KNOWLEDGE OF MENSTRUAL HYGIENE AND PRACTICES AMONG ADOLESCENT GIRLS IN PRIMARY SCHOOLS IN NAROK SOUTH SUB-COUNTY, NAROK COUNTY

FLORENCE WAMBUI MWANGI

SHS/MPH/3823-1/2021

A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILMENT FOR THE DEGREE OF MASTERS IN PUBLIC HEALTH, DEPARTMENT OF COMMUNITY HEALTH, SCHOOL OF PUBLIC HEALTH

AMREF INTERNATIONAL UNIVERSITY

JULY 2024

DECLARATION AND APPROVAL

Declaration by Candidate:

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

Signature: 

Florence Wambui Mwangi

SHS/MPH/3823-1/2021

Date: 12/06/2024

Approval by Supervisors:

This thesis has been submitted with our approval as the University Supervisors.

Signature: 

Prof. Tammary Esho

Amref International University

Date: 12-06-2024

Signature: 

Dr. Mary Joy Kaimuri

Meru University of Science and Technology

Date:12-06-2024

DEDICATION

This thesis is dedicated to my family for their unyielding support and encouragement throughout the course.

ACKNOWLEDGEMENT

I wish to acknowledge my supervisors, Prof. Tammary Esho and Dr. Mary Joy Kaimuri, for their profound support and most-needed guidance in the completion of this thesis.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Background: Menstruation, a natural physiological occurrence, often faces societal stigmas and misconceptions, leading to poor menstrual hygiene practices among adolescent girls. Limited knowledge about menstruation can result in adverse health outcomes and hinder educational attainment.

Objective: This study aimed to examine the understanding and menstrual hygiene practices among adolescents' girls in Narok South sub-county.

Methods: A cross-sectional descriptive study of 380 adolescent girls aged 10-14 years from private and public primary schools. Data was collected using structured questionnaires and analyzed through descriptive and inferential statistics using SPSS software.

Results: 91.8% of participants demonstrated good knowledge of menstrual hygiene practices. (94.2%) used sanitary pads. 97.6% of participants changed absorbents at school, with three changes being the most common (40.5%). Cleaning genital areas during menstruation was practiced by (97.4%) of respondents, primarily using plain water (50.3%) or soap and water (34.5%).16.7% of the primary schools had dedicated changing rooms for girls and 33.3% had accessible Sanitary Materials. Knowledge level had a varying influence on the menstrual hygiene practices among adolescent girls. Significant associations were observed between the class of participants ($p = .001$), age of menarche ($p = .004$), handwashing practices ($p = .000$), frequency and materials used for cleaning genitals ($p = .000$ and $p = 0.008$, respectively), and the level of knowledge on menstrual hygiene. However, no significant relationships were found between age ($p = .361$), type of school ($p = 0.614$), family affordability ($p = .129$), sources of information ($p = .429$), or types of sanitary materials used ($p = .935$) and the level of knowledge.

Conclusion: The study found that most participants had good knowledge and practices of menstrual hygiene, yet significant gaps remain in schools for facilities to support menstruation hygiene.

Recommendation: Implement comprehensive menstrual hygiene education programs, improve access to menstrual hygiene products, and enhance menstrual hygiene facilities in primary schools.

ABBREVIATION AND ACRONYMS

COVID-19: Coronavirus disease 2019

CIDP: County Integrated Development Plans

KDHS: Kenya Demographic Health Survey

KNBS: Kenya National Bureau of Statistics

KPHC: Kenya Population and Housing Census

LMIC: Low Middle-Income Countries

MHM: Menstrual Hygiene Management

MHP: Menstrual hygiene Practices

MoE: Ministry of Education

MoH: Ministry of Health

NACOSTI: National Commission for Science, Technology & Innovation

NGOs: Non-Governmental Organizations

SD: Standard Deviation

SDG: Sustainable Development Goals

UNICEF: United Nations International Children's Emergency Fund

UNESCO: United Nations Educational, Scientific and Cultural Organization

WASH: Water Sanitation and Hygiene

WHO: World Health Organization

OPERATIONAL DEFINITION OF TERMS

Adolescent girls: This term refers to girls who are between the ages of 10 and 19. In the context of this study, we are focusing specifically on those who are aged 10-14 years.

Hygiene: Hygiene refers to practices and conditions that help maintain health and prevent the spread of diseases. It involves various activities and behaviors to ensure cleanliness and sanitation. Hygiene can be categorized into several types, including:

Menstrual Hygiene: This encompasses a range of behaviors aimed at maintaining good menstrual health and promoting overall well-being. Effective menstrual hygiene means maintaining cleanliness, particularly during periods, to avoid urinary tract infections. This implies a clean state regarding good menstrual health.

Menstruation: This is a natural and healthy biological process where the uterus expels blood and tissue through the vagina. It typically occurs in girls and women of childbearing age.

Menarche: This term refers to the first occurrence of menstruation in a woman's life.

Menstrual Health: This is a state of total physical, mental, and social well-being about the menstrual process, and not just the absence of disease or infirmity.

Menstrual Hygiene Management (MHM): This involves using clean menstrual materials by women and teenage girls to absorb or collect menstrual blood.

Menstrual Hygiene Practices: These are the practical steps for maintaining personal and environmental cleanliness among teenage girls during their menstrual cycle. They involve using clean sanitary products, maintaining bodily hygiene, and disposing of used sanitary products correctly.

Knowledge: refers to awareness, comprehension, or information about menstrual hygiene gained through experience or study and held by students or the adolescent population in general.

CHAPTER 1: INTRODUCTION

1.1 Introduction

This chapter serves as an introduction to the research study, providing an overview of knowledge assessment and menstrual hygiene practices among adolescent girls in primary schools in Narok South Sub-County, Narok County. Understanding the level of knowledge and practices related to menstrual hygiene among teenage girls in this specific region is essential for implementing targeted interventions and policies to promote their health, well-being, and educational success. This chapter begins by presenting the background, the statement of the problem, the importance of the study, the primary and specific objectives, and the research queries the study seeks to answer.

1.2 Background of the Study

Menstrual Hygiene Management (MHM) pertains to the practices adopted by women and adolescent girls to handle their menstrual cycle in a clean and hygienic manner. This involves using clean materials to absorb or collect menstrual blood, maintaining personal hygiene, and safely disposing of used menstrual products (Ssewanyana & Bitanihirwe, 2019). Menstruation is a normal bodily function that women experience during their fertile years. The commencement of menstruation, usually during adolescence, ushers in considerable physical and emotional changes (Parle & Khatoon, 2019). This crucial period is when girls learn how to handle their menstrual hygiene efficiently and safely. This phase also signals important transitions, such as entering high school and preparing for adult life (Choudhary & Gupta, 2019). However, a significant number of girls, especially those between the ages of 10 and 19, approach this phase without adequate preparation due to a lack of information (Belayneh, 2019). Regrettably, societal stigmas often render

menstruation a challenging topic to discuss, resulting in adolescent girls having limited access to appropriate information (Bulto, 2021). The information that they obtain is often partial and laden with misconceptions.

Managing menstrual hygiene among adolescent girls is a global challenge influenced by various factors, such as inadequate Water Sanitation and Hygiene (WASH) facilities, a lack of private toilets, insufficient means for disposing of used sanitary products, and limited understanding of the menstrual cycle (Ssewanyana & Bitanihirwe, 2019). Research in India underscores the physical and psychological burdens resulting from these challenges (Parle & Khatoon, 2019). Cultural beliefs and restrictions further compound negative experiences, impacting emotional well-being, lifestyle, and overall health (Choudhary & Gupta, 2019). Comprehensive interventions are crucial, as highlighted by studies on menstrual hygiene's broader impact (Anbesu & Asgedom, 2023; Fialkov et al., 2021). The collective findings emphasize the need for targeted efforts to enhance the well-being of adolescent girls worldwide (Shumie & Mengie, 2022; Sharma et al., 2019).

In Bangladesh, societal norms often cast menstruation in a negative light, pushing girls to conceal and ignore it. Traditional beliefs even suggest that menstrual cloths should be buried for fear of spiritual possession (Ssewanyana & Bitanihirwe, 2019). Inadequate facilities at schools often lead girls to stay at home during their period, thereby impacting their academic performance (Parle & Khatoon, 2019). Those who do attend school may not change their sanitary products throughout the day due to fear of leakage and embarrassment, causing further discomfort and distraction (Choudhary & Gupta, 2019). The issue of menstrual hygiene is particularly pressing in developing countries. Adolescent girls face significant challenges in managing their menstrual hygiene, especially in school

settings (Anbesu & Asgedom, 2023). This often results in school absences, affecting their academic performance and overall educational attainment (Chandra-Mouli & Patel, 2020). In several African countries, menstruation and menstrual hygiene have been largely overlooked, causing a range of adverse effects on girls, women, families, the economy, and even the environment (Bulto, 2021; Fialkov et al., 2021). A study conducted in Ethiopia revealed that adolescent girls often experience stress, embarrassment, humiliation, confusion, and fear due to inadequate knowledge about menstruation, inability to manage menstrual flow, and teasing from peers (Edet et al., 2020). The study also found that only 35% of the school girls used sanitary napkins, while 55% relied on homemade materials during their menstruation. About 11% of girls change their menstrual clothes only once a day, with most using old rags as makeshift sanitary pads. These practices increase their risk of infections (Shumie & Mengie, 2022; Mohammed & Larsen-Reindorf, 2020; Bhusal et al., 2020).

