. True ()

False ()

9. Hands need to be dried after washing. True () False ()

10. Hand-washing is part of hygiene. True () False ()



Section C: Questionnaire on attitude of hand-washing

Attitude statement	Good attitude	Poor attitude
I adhere to hand-washing practices at all times		
I refuse to wash my hands after using the washrooms facilities		
I review informative material on hand hygiene frequently		
I feel frustrated when other students fail to wash hands		
Sometimes I have other important things to do than hand-washing		
I am reluctant to ask others to wash their hands		
I strictly adhere to hand-washing practices		
School activities make hand-washing difficult		

Section D: Practices of hand-washing

Hand hygiene practices	Always	Sometimes	Never
I wash my hands before meals			
I wash my hands after meals			
I wash my hands after using restrooms			
I wash my hands when I come home			
I wash my hands after shaking hands			
I wash my hands after using public transportation			
I wash my hands only if they are soiled			
Hand-washing is essential part of my role			
Sometimes I miss out hand hygiene simply because I forget			

Tafadhali weka alama (☐) katika jibu

sahihi Sehemu ya A: Hadhi

1. Una umri wa miaka mingapi?

13-14 ☐ 15-17 ☐ 18 na zaidi ☐

2. Jinsia yako ni gani

Kiume ☐ kike ☐

3. Uko kidato cha ngapi?

3 ☐ 4 ☐

Sehemu ya B: Maswali kuhusu ufahamu wa kunawa mikono

1. Mbinu za kunawa mikono ili kupunguza viini vya uchafu inatekelezwa

kabla ya kukula chakula chochote. Ukweli ☐ Si kweli ☐

2. Mazoea ya kunawa mikono kwa kutumia vifaa vifaavyo ni muhimu sana

shuleni. Ukweli ☐ Si kweli ☐

3. Vifaa vya kunawa mikono haviitajiki shuleni. Ukweli ☐ Si kweli ☐

4. Maji baridi yafaa kutumiwa kunawa mikono. Ukweli ☐ Si kweli ☐

5. Kunawa mikono kunamzuia mtu kupata magonjwa. Ukweli ☐ Si kweli ☐

6. Inafaa unawe Mikono muda wa sekunde 15. Ukweli ☐ Si kweli ☐

7. Maji moto inafaa kutumika kunawa mikono Ukweli ☐ Si kweli ☐

8. Hakuna haja ya kuyatoa mapambo kama saa ya mkono unaponawa mikono

yako. Ukweli Si kweli

9. Mikono inafaa kupanguzwa baada ya kunawa. Ukweli Si kweli

10. Kunawa mikono ni baadhi tu ya mbinu za usafi. Ukweli Si kweli

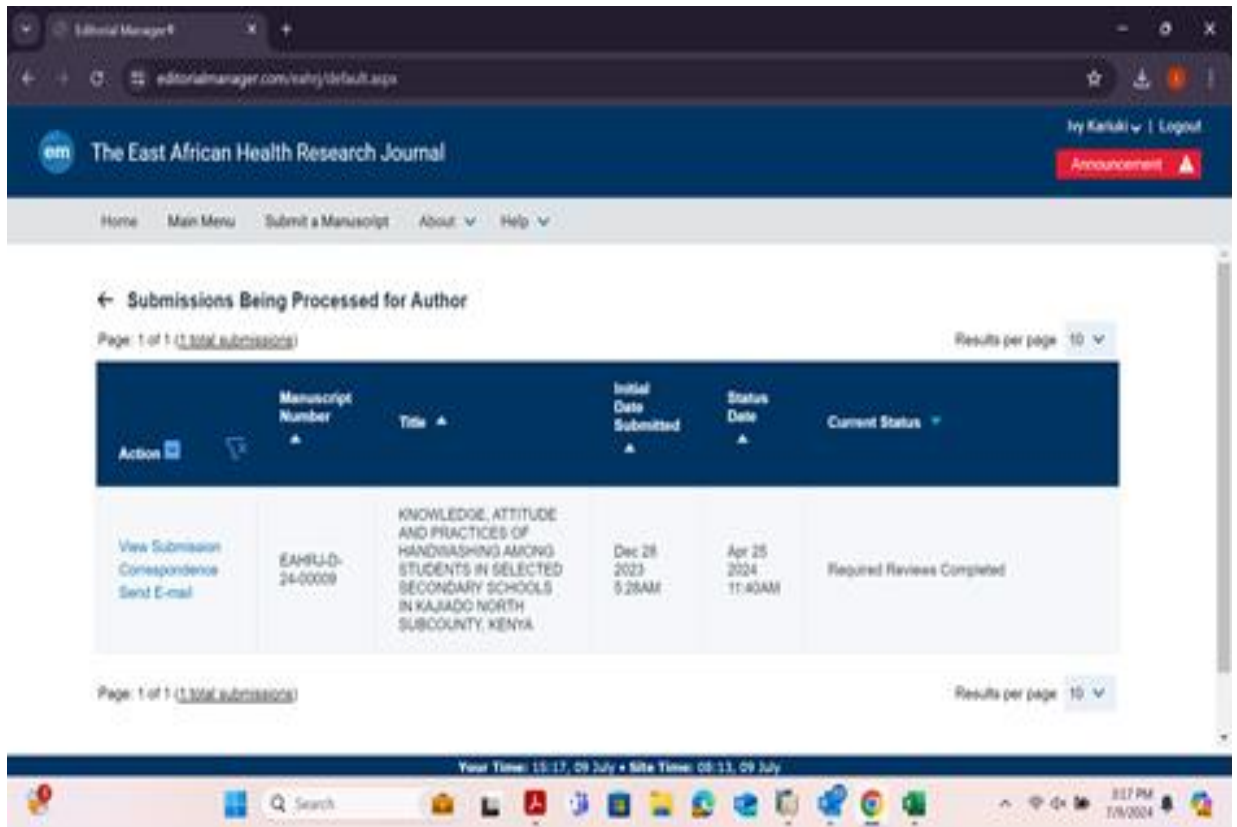
Sehemu ya C: Maswali kuhusu mtazamo za kunawa mkono

Mtazamo	Mtazamo nzuri	Mtazamo mbaya
Ninazingatia unawaji mikono kila wakati		
Siwezi nawa mikono baada ya kwenda msaalani		
Mimi husoma nakala muhimu kuhusu usafi wa mikono kila wakati		
Ninajihisi kutatizika wakati wanafunzi wenzangu hukosa kunawa mikono		
Wakati mwingine nina matukio muhimu sana ya kutekeleza badala ya kunawa mikono		
Sijawai dhubutu kuwaambia wenzangu kunawa mikono		
Nina tabia za kunawa mikono bila kukosa.		
Shughuli nyingi za shule zinafanya unawaji mikono kuwa kazi ngumu		

Sehemu ya D: Mazoea ya Kunawa mikono

Mazoea ya kunawa mikono	Kila wakati	Wakati mwingine	La
Huwa nanawa mikono kabla ya kula chakula			
Huwa nanawa mikono baada ya kula chakula			
Huwa nanawa mikono baada ya kuenda msaalani			
Huwa nanawa mikono nikifika nyumbani			

Appendix 5: Progress of Publication



The screenshot displays the Editorial Manager interface for 'The East African Health Research Journal'. The page title is 'Submissions Being Processed for Author'. It shows a table with one submission entry. The submission details are as follows:

Action	Manuscript Number	Title	Initial Date Submitted	Status Date	Current Status
View Submission Correspondence Send E-mail	EAHRJID-24-00009	KNOWLEDGE, ATTITUDE AND PRACTICES OF HANDWASHING AMONG STUDENTS IN SELECTED SECONDARY SCHOOLS IN KAJIADO NORTH SUBCOUNTY, KENYA	Dec 28 2023 5:28AM	Apr 25 2024 11:40AM	Required Reviews Completed

At the bottom of the screenshot, a watermark for 'INTERNATIONAL UNIVERSITY' is visible, featuring a circular logo with a caduceus and the motto 'INSPIRING LASTING CHANGE' on a ribbon.