In places like Malawi, for instance, the absence of proper waste disposal facilities and gender-specific WASH facilities in schools forces girls to carry used sanitary products back home (Andani, 2020). It is a common issue in many low and middle-income countries and is often linked to poor MHM practices among adolescent girls (Chandra-Mouli & Patel, 2020). In Kenya, there are still significant barriers to effective MHM, especially among low-income women and girls. As per the Kenya Demographic Health Survey 2022, only about half the schools have proper latrine facilities. Many schools lack private changing rooms, leaving girls without a private space to change their sanitary products (Majeed et al., 2022). Furthermore, cultural and religious beliefs often hinder proper MHM practices (Sharma et al., 2019).

The repercussions of poor menstrual hygiene practices are not just educational but also health-related. Many adolescent girls face reproductive health problems, particularly urogenital infections, due to unsafe and unhygienic practices (Shumie & Mengie, 2022). Moreover, communities perpetuate various myths and taboos about menstruation, limiting girls' activities and mobility during their menstrual cycle (Nnennaya et al., 2021). These cultural beliefs and stigma around menstruation exacerbate the mental and social stress experienced by girls, forcing them to adopt diverse coping strategies based on their personal preferences, available resources, knowledge, and cultural beliefs (Michael et al., 2020; Jyothi & Hurakadli, 2019). Therefore, there is a pressing need to promote better access to accurate information about menstruation. We can support healthier and more effective menstrual hygiene practices by debunking the myths and breaking the stigma around menstruation. This study aims to evaluate the knowledge and menstrual hygiene practices among adolescent girls in primary schools in Narok Sub-County, Kenya (Kumbeni et al., 2020; Jyothi & Hurakadli, 2019; Shrestha et al., 2020; Rastogi et al., 2019; Chinyama et al., 2019). By gaining a better understanding of these practices, we can work towards implementing effective strategies that ensure these girls are better equipped to manage their menstrual hygiene, improving their overall well-being and academic performance.

1.3 Problem Statement

The issue at hand pertains to inadequate menstrual hygiene management (MHM) practices in various societies, particularly in Narok County, Kenya. A prevailing culture of silence and taboo exacerbates issues such as discomfort, pain, and the use of inappropriate protection materials (Korir et al., 2018). Additionally, there is a persistent lack of accurate

information about menstruation and the importance of good menstrual hygiene management within the Narok community (World Bank, 2018).

Despite MHM's comprehensive scope—encompassing understanding biological processes before menarche, selecting appropriate sanitary products and disposal methods, and maintaining overall bodily cleanliness—menstruation remains stigmatized in many communities as unclean or dirty (Michael et al., 2020). This stigma, coupled with cultural practices that isolate menstruating females and limit their participation in activities, has fostered a negative perception of menstruation (Choudhary & Gupta, 2019).

There is a lack of culturally specific studies to understand how local beliefs, practices, and taboos affect menstrual hygiene management, which could help tailor interventions to be more effective and acceptable. Moreover, limited research exists on the impact of stigma and taboos surrounding menstruation on women's and girls' mental health and social status. More qualitative studies are needed to explore these dimensions.

In several African countries, including Kenya, there is insufficient evidence on the most effective educational strategies and interventions to improve menstrual health literacy across different age groups and communities. Additionally, little is known about the role of schools and teachers in disseminating menstrual health education and how to train them effectively (Kumbeni et al., 2020). More data is needed on the affordability, availability, and accessibility of various menstrual hygiene products, especially in low-income and rural areas. Furthermore, studies on women’s and girls’ preferences for different types of menstrual hygiene products (reusable vs. disposable) and the factors influencing their choices are limited. (Sychareun et al., 2020)

A study in Ethiopia revealed the emotional distress experienced by adolescent girls due to inadequate knowledge about menstruation, improper management, and societal teasing, leading to health risks (Michael et al., 2020). In Kenya, despite national policies and awareness efforts, low-income women and girls, especially in Narok County, face significant challenges in accessing high-quality menstrual hygiene management. Limited research exists on the effectiveness of existing policies and programs aimed at improving menstrual hygiene management. Hence, there is a need for studies to evaluate the implementation, outcomes, and scalability of such programs.

Additionally, more research is needed to identify best practices for implementing menstrual hygiene management programs in diverse settings, including the roles of various stakeholders such as governments, civil society organizations, and the private sector. This study aims to address these challenges by investigating the understanding of menstruation and menstrual hygiene among adolescent girls, to inform decisions and policy formulation to enhance education and awareness, particularly in primary schools.

1.4. Research Objective

1.4.1 General Objective

To assess knowledge and menstrual hygiene practices among adolescent girls in primary schools in the Narok South Sub-County.

1.4.1 Specific Objectives

i. To assess the level of knowledge on menstrual hygiene among adolescent girls in primary schools in Narok South Sub-County;

ii. To identify the menstrual hygiene practices among adolescent girls in primary schools in the Narok South Sub-County;

iii. To determine the availability of Water, Sanitation, and Hygiene (WASH) facilities to support adolescent girls during menstruation in primary schools in the Narok South Sub-county.

iv. To assess the relationship between menstrual hygiene knowledge level and sociodemographic factors and menstrual hygiene practices among adolescent girls in primary schools in Narok South Sub-county

1.5: Research Questions

i. What is the level of knowledge on menstrual hygiene among adolescent girls in Narok South?

ii. Which are the menstrual hygiene practices among adolescent girls in Narok South?

iii. What WASH facilities are available in schools to support adolescent girls during menstruation?

1.6. Hypothesis

Ho. There is no significant relationship between knowledge among adolescent girls and their practices on menstrual hygiene

1.7 Justification of the Study

Inadequate knowledge and poor menstrual hygiene practices have significant implications for the health and well-being of adolescent girls. Poor menstrual hygiene can lead to infections, reproductive health problems, and other serious health issues, making it crucial to promote the overall health and hygiene of the female population in Narok County.

Menstrual issues contribute to absenteeism among schoolgirls in many parts of Kenya, including Narok County. Girls often miss school during their periods due to insufficient facilities, products, and support. Improving menstrual hygiene practices can increase regular school attendance, thereby enhancing educational outcomes and future opportunities. This study provides critical insights into the specific challenges and needs related to menstrual hygiene management among adolescent girls in the Narok South sub-county. It highlights the unique socio-cultural and economic factors impacting menstrual hygiene, such as the prevalence of child marriage, female genital mutilation, and teenage pregnancies. By focusing on this community, the study uncovers the extent of the problem, such as the widespread use of unhygienic materials due to the lack of affordable sanitary products, and the cultural taboos that prevent open discussions about menstruation. These findings are essential for designing culturally sensitive interventions that address the real-world issues faced by these girls. Moreover, this study contributes valuable data on the availability and adequacy of WASH (Water, Sanitation, and Hygiene) facilities in schools, which are crucial for managing menstruation effectively. By providing a detailed examination of the current state of menstrual hygiene practices and the related infrastructure, the research informs policymakers and stakeholders about the necessary improvements and supports the creation of targeted strategies to enhance menstrual hygiene management. These insights are pivotal for developing policies and programs that cater specifically to the needs of adolescent girls in this marginalized region, ultimately aiming to improve their health, education, and overall well-being.

1.8. Significance of the Study

The significance of this study extends beyond addressing immediate challenges to impacting broader policy frameworks and development goals. The lack of clean and private latrines with water facilities in most schools across Kenya, coupled with the absence of disposal facilities, creates a hostile environment for menstruating girls, negatively impacting their education and life aspirations (MOH, 2019; Michael et al., 2020). The study's results will contribute to implementing the menstrual hygiene policy and a strategic plan formulated by the Ministry of Health and Education, aiming to promote good menstrual hygiene practices in schools and augment the knowledge base on MHM. Additionally, the findings will offer valuable insights for the improvement of key policy documents related to Water, Sanitation, and Hygiene (WASH) for adolescent girls in schools. By aligning with national and international goals, such as Kenya Vision 2030 and the Sustainable Development Goals, particularly Goal 6 on Water Sanitation and Hygiene, the study endeavors to expedite positive change and contribute to the holistic well-being of adolescent girls in Narok and beyond.

1.9 Study Limitations

The study mainly had methodological related limitations that could affect the generalizability and depth of the findings. Firstly, the study's cross-sectional design limits the ability to establish causality between variables, as it captures a single point in time rather than longitudinal data. Secondly, the reliance on self-reported data may introduce response bias, as participants might overestimate or underestimate their knowledge and practices regarding menstrual hygiene due to social desirability or recall bias. Additionally, the study was conducted in a specific geographical area with unique socio-cultural and

economic conditions, which may limit the applicability of the findings to other regions with different dynamics. While adequate for initial insights, the sample size may not be large enough to detect subtle but significant differences across various subgroups. Furthermore, the study's scope did not allow for a detailed exploration of all potential factors influencing menstrual hygiene practices, such as the role of family dynamics, peer influence, and access to health education and resources, which could provide a more comprehensive understanding of the issue. Finally, logistical constraints limited the ability to conduct in-depth qualitative interviews that could have enriched the quantitative findings with personal narratives and nuanced perspectives. These limitations highlight the need for further research to build on these initial findings and provide a more holistic view of menstrual hygiene management challenges and solutions.

1.10 Assumptions of the Study

It was presumed that the respondents would share truthful and reliable information regarding the menstrual hygiene practices of adolescent girls in the targeted schools within Narok South Sub-County, Narok County. Additionally, it was assumed that all respondents would willingly complete the questionnaire, providing honest and accurate responses as requested. It was also expected that the parents or guardians of the chosen adolescent girls would grant their consent for participation in the study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter subsumes an all-inclusive literature review regarding menstrual hygiene management both globally and specifically within Kenya. It includes examining various studies conducted on this subject in Kenya and other countries worldwide. The chapter wraps up with a synopsis of the reviewed literature, identifying gaps this study aims to address. Additionally, a review of the theoretical framework and a discussion of the conceptual framework are included toward the end of the chapter.

2.2 Theoretical framework

This study adopts an ecological perspective, a framework initially presented by Bronfenbrenner in 1977 to elucidate human development (El zaatari & Maalofu, 2022). The ecological perspective is formulated to spotlight the intricate dynamics between personal and environmental health factors. Bronfenbrenner's original conceptualization likened the ecological environment to a set of Russian dolls nesting within each other (El zaatari & Maalofu, 2022). This metaphor suggests that an individual's development is influenced by, and in turn influences, multiple systems - or levels - that Bronfenbrenner abstractly categorized as micro, meso, and exo systems.

Each of these systems facilitates and guides individual development, but they are specific to an individual's life and present diverse potential developmental pathways. The microsystem, the innermost layer in Bronfenbrenner's model, includes direct interactions and interpersonal relationships within one's immediate surroundings, such as family members or a child's school environment. In this study, the microsystem includes factors

like access to water, sanitation facilities, hygiene resources within schools, and familial attitudes and practices regarding menstruation. Understanding how these microsystem factors influence menstrual hygiene practices and knowledge among adolescent girls is crucial for developing targeted interventions. The mesosystem, on the other hand, encompasses interactions between various microsystem components, like the relationship between a child's family and their school. In the study, the mesosystem may examine how school policies and practices interact with family dynamics and community norms to shape menstrual hygiene behaviors. Exploring these interactions can provide insights into the interconnectedness of various social environments and their impact on MHM. The ecosystem includes elements of structures within the microsystem that indirectly affect a child, like familial financial struggles or parental job loss. The exosystem includes broader societal attitudes towards menstruation, cultural taboos, and government policies related to menstrual hygiene. Analyzing how these external factors influence menstrual hygiene practices and knowledge can highlight the broader socio-cultural context in which MHM occurs. Finally, the outermost layer, the macrosystem, represents broader social and cultural contexts (El zaatari & Maalofu, 2022). This may involve examining broader socio-economic factors, gender norms, and historical contexts that shape attitudes towards menstruation and MHM. Understanding these macro-level influences can provide insights into the systemic barriers and inequalities that affect menstrual hygiene practices and knowledge.

Bronfenbrenner proposed that individuals constantly engage with these systems, which continuously influence each other. He emphasized that both individuals and their environments are perpetually impacting one another. This theory underscores the

unpredictable and unstable nature of family life, often disrupted by economic forces, which can be detrimental to a child's development (Xia & Tudge, 2020). The lack of stable, mutual interaction between parents and children can hamper development. Parents may not always have the time for in-depth discussions about growth and development with their children. Consequently, children seeking affirmation from their parents or guardians may seek attention in inappropriate places. These deficits can manifest themselves in adolescence as antisocial behavior, a lack of self-discipline, and an inability to self-direct (Xia & Tudge, 2020).

2.3 Knowledge of Menstruation and Menstrual Hygiene

The transitional period from childhood to adulthood represents a critical juncture in the lives of adolescent girls. Chandra et al. (2019) underscored these young girls' profound understanding of menstruation, emphasizing the importance of cultivating crucial hygiene habits during this phase. Practices such as utilizing sanitary pads and maintaining the cleanliness of the genital area were identified as critical components of menstrual hygiene (Shumie & Mengie, 2022). In the context of Indian society, menstruation is frequently perceived through a lens of impurity or uncleanness, contributing to a widespread negative attitude toward this natural occurrence (Chandra et al., 2019). This negative perception is further intensified by the isolation and restrictions imposed on menstruating girls, creating barriers to open dialogue and accurate information dissemination. This phenomenon is particularly prevalent in rural and tribal communities, where cultural norms and practices shape the experiences of adolescent girls during menstruation.

The consequences of these negative attitudes and the resultant knowledge gaps are significant, especially when it comes to the menstrual hygiene practices of adolescent girls.

Studies across diverse cultures consistently highlight this knowledge deficit, revealing a low level of awareness among girls as they confront infections attributed to inadequate menstrual hygiene (Hennegan, 2019). Recognizing the intricate interplay between cultural perceptions, social restrictions, and the impact on the knowledge and practices of adolescent girls during menstruation is crucial for developing effective interventions and policies that address the unique challenges faced by this demographic. Even though menstruation is a natural process, it is considered shameful in many communities, such as those in Bangladesh, leading to various negative consequences. The cultural norm suggests that menstruation should be hidden and ignored. Research from Bangladesh revealed that adolescent girls would bury used menstrual cloths out of fear of possession by evil spirits (Shumie & Mengie, 2022). These girls also hide their used cloths from male family members, believing that if men see menstrual blood, it will bring misfortune (Kaur et al., 2021). In many Muslim societies, women are prohibited from visiting temples or mosques during their periods. Some women remain homebound seven days each month during menstruation (Sychareun et al., 2020). These women often observe dietary restrictions, refrain from reading the Quran, and are barred from touching food, cooking utensils, or kitchen gardens (Kaur et al., 2021).

In Ethiopia, a substantial proportion of adolescent girls undergo the transformative phase of puberty without adequate preparation, primarily attributed to the scarcity of information about this crucial milestone (Anukriti & Dasgupta, 2018). The pervasive societal stigma surrounding menstruation compounds this challenge, fostering an environment where open discussions about this natural process are restricted, consequently limiting adolescent girls' access to essentials (Majeed et al., 2022). Furthermore, the information that girls do

manage to acquire, often sourced from religious institutions, peers, or family members, tends to be selective and permeated with myths and misconceptions (Sommer et al., 2021). The prevalence of such inaccurate information further complicates the journey of adolescent girls through puberty, emphasizing the urgent need for comprehensive and accurate educational initiatives that debunk myths, dispel stigma, and empower young girls with the knowledge necessary for a healthy transition into adulthood. In Kenya, there is a growing commitment to enhance menstrual health for women and girls. Several entities, such as the Kenyan government, international funding bodies, local non-profits, and social businesses, are working towards improving Menstrual Hygiene Management (MHM). However, many of these efforts are currently focused on supplying menstrual management products, with a limited focus on advancing menstrual awareness (Majeed et al., 2022). Studies conducted in the Nyanza region and Siaya County found that girls often lacked comprehensive knowledge about menstruation until they experienced their first menstrual cycle. This knowledge gap was associated with the inadequacy of traditional systems for conveying such information and mothers' reluctance to prepare their daughters for this significant biological change (Majeed et al., 2022). Insights from group discussions in an informal settlement in Nairobi indicated that mothers' restricted knowledge, embarrassment, and cultural constraints prevented them from offering their daughters accurate reproductive health information, including facts about menstruation (Majeed et al., 2022). A study by Wamoto et al. (2021) found that many schoolgirls in Kenya have limited knowledge about menstruation prior to menarche. The primary sources of information were mothers and teachers, but these sources often lacked comprehensive knowledge themselves. The study emphasized the need for structured menstrual education

programs in schools to fill the knowledge gaps. The collective evidence underscores the necessity for improved menstrual health education and more comprehensive support for adolescent girls. It is crucial to dismantle the stigmas surrounding menstruation and to ensure that accurate, accessible, and empathetic information is available to all girls. Moreover, it is paramount to involve all stakeholders - including families, educators, community leaders, and policymakers - in this vital conversation. Doing so will contribute to the broader goals of enhancing gender equality, promoting adolescent health, and supporting young women's overall development and empowerment.

2.4 Menstrual Hygiene Practices

The onset of puberty and menarche signifies a pivotal period of vulnerability for girls as they grapple with the emergence of romantic interests while simultaneously confronting a myriad of external pressures. These pressures encompass navigating the complexities of sexual coercion or harassment, contending with familial expectations regarding marriage, and the imperative to excel academically in primary school to secure a pathway to secondary education (Bhatt & Kadam, 2020). Numerous qualitative studies conducted in African contexts reveal that these challenges are further amplified by girls' inadequate understanding of their bodies, their rights, and the potential consequences of their decisions. Additionally, there is often a notable absence of necessary resources for menstrual health and hygiene management (MHM), leaving girls ill-equipped to traverse the challenges of puberty and adolescence with a sense of safety and comfort (Chandra-Mouli & Patel, 2020). The confluence of these factors emphasizes the critical need for comprehensive support systems and educational initiatives tailored to empower girls during this crucial phase of development.

Multiple qualitative studies conducted in Kenya have underscored the various challenges girls face in handling their menstruation. These challenges include insufficient access to menstrual products and no precise information about menstruation (Chandra-Mouli & Patel, 2020). A study carried out in Western Kenya's Nyanza region identified poverty as a significant hindrance to appropriate menstrual hygiene management, as reported by girls participating in group discussions and comprehensive interviews (Sommer et al., 2021). When families are financially incapable of purchasing sanitary pads, girls are compelled to use alternatives like pieces of cloth, mattress parts, and other materials, which often fail to prevent menstrual blood from staining their clothes (Chandra-Mouli & Patel, 2020). A qualitative study in Siaya County, Western Kenya, further underscored the ineffectiveness of these makeshift solutions and the girls' preference for sanitary pads (Birech, 2019). Although mothers are usually the primary source of sanitary pads, some girls mentioned receiving money from boyfriends to buy pads, often with a veiled expectation of sexual reciprocity.

The initiation of the National Sanitary Towels program by the Kenyan government's Ministry of Education, Science, and Technology in 2020 aimed to address the challenges girls face in maintaining regular school attendance and participation (Birech, 2019). This program, which targeted schools across the country, entailed the distribution of sanitary pads to schoolgirls and providing training to teachers on the proper and hygienic usage and disposal of these pads, as documented by UNESCO in 2019 (Birech, 2019). Despite the well-intentioned efforts of the program, a gap in its implementation surfaced during a preliminary evaluation conducted in Kilifi County in 2017, revealing that some schools within the region received an insufficient supply of sanitary pads (Birech, 2019). This

inadequacy left these schools unable to meet the annual menstrual hygiene needs of all their female students, thus indicating a potential disparity in the effectiveness of the program and raising concerns about the equitable distribution of resources (Birech, 2019). The identified gap in the distribution of sanitary pads highlights a crucial aspect of the broader issue concerning knowledge and menstrual hygiene practices among adolescent girls in primary schools. The shortfall in the provision of sanitary materials may contribute to challenges faced by girls in maintaining proper menstrual hygiene, potentially impacting their school attendance and overall well-being. Addressing this gap becomes pivotal in understanding the practical implications of menstrual hygiene initiatives. It underscores the relevance of the study's aim of assessing knowledge and menstrual hygiene practices among adolescent girls in primary schools. By investigating the state of knowledge and menstrual hygiene practices, particularly in the context of resource distribution, the study seeks to contribute valuable insights to the ongoing discourse on effective menstrual hygiene management in school settings.

2.5 Availability of WASH Facilities

The global deficit in essential water, sanitation, and hygiene (WASH) services within educational institutions has profound repercussions, affecting the developmental and learning experiences of millions of children worldwide (Birech, 2019). This challenge is particularly pronounced in countries like Kenya, where a significant portion of the population is of school age, underscoring the critical importance of ensuring access to safe water for the education of its 20 million students (Diamond-smith, et al., 2020). The National Education Sector Strategic Plan 2018-2022 reinforces this notion, emphasizing

the indispensable role of clean water, handwashing facilities, and proper sanitation in pre-primary schools for the health and overall development of children (Korir et al., 2018).

Despite the acknowledged importance of water, sanitation, and hygiene (WASH) in educational settings, menstrual hygiene management (MHM) frequently finds itself relegated to the periphery of the broader WASH framework. This oversight has profound implications, particularly in developing nations where millions of menstruating girls and women grapple with substantial challenges in accessing clean water, private spaces for change, and adequate menstrual materials. These difficulties are compounded by complex interplays of societal, political, and cultural factors that exacerbate the barriers to effective MHM (Korir et al., 2018). While governments, institutions, and non-governmental organizations have increasingly recognized the significance of MHM, aligning it with multiple Sustainable Development Goals (SDGs) such as health and well-being, quality education, gender equality, water and sanitation, economic growth, and sustainable consumption, the translation of this awareness into the implementation of comprehensive MHM initiatives remains a persistent challenge (Korir et al., 2018).

The interconnectedness of MHM with broader global development goals underscores the urgency of fostering meaningful change and ensuring equitable access to education and resources for all. By addressing the multifaceted challenges surrounding MHM, including the provision of clean water and private spaces, society can work towards dismantling the barriers that hinder the educational and socio-economic advancement of menstruating individuals. Recognizing MHM as an integral component of WASH initiatives is crucial for promoting not only individual well-being but also contributing to the achievement of broader sustainable development objectives on a global scale.

2.6 Conceptual Framework

The conceptual framework for this study provides a structured way to understand the multiple factors influencing menstrual hygiene practices and knowledge among adolescent girls in Narok County. The framework integrates the various levels of environmental influences and their interactions, offering a comprehensive view of how these factors impact menstrual hygiene management (MHM). Independent variables identified for this study potentially influence the menstrual hygiene practices and knowledge of adolescent girls. The variables include personal, familial, school, community, policy, and broader societal factors. The dependent variables on the other hand, study aims to measure, such as the menstrual hygiene practices, knowledge about menstruation, health outcomes, and school attendance of adolescent girls.

Understanding the interaction between these independent and dependent variables will help in designing effective interventions and policies to improve MHM in Narok County.

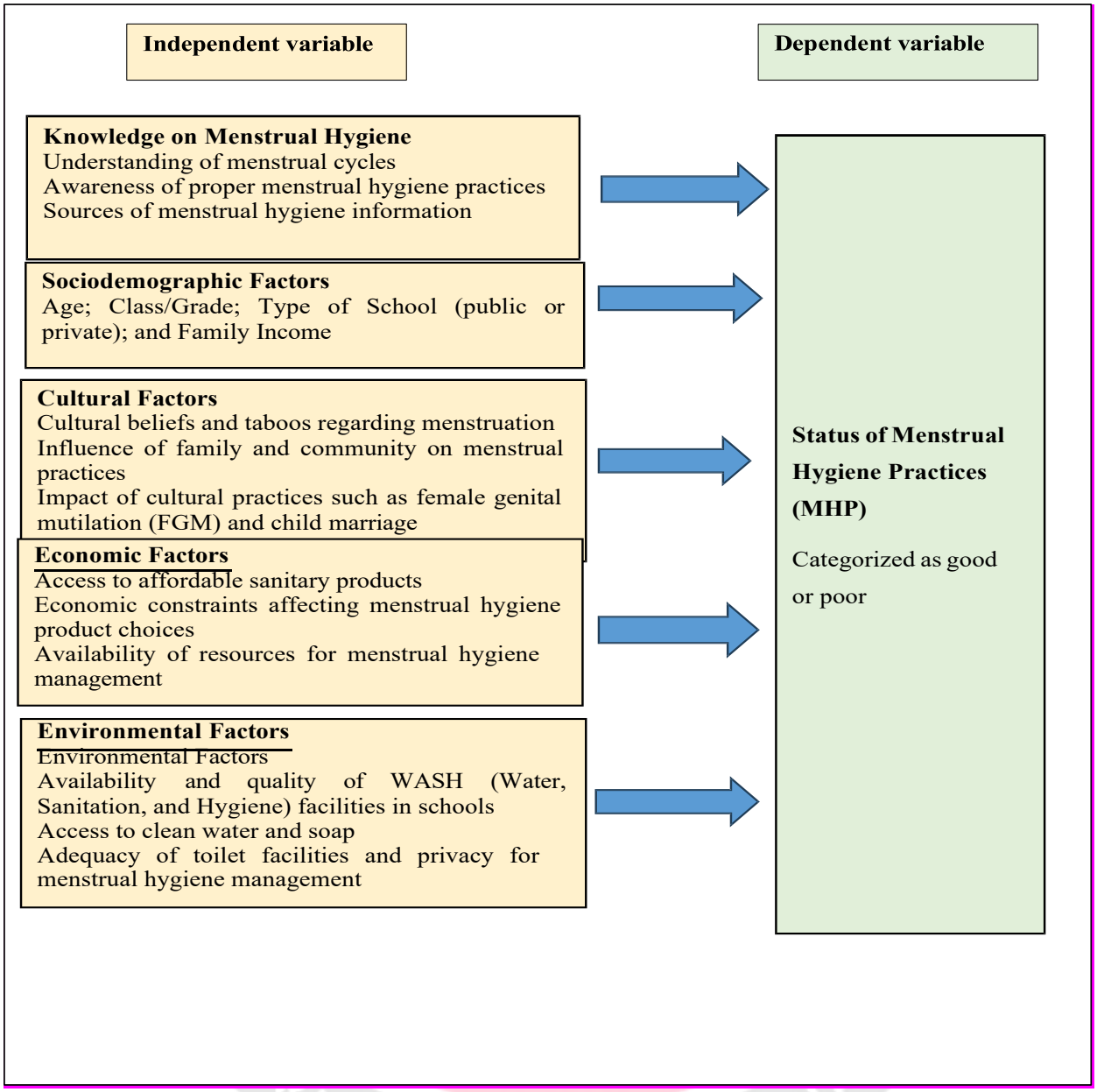


Figure 1: Conceptual Framework of the Study

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter presents the methodology employed in the study assessing knowledge and menstrual hygiene practices among adolescent girls in primary schools in Narok South Sub-County, Narok County. It outlines the research design, study site, target population, sample size, sampling method, sampling procedures, data collection methods, data collection procedures, and the methods of data analysis. This comprehensive methodology chapter lays the groundwork for the subsequent chapters that will present the findings and discussion of the research.

3.2 Research Design

For this study, a descriptive cross-sectional design was employed to thoroughly investigate the knowledge and menstrual hygiene practices among adolescent girls in primary schools in Narok South Sub-County, Narok County. This design was carefully selected due to its ability to provide a detailed snapshot of the current state of knowledge and practices within a defined timeframe, thereby offering a comprehensive understanding of the subject matter. By conducting data collection at a single point in time, the researchers were able to capture a holistic view of the participants' knowledge. Additionally, the descriptive nature of the design facilitated the exploration of various factors influencing menstrual hygiene practices. This approach ensured that the study's objectives could be met effectively, allowing for an in-depth examination of the topic while maintaining the integrity of the participants' natural behaviors. Through the utilization of this robust design, the study aimed to contribute valuable insights into the menstrual hygiene practices of adolescent

girls, thereby informing future interventions and policies aimed at promoting their well-being and health in primary school settings.

3.3 Location of Study

Located along the Great Rift Valley in Kenya, Narok County spans an area of 17,933.1 square kilometers and is home to approximately 850,920 individuals (as per the KPHC, 2018-2022). This county is renowned for the Maasai Mara game reserve. With a population density of 47 individuals per square kilometer, the majority of the inhabitants belong to the Maasai community, known for upholding a mix of progressive and traditional cultural practices. The county is divided into six sub-counties: Transmara East, Narok North, Narok South, Narok East, Narok West, and Transmara West (see appendix 6 for more details). The county's administrative and commercial hub is Narok town. The poverty level in the county is relatively high, recorded at 33.7% (according to the CIDP Narok, 2018). The focus of this research was on Narok South sub-county within Narok County. As per the KNBS (2018), this sub-county houses a population of 176,764, comprising 89,123 males and 87,641 females. Among the female populace, 21,079 are adolescent girls. The sub-county hosts a total of 148 public and private schools, which represents 22% of the county's overall 664 primary schools (as per CIDP 2018-2022).

The choice of Narok South sub-county for this research was strategic, considering its significant demographic and socioeconomic characteristics within Narok County. With a population density of 47 individuals per square kilometer, the majority belonging to the Maasai community, Narok South provides a rich cultural context for studying menstrual hygiene practices. Additionally, its relatively high poverty level, recorded at 33.7%, underscores the importance of addressing menstrual hygiene challenges in this area, as

socioeconomic factors can significantly impact access to hygiene resources and practices among adolescent girls.

3.4 Study Population

The study targeted schoolgirls aged 10-14 years who were attending primary schools in Narok South Sub-County. Adolescent girls aged 10-14 years refer to individuals who are transitioning from childhood to adulthood, typically characterized by physical, cognitive, and emotional changes. This developmental stage, often referred to as early adolescence, is marked by the onset of puberty, which entails the maturation of secondary sexual characteristics such as breast development and the onset of menstruation in females. Psychologically, adolescents in this age range may experience increased independence-seeking behaviors, fluctuations in mood, and a growing sense of identity formation. They are also often navigating changes in social dynamics, including peer relationships and interactions within familial structures. The population of interest consisted of 21,079 adolescent girls, representing approximately 24% of the total number of women residing in Narok South Sub-County, as stated in the County Integrated Development Plan (CIDP) for the years 2018-2022. By focusing on this specific age group and educational setting, the study aimed to assess the knowledge and menstrual hygiene practices of adolescent girls within the context of their primary school environment. The large population size emphasized the significance and relevance of investigating this topic to contribute to the improvement of menstrual hygiene management among adolescent girls in Narok South Sub-County. The population of schoolgirls aged 10-14 years in Narok South Sub-County is a suitable target for this study due to its substantial representation within the broader female demographic, as evidenced by the County Integrated Development Plan (CIDP).

Furthermore, focusing on this demographic within the primary school setting offers a strategic opportunity to assess and potentially improve menstrual hygiene practices among adolescent girls during a formative period of their development.

3.5 Eligibility Criteria

3.5.1 Inclusion Criteria

The inclusion criteria for participant selection in the study were as follows:

i. Age Range: Girls aged 10 to 14 years were included in the study, as this specific age range aligned with the research's focus on understanding menstrual hygiene practices among adolescent girls.
ii. Geographic Scope: Participants consisted of girls attending schools within the defined study area of Narok South Sub-County. This criterion ensured that the study concentrated on the target population within the specified geographic boundaries, enhancing the relevance and applicability of the findings.
iii. Menstrual Onset: Girls who had commenced menstruating were included, acknowledging the relevance of menstrual hygiene practices within the study context. This criterion ensured that the study captured insights from girls who had experienced the onset of menstruation.

3.5.2 Exclusion Criteria

The exclusion criteria for participant selection in the study were as follows:

i. The study excluded girls who had concurrent medical conditions affecting their menstrual health.

ii. Girls who were physically or mentally reliant on others for menstrual hygiene due to any physical or mental condition were excluded from the study.

iii. Girls who were absent or ill on the day of the research were excluded from the study.

iv. Participants with other hygiene-related health issues, such as urinary tract infections (UTIs), skin infections, and reproductive health problems, were excluded from the study sample.

3.6 Sample Size Determination

The sample size calculation was based on Fisher's formula (1998), which is commonly used for estimating single proportions. Using this formula, a 95% confidence level was adopted, along with a 45% preliminary estimate of the proportion of schoolgirls lacking knowledge about menstrual hygiene, as identified in a study conducted in Kajiado (Korir et al., 2018). With a 5% margin of error, the minimum number of required respondents was calculated as 380. However, to strengthen the analysis and account for potential dropouts (attrition rate), this number was raised to 418.

The formula n= (Z^2pq)/d^2

Z= standard deviation of required confidence level, z statistic is 1.96 while accuracy level is at 0.05.

P= Proportion in target population estimated to have characteristics being measured (45%)

q=1-p

d= level of statistical significance.

The sample size will be $N= (1.96)^2(0-45) (1-0.45)/0.05^2$

1.96 x 1.96 (0.45) (1-0.45) /0.05 x 0.05

3.841 x 0.45 x 0.55 / 0.0025

= 380.32

The sample size will be 380 girls + attrition rate = 418.

3.7 Sampling Techniques and Procedures

The sampling frame of the study was carefully structured to ensure a comprehensive and representative selection of girls aged 10-14 years from various primary schools in the Narok South sub-county of Kenya. The sampling frame included a total of 12 schools across six Wards—Ololunga, Melelo, Narosura, Sogoo, Sagamian, and Loita—comprising both public and private institutions. The total population of girls aged 10-14 years within these schools was 1,315 (School Admission Register, 2024). A sample of 418 girls was drawn from the sampling frame (Table 1). The sampling techniques involved both stratified random sampling and simple random sampling.

The entire process of sample selection was accomplished through a meticulous three-stage sampling process:

Stage I: Initially, schools were grouped according to their respective Wards. This distribution was as follows: 20 schools in Loita, 26 in Melelo, 30 in Narosura, 37 in Ololunga, 14 in Sagamian, and 21 in Sogoo (Table 1).

Stage II: Subsequently, the schools were further stratified into public (127 schools) and private schools (21 schools). The selection of schools was conducted randomly, ensuring

an unbiased process. A random number generator was utilized to assign a unique number to each school within the wards. Schools were then chosen based on these generated numbers proportionate to the total number of schools in each ward. This ensured representation across all wards, considering the varying numbers of schools.

Stage III: The third stage involved proportionate sampling to determine the number of girls to be selected from each school. The ratio of students in public and private schools was considered to achieve representative numbers. The sample size for each school was allocated using a population proportion to the sample, with the size determined by the number of students in each school.

Stage IV: Finally, a proportional number of participants (students) were selected from each school using a simple random sampling technique. Each girl in the selected schools was assigned a unique number, and a random number generator was utilized to choose the participants. This process was conducted individually for each school to meet the desired sample size.

Table 1: Sampled Girls

Sub-County	Name of Ward	Name of school	Category of school	Total population of girls 10-14	Total girls sampled
Narok south	Ololunga	Nchaishi	Public	75	28
		Iladoru	Public	77	28
		Lengina	Public	78	29
	Melelo	Ntuka	Private	77	28
		Esupetai	Public	128	39
	Narosura	Olenkuluo	Public	86	30
		Enkare Nairouwa	Public	135	38
		Entiapiri	Private	173	50
	Sogoo	Nkiimpa	Public	70	25
		Ongata Primary	Private	120	36
	Sagamian	Olornganayio	Public	171	48
	Loita	Vision Academy	Private	125	39
	Totals			**1315**	**418**

3.8 Data Collection Tools and Procedures

Data was gathered through structured questionnaires, which were distributed to the girls in the sample. Research assistants were present to provide clarity and assistance as needed while the girls filled out the questionnaires independently, ensuring that responses truly reflected their individual knowledge and practices.

These questionnaires were divided into different sections. The first section covered socio-demographic information, while the subsequent sections were designed to assess the girls' understanding and practices related to menstrual hygiene. The knowledge assessment was based on six specific questions in the second section of the questionnaire. Each correct answer was awarded one point, with incorrect responses receiving no points. Respondents

who scored between 4-6 points were categorized as having good knowledge on menstrual hygiene, while those scoring between 0-3 points were classified as having poor knowledge of menstrual hygiene.

In addition to the questionnaires, an observational checklist was utilized to evaluate the WASH facilities present in the schools.

The girls' participation was entirely voluntary, and written assent was obtained from each participant. No personal identifiers were included in the data collection tools to maintain confidentiality. This ensured that the girls' responses could not be linked back to them, fostering a more open and honest response environment.

3.8.1 Process of Obtaining Parent Consent and Assent from Study Participants

A detailed consenting process was implemented to carry out the study involving minors. Permission was first sought from the administration of the selected schools. The researcher met with school administrators, including the head teacher, to explain the study's objectives, potential benefits, and risks. Once the school gave its approval, the next step was to secure an initial meeting with the parents or guardians and explain the research in order to obtain their consent. Given the participants' age, obtaining this consent was necessary to ensure ethical considerations were met. The school representatives organized a meeting with the parents where the researcher could discuss in detail the research and the need for consent. Parents or guardians were then allowed to ask for any clarification or questions regarding the process before the researcher issued the consent forms. The forms provided comprehensive details about the study, including its purpose, what participation would involve, and any potential risks. Parents or guardians were then required to read

through this information and give their consent by signing the form. During this process, it was communicated to girls that their participation was voluntary. It was emphasized that choosing not to participate would not result in discrimination or negative consequences. This reassurance was provided to ensure the students felt comfortable making an informed decision about their participation.

3.8.2 COVID-19 Consideration in the Study

COVID-19 public health guidelines released by the Ministry of Health -Kenya were observed during the study period. This included.

i. Social distancing shall be observed conducting training and workshops in 1 spacious hall with people sitting 1 .5 meters apart or outdoors.
ii. Hygiene and sanitation were observed by providing hand washing stations and sanitizers.
iii. All participants will wear face masks.
iv. Smaller teams with shorter data collection days were applied.
v. A recommended maximum number of passengers based on vehicle capacity will be observed.

3.8.2. Protection of the Minors During the Study

This study involved girls who had not reached the legal age of consent. Therefore, the protection of minors was paramount throughout the research process. Rigorous ethical considerations were applied, aligning with principles aimed at safeguarding the participating adolescent girls' rights, well-being, and confidentiality. Informed consent was diligently sought, involving both the minors and their parents or guardians, emphasizing

the voluntary nature of participation and the right to withdraw at any point without consequences. Considering the participants' age and maturity, assent was also actively sought to ensure the girls' active agreement in addition to parental consent. The study protocol underwent careful ethical review by an institutional review board (IRB), ensuring that the research design, procedures, and consent processes met the highest ethical standards. Privacy and confidentiality were prioritized through secure data storage and the use of coding systems, with a commitment to minimizing potential risks and discomfort for adolescent participants. The study design incorporated age-appropriate language and methodologies, and ongoing support and communication with minors and their parents were maintained to uphold ethical standards and foster a transparent and respectful research environment.

3.9 Data Collection Technique and Management

3.9.1 Pre–visiting

A visit to the study area was made before data collection. This helped the researcher gain prior knowledge and further insight about the area, the necessary leadership protocols, the target respondents, and informal permission to go there.

3.9.2 Pre-testing

Prior to the actual data collection, the research tools were pretested at Ewaso Ngiro Primary School, which has characteristics similar to those of the target schools. A total of 45 girls from the schools were selected and participated in the pretest. However, this school was not included in the main study. The pretest was instrumental in enhancing the validity and

reliability of the research instruments, leading to necessary modifications for clarity and accuracy.

3.9.3 Training of Research Assistants

The researcher identified reproductive health officers and teachers as research assistants and trained them to help collect data. The assistants were trained on how to use the data collection tools and observe all necessary procedures.

3.9.4 Editing

The questionnaire was reviewed directly after each interview with each participant before moving on to the following individual. This process included ensuring that all questions had been fully answered. Further, it ensured that each response was appropriate, comprehensive, and matched with the correct question. This procedure was undertaken to maximize efficiency and eliminate the need for follow-up inquiries with the participants.

3.9.5 Coding

"Coding refers to assigning a numeric value to a particular response. For each question, a coding scheme was established, consisting of a range of selectable options. This method simplified data entry and subsequent analysis. The questionnaire was pre-coded, meaning that codes were assigned prior to data collection. In cases where it was necessary, post-coding was conducted after data collection to account for specific and detailed responses that the researcher had not anticipated."

3.9.6 Data Entry

Upon completion of the data collection phase, the next step was data entry. This necessitated the creation of a master sheet or template, which was used to transfer data from the questionnaires. The construction of this template was facilitated using the SPSS Version 25.0 software.

3.9.7 Data Storage

"Preserving data integrity is crucial, and appropriate storage measures were taken to ensure this. Three boxes were used to store the research tools: one for blank questionnaires and the second for completed questionnaires until the desired sample size was achieved. These boxes were under the strict supervision of the researcher. Once the data was transferred into the computer template, the filled-out questionnaires were moved to the third box, where they were kept until data cleaning. The digital template and preliminary reports were saved as password-protected soft copies, accessible only to the researcher, to prevent unauthorized modifications. Multiple copies of the digital files were kept as a precautionary measure, providing a backup in case of data corruption."

3.9.8 Data Cleaning

Data was cleaned for entered data to check for errors and omissions traceable in the field data tools. This ensured that quality data was presented and analyzed.

3.10 Plan for Data Analysis and Presentation

The data collected went through a thorough process to validate its reliability and prepare it for analysis. This began with data coding to systematically arrange it for entry into the

SPSS software (Version 25.0) was done. At this juncture, data cleaning was conducted to spot and rectify mistakes such as typographical errors or outliers, ensuring the precision of the data. This was done before any analysis to protect the legitimacy of the research outcomes. Subsequently, the data was examined using a variety of statistical methods. Descriptive statistics were applied to summarize and illustrate the data, as well as unearthing patterns and trends in the knowledge and menstrual hygiene practices of adolescent girls attending primary schools in Narok South Sub-County. Central tendency measures (mean, median, mode) and dispersion measures (range, standard deviation, variance) were employed for this.

Additionally, inferential statistics were used to make inferences and predictions about the larger population from the sampled data. The relationships between variables, like knowledge levels and menstrual hygiene practices, were evaluated using the Chi-square test. This statistical method is frequently used to detect significant relationships between two categorical variables. In this research, a p-value of less than 0.05 was deemed statistically significant, suggesting a significant relationship between variables that could not be ascribed to randomness. The results derived from the data analysis were then clearly displayed for easy understanding. Tables were utilized to visually depict these results, allowing for simple data interpretation and comparison.

3.11 Quality Control Issues

At the end of the data collection day, the tools were checked for accuracy and consistency. After this research study, all completed questionnaires will safely be kept for a year, after which they will be shredded and destroyed. The pretesting also helped to ensure that the questionnaire had no errors.

3.12 Plan for Dissemination of Results

The research study findings were shared with Amref International University, and plans were set in motion to present the report to the County Education Officer in Narok. Publication of the results will also be shared through relevant research articles to disseminate knowledge.

3.13 Limitations of the Study Design and Methods of Data Analysis

The challenges encountered in the study included low transparency among respondents, communication issues such as language barriers and question misunderstandings, and poor time management. Some respondents took excessive time to complete the questionnaire. To mitigate these challenges, several strategies were employed. Low transparency was addressed, assuring the respondents of the confidentiality and anonymity of their responses to foster a more open and honest communication environment. For communication concerns, the questionnaires were translated into the local language and administered by bilingual research assistants who could clarify any misunderstandings. To improve time management, respondents were assisted in filling the questionnaires by research assistants to minimize time wastage

3.14 Ethical Considerations

Ethical approval for this study was granted by the AMREF Ethics and Scientific Review Committee. Additionally, authorization was sought from the National Commission for Science, Technology & Innovation (NACOSTI). To gain permission to conduct the research in the specified location, an introductory letter identifying the researcher as a master's student from AMREF International University-AMIU was submitted to the County education office.

The Narok County Education office also provided written consent for the study to proceed. Before involving the participants, informed consent was obtained from the parents or guardians, while the adolescent girls themselves gave their assent. It was emphasized to the participants that their participation was completely voluntary, and they could choose to withdraw at any time without any negative consequences.

Should participants decide to withdraw from the study, they were advised to inform the research team. It was explained that any data collected before their withdrawal could still be included in the study if its use is in accordance with the study's objectives and procedures outlined in the consent and assent documents.

CHAPTER 4: RESULTS

4.1. Introduction

This chapter focused on analyzing the data collected from the adolescent girls in Primary Schools in Narok South Sub-County, Narok County, on their knowledge and menstrual hygiene practices. The first segment presents descriptive statistics regarding the knowledge and menstrual hygiene practices. The second segment presents a bivariate analysis that involves the Pearson chi-square test conducted to determine the significance or relationships between the level of knowledge and menstrual hygiene practices among adolescent girls. Out of the anticipated 418 respondents, a total of 380 individuals successfully completed the questionnaires, resulting in a response rate of approximately 90.9%. This exceptional level of participation allowed the researcher to compile thorough insights into the understanding and menstrual hygiene practices of adolescent girls in Narok South Sub-County. Moreover, it instilled confidence in the reliability and representativeness of the findings, as the high response rate ensured a robust data set.

4.2. Demographic Characteristics of the Participants

The demographic characteristics of the participants are as follows. The mean age of the participants was 13.43 years (M = 13.43, SD = 0.67). The median age was 14.00, ranging from 11.00 to 14.00 years. The majority, 53.20% (n = 202), were 14.00 years old, while only 0.30% (n = 1) were 11.00 years old (Table 2). In terms of class distribution, most of the pupils 43.4% (n = 165) were in class C8, while only 1.6% (n = 6) were in class C5 (Table 2). Furthermore, the study found that 60.3% (n = 229) of the respondents attended public schools, while 39.7% (n = 151) attended private schools (Table 2). Additionally, the mean age at menarche was 12.34 years (SD = 0.90), ranging from 9 to 14 years. The

majority of respondents (42.9%, n = 163) experienced their first menstruation at age 12, followed by 36.1% (n = 137) at age 13, and 7.6% (n = 29) at age 14 (Table 2).

Table 2: Socio-Demographic Characteristics of the Participants

Variable	Frequency (n)	Percentage (%)
Age (Years)		
11	1	0.3
12	35	9.2
13	142	37.4
14	202	53.2
Type of School		
Private	151	39.7
Public	229	60.3
Class	6	
C5	76	1.6
C6	133	20.0
C7	165	35.0
C8		43.4
Age of Menarche		
9.00	2	.5
10.00	10	2.6
11.00	39	10.3
12.00	163	42.9
13.00	137	36.1
14.00	29	7.6

4.3. Participants' Knowledge of Menstrual Hygiene

Participants' understanding of menstrual hygiene was evaluated through their responses to a fundamental question. A majority (96.6%, n = 367) provided accurate definitions, indicating strong comprehension, while a minority (3.4%, n = 13) gave incorrect answers, reflecting lower knowledge levels (Table 3). The majority of participants (92.4%, n = 351) reported familiarity with menstrual hygiene before experiencing menstruation, contrasting with a smaller proportion (7.6%, n = 29) who had not heard about it, suggesting widespread pre-menarcheal awareness (Table 3). A significant majority (94.7%, n = 360) recognized

the link between poor menstrual hygiene and infections, with only a minority (5.3%, n = 20) indicating otherwise, affirming a solid understanding. Awareness varied among participants regarding menstrual hygiene products. Disposable sanitary pads were most recognized (47.1%, n = 179), followed by reusable pads (23.7%, n = 90), while other products had lower levels of familiarity. Participants predominantly viewed readymade sanitary pads (79.7%, n = 303) as the ideal menstrual material, with other options such as cloth, tampons, and menstrual cups having lower endorsement rates (Table 3). Lastly, participants cited diverse sources for information on menstrual hygiene, with mothers (46.3%, n = 176) being the primary source, followed by the school (27.1%, n = 103), indicating the pivotal role of familial and educational channels in disseminating knowledge (Table 3).

Table 3: Knowledge on Menstrual Hygiene Among the Participants

Variables	Frequency (n)	Percentage (%)
Meaning of Menstrual Hygiene		
Incorrect	13	3.4
Correct	367	96.6
Heard about menstrual hygiene before period started		
No	29	7.6
Yes	351	92.4
Poor menstrual hygiene causes infection		
No	20	5.3
Yes	360	94.7
Hygiene product heard of		
Tampon	23	6.1
Menstrual cup	36	9.5
Cotton wool	52	13.7
Reusable pad	90	23.7
Disposable sanitary pad	179	47.1
Ideal material used during menstruation		
Others	1	.3
Cotton wool	8	2.1
Clothes kept separately for this purpose	12	3.2
Menstrual cups	16	4.2
Tampons	19	5.0
Any type of clothes available	21	5.5
Readymade sanitary pads	303	79.7
Source of information on menstrual hygiene		
Church		
Aunties	3	0.8
Media	8	2.1
Peers	12	3.2
Sister	35	9.2
School	43	11.3
Mother	103	27.1
	176	46.3

4.3.1. Level of Knowledge of on Particular Menstrual Hygiene Practices

Five knowledge-related questions on the definition of menstrual hygiene, menstrual hygiene before periods, menstrual hygiene and infection, menstrual hygiene products, and ideal material used during menstruation were used to determine the level of knowledge of the participants on menstrual hygiene practices. The participants' responses were considered good or bad based on the accuracy and depth of understanding. Those who provided correct definitions of menstrual hygiene, recognized the link between poor hygiene and infections, and demonstrated awareness of hygiene products scored 1 as having good knowledge. Conversely, participants who provided incorrect definitions were unaware of the link between poor hygiene and infections or showed limited familiarity with hygiene products were scored 0 as having lower knowledge levels.

Based on this scoring, most participants demonstrated good knowledge, with 96.6% (n = 367) reporting a correct meaning of menstrual hygiene (Table 4). In contrast, a small percentage, 3.4% (n = 13), indicated a poor understanding of this area. The second question asked whether they had heard about menstrual hygiene before their first period started. The "Yes "answer was scored as 1 to indicate good knowledge, while the "Yes" answer was scored 0 to indicate poor knowledge. In this regard, 92.4% (n = 351) of participants had good knowledge, while 7.6% (n = 29) indicated poor knowledge. Thirdly, in terms of knowledge regarding the link between poor menstrual hygiene and infection, the "Yes" answer was scored as 1 as good knowledge, while a "No" answer was score 0 as poor knowledge. Most participants, 94.7% (n = 360), showed good knowledge of this association, whereas 5.3% (n = 20) had a poor understanding. Fourthly, regarding knowledge of hygiene products, the participants who selected disposable sanitary pads,

tampons, reusable pads, and menstrual cups were awarded 1 score for good knowledge, while those who selected cotton wool were awarded 0 for poor knowledge. Based on this, 86.3% (n = 328) of participants displayed good knowledge, while 13.7% (n = 52) showed poor knowledge. Lastly, the responses that recognized the use of readymade sanitary pads, tampons, and menstrual cups were scored a 1 for good knowledge. The responses that identified using any type of cloth available, cloth kept separately for this purpose, or cotton wool scored 0 for poor knowledge. Therefore, 88.9% (n = 338) had good knowledge, while 11.1% (n = 42) had poor knowledge regarding the ideal material to be used during menstruating.

The analysis of the percentages of results questioned the practicability of the findings. Further bivariate analysis was conducted to check if these knowledge levels translate into practical applications. The correlation analysis using the chi-square test was conducted in the succeeding section (4.6). The further analysis examined the relationship between knowledge scores and actual menstrual hygiene practices, which assisted in identifying any potential gaps and barriers to applying knowledge in real-life scenarios.

Table 4: Knowledge Level Scores

Variables	Frequency (n)	Percentage (%)
Knowledge of the meaning of Menstrual Hygiene		
Good	367	96.6
Poor	13	3.4
Heard about menstrual hygiene before period started		
Good	351	92.4
Poor	29	7.6
Have Knowledge that poor menstrual hygiene causes infection	360	94.7
Good	20	5.3
Poor		
Knowledge of Hygiene product		
Good (Disposable sanitary pad, tampon, reusable pads, Menstrual cup)	328	86.3
Poor (Cotton wool	52	13.7
Knowledge of Ideal material used during menstruation	338	88.9
Good (Readymade sanitary pads, Tampons, menstrual cup)	42	11.1
Bad (any type of cloth available, cloth kept separately for this purpose, and Cotton wool, others)		

4.3.2. Overall Level of Knowledge of the Participants

The overall knowledge level of the participants on menstrual hygiene practices was determined by getting the total score of participant responses derived from the five questions used to assess the patient's knowledge. Thus, the total scores were categorized into two broad categories to determine the overall participants' level of knowledge as either “poor knowledge” (0) or “good knowledge.” The poor knowledge level included a total score of 0-2. The “good knowledge level included good and very good scores 3 and above. Therefore, out of the total participants, 91.8% (n = 349) demonstrated a good knowledge

level, while 8.2% (n = 31) had a poor knowledge level (Figure 2). These findings indicate that most participants possess a commendable level of knowledge regarding menstrual hygiene.

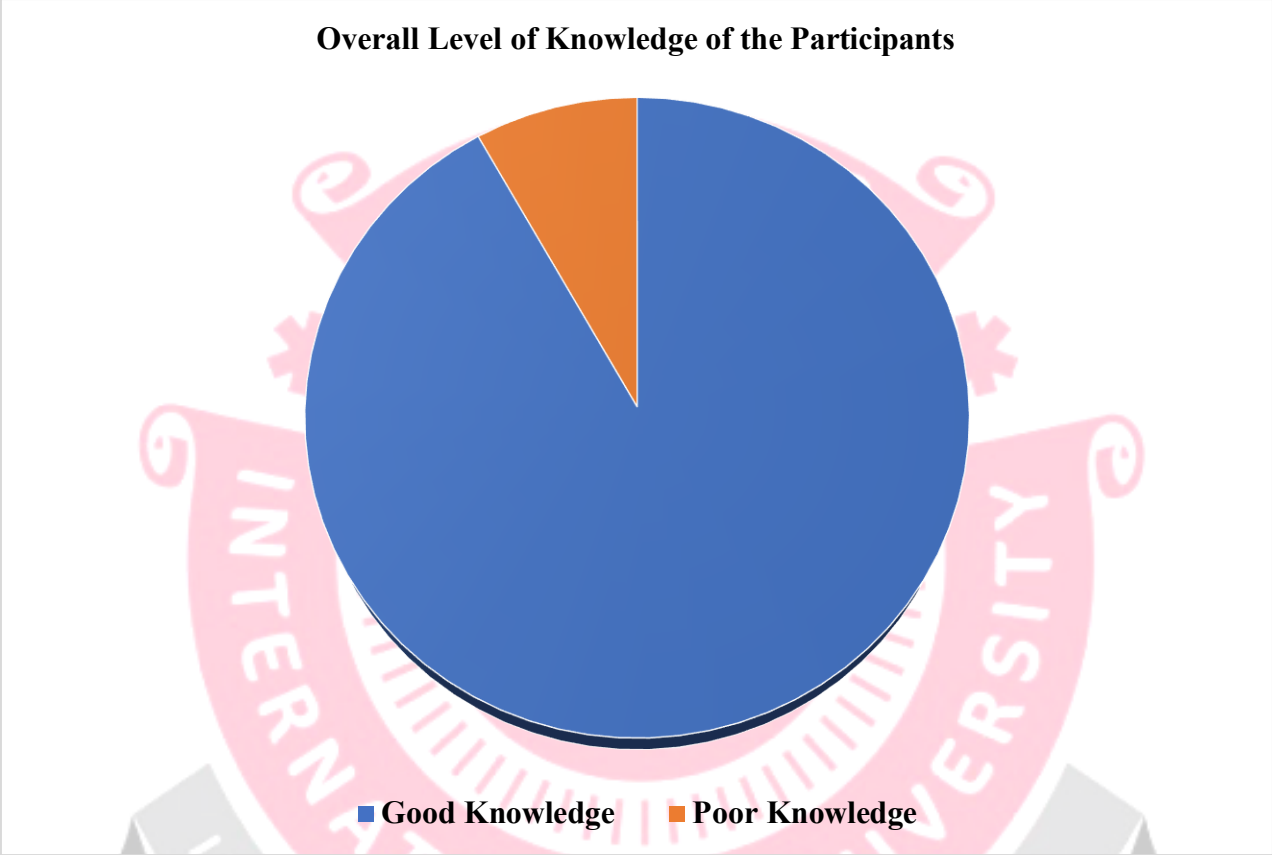


Figure 2: A Pie Chart Showing the Overall Level of Knowledge of the Participants

4.4. Menstrual Hygiene Practices

The study examined menstrual hygiene practices among adolescent girls, revealing critical insights into their sanitary product preferences and hygiene routines. The majority of participants, 94.2% (n=358), preferred using sanitary pads, with minimal use of other products like cloth at 2.4% (n=9), tampons at 0.3% (n=1), menstrual cups at 1.3% (n=5), toilet paper at 1.6% (n=6), and cotton wool at 0.3% (n=1) (Table 5). Most respondents

sourced their sanitary materials from home at 42.6% (n=162) and school at 41.1% (n=156), while smaller percentages relied on shops at 3.2% (n=12) and faith-based organizations at 2.6% (n=10) (Table 5). Changing absorbents at school was a common practice, with 97.6% (n=371) of respondents doing so, primarily changing them two times at 37.1% (n=141) or three times at 40.5% (n=154) during school hours. Additionally, 97.4% (n=370) reported cleaning their genital area during menstruation, typically twice a day at 93.2% (n=354), using plain water at 50.3% (n=191), soap and water at 34.5% (n=131), or lukewarm water at 13.9% (n=53).

The study also explored the storage and disposal of sanitary materials. Most participants stored their sanitary products in a box at 36.8% (n=140) or a bag at 38.9% (n=148), with only 5.8% (n=22) using the bathroom (Table 5). Disposal methods in schools predominantly involved using latrines at 90.3% (n=343), with smaller percentages using sanitary buckets at 7.1% (n=27) or routine waste bins at 1.3% (n=5) (Table 5). Handwashing after changing sanitary materials was a common practice at 97.9% (n=372). Furthermore, 78.9% (n=300) of respondents reported not facing any restrictions during their menstrual periods. Of those who faced restrictions during their menstrual periods, 21.1%(n=80) reported restrictions, such as not visiting the washroom other than break times, not sitting with other students, not playing with other pupils, or not attending classes as usual. These findings highlight the prevalent menstrual hygiene practices and the need for adequate facilities and education to support adolescent girls in maintaining proper menstrual hygiene.

Table 5: Menstrual Hygiene Practices

Variables	Frequency (N= 380) (n)	Percentages (%)
Type of sanitary product used		
Tampons	1	.3
Cotton wool	1	.3
Menstrual cups	5	1.3
Cloth	9	1.6
Toilet paper	6	2.4
Sanitary pads	358	94.2
Sources of Sanitary Materials	10	2.6
Other sources	10	2.6
Faith-based organizations	12	3.2
Shops	29	7.6
School and home	156	41.1
School environment	162	42.6
Home environment		
Changing absorbents at school		
Yes	9	97.6
No	371	2.4
Number of times changing absorbents at school		
Not changed	9	2.4
Once	48	12.6
Twice	141	37.1
Three times	154	40.5
Four times	24	6.3
Five times	4	1.1
Cleaning genital areas during menstruation		
Yes	370	97.4
No	10	2.6
Frequency of cleaning genital areas during menstruation	16	4.2
Once a day	354	93.2
Twice a day	10	2.6
Not cleaning		
Materials or items used for cleaning genitals		
Antiseptics	5	1.3
Lukewarm water	53	13.9
Soap and water	131	34.5
Plain water	191	50.3
Storage of sanitary protection materials		
Other storage methods	10	2.6
Not stored	11	2.9
Bathroom	22	5.8
With regular clothing	49	12.9

Box	140	36.8
Bag	148	38.9
Disposal of sanitary material at school		
Other disposal methods	1	0.3
Burning	4	1.1
Waste bins	5	1.3
Sanitary bucket	27	7.1
School latrines	343	90.3
Washing Hands After Changing Sanitary Materials		
No	8	2.1
Yes	372	97.9
Restrictions placed during periods		
Yes	80	21.1
No	300	78.9

4.5. Availability of WASH Facilities

The study assessed Water, Sanitation, and Hygiene (WASH) facilities across 12 primary schools, focusing on Menstrual Hygiene Management Facilities and Materials. Only 16.7% (n=2) of the schools had a designated changing room for girls, while 83.3% (n=10) did not (Table 6). Sanitary materials were accessible in 33.3% (n=4) of the schools, but 66.7% (n=8) lacked them. Similarly, 25.0% (n=3) of the schools had basins or buckets available, whereas 75.0% (n=9) did not. Additionally, 41.7% (n=5) had washrooms next to the girls' changing room or latrine, but 58.3% (n=7) did not. Water availability in washrooms was reported by only 16.7% (n=2) of the schools, with the remaining 83.3% (n=10) lacking this resource (Table 6). Moreover, 25.0% (n=3) had soap available in washrooms, while 75.0% (n=9) did not. These findings highlight significant disparities in the availability of menstrual hygiene facilities, emphasizing the need for targeted interventions.

The assessment of latrine facilities revealed that 75.0% (n=9) of the schools had permanent status latrines; they were made with bricks, while 25.0% (n=3) were of temporary status.

Only 8.3% (n=1) had latrines made from iron sheets on both the walls and the roof, with 91.7% (n=11) lacking this type and thus were considered to be of temporary status (Table 6). Additionally, 16.7% (n=2) had latrines with no superstructure, just a hole, while 83.3% (n=10) did not and thus were not of a conducive status to be used by girls. Latrines without doors and keys were present in 25.0% (n=3) of the schools, whereas 75.0% (n=9) lacked this feature and thus were not of suitable status to be used by girls. Water sources were universally available in all schools, but 33.3% (n=4) reported non-functioning sources, and 66.7% (n=8) had rarely available functioning sources. Handwashing facilities were available in 75.0% (n=9) of the schools, with 50.0% (n=6) functioning properly. Additionally, disposable facilities were available in 33.3% (n=4) of the schools, with 58.3% (n=7) having standard dustbins and 50.0% (n=6) having specific sanitary pad receptacles (Table 6). These findings underscore the varied conditions and accessibility of hygiene facilities, highlighting the need for improvements in menstrual hygiene management in schools.

Table 6: Availability of WASH Facilities

Variable	Frequency	Percentage (%)
Menstrual Hygiene Management Facilities/Materials		
Changing Room for Girls		
Yes	2	16.7
No	10	83.3
Sanitary Material Available		
Yes	4	33.3
No	8	66.7
Basin/Bucket Available		
Yes	3	25.0
No	9	75.0
Washroom next to girls' changing room/Latrine		
Yes	5	41.7
No	7	58.3
Water available in washrooms		

Yes	2	16.7
No	10	83.3
Soap available in the washroom		
Yes	3	25.0
No	9	75.0
Latrine		
Latrines made from permanent structures with bricks	9	75.0
Yes	3	25.0
No		
Made from iron sheet		
Yes	1	8.3
No	11	91.7
Hole no superstructure		
Yes	2	16.7
No	10	83.3
Latrine with no doors and Key		
Yes	3	25.0
No	9	75.0
Latrine is outdated/Not functional		
Yes	1	8.3
No	11	91.7
Grass thatched/Mud walls		
No	12	100.0
Latrine made of grass		
No	12	100.0
Latrine with the wall but no roof		
No	12	100.0
Water Source		
Water source not available		
No	12	100.0
Rarely available but no functioning		
Yes	4	33.3
No	8	66.7
Rarely available and functioning		
Yes	4	33.3
No	8	66.7
Some schools have water sources within school compound	7	58.3
Yes	5	41.7
No		
Water source more than 1 KM		
Yes	8	66.7
No	4	33.3
The water source environment is clean		
Yes	4	33.3

No	8	66.7
Handwashing		
Hand washing facility available		
Yes	9	75.0
No	3	25.0
Facility functioning and not damaged		
Yes	6	50.0
No	6	50.0
Soap Detergent/Ash used		
Yes	5	41.7
No	7	58.3
Disposable facility available		
Yes	4	33.3
No	8	66.7
Normal dustbin		
Yes	7	58.3
No	5	41.7
Specific sanitary pad receptacles		
Yes	6	50.0
No	6	50.0
Facility functioning and not damaged		
Yes	4	33.3
No	8	66.7
The facility well well-placed and accessible		
Yes	4	33.3
No	8	66.7

4.6. Bivariate Analysis

The bivariate analysis was conducted to examine the relationships between overall knowledge levels about menstrual hygiene practices and various sociodemographic factors and menstrual hygiene practices. The socio-demographic factors analyzed included age, type of school, class level, age of menarche, and the capability of parents to provide sanitary pads. Additionally, the study assessed menstrual hygiene practices such as types of sanitary materials used, frequency and methods of cleaning the genital area, changing absorbents at school, storage, and disposal of sanitary materials, handwashing after changing sanitary materials, and restrictions placed during menstruation. The purpose of these tests was to identify any significant associations between these variables and the

overall knowledge levels of the participants. A p-value less than 0.05 indicated statistical significance, which implied that the observed relationship between variables was unlikely to be due to chance. Conversely, when $p > 0.05$ suggested no statistically significant association between the variables under consideration.

4.6.1. Knowledge Level and The Socio-demographic Factors

The bivariate analysis explored the relationship between various sociodemographic factors and the overall knowledge levels about menstrual hygiene practices. Class level and age of menarche were found to have significant associations with knowledge levels. Higher class levels (C7 and C8) corresponded with better knowledge about menstrual hygiene practices, as indicated by a significant chi-square test result ($X^2(3, N = 380) = 37.253$, $p = .001$). This indicated that class level and age of menarche were significantly associated with knowledge levels. Additionally, the age of menarche showed some influence on knowledge levels, with a significant association found between the age at first menstruation and overall knowledge ($X^2(5, N = 380) = 17.202$, $p = .004$) (Table 7). Thus, a statistically significant association between the age of menarche and menstrual hygiene practices was established. In contrast, participants' age and type of school did not significantly influence their overall knowledge levels. The analysis found no significant difference in knowledge levels across age groups ($\chi^2(3, N = 380) = 3.203$, $p = .361$) (Table 7). Similarly, public and private school students displayed comparable levels of knowledge ($\chi^2(1, N = 380) = 0.255$, $p = .614$). Furthermore, the capability of parents to provide sanitary pads did not significantly impact knowledge levels ($\chi^2(1, N = 380) = 2.300$, $p = .129$), suggesting that other factors or information sources may play a more critical role in acquiring knowledge about menstrual hygiene practices.

Table 7: Relationship between Level of Knowledge and Socio-Demographic Factors

Variable	Poor Knowledge (n (%))	Good Knowledge (n (%))	X^2	df	*p*-value
Age					
11	0(.0)	1 (0.3)			
12	5 (16.1)	30 (9.6)			
13	8 (25.8)	134 (38.4)			
14	18 (58.1)	184 (52.7)	3.203	3	.361
Type of school					
Public	20(64.5%)	209(59.9%)			
Private	11(35.5%)	140(40.1%)	.255	1	.614
Class	4(12.9%)	2(.6%)			
C5	11(35.5%)	65(18.6%)			
C6	11 (35.5%)	122 (35.0%			
C7	5 (16.1%)	160 (45.8%			
C8	31 (100.0%)	349 (100.0%	37.25	3	.001
Age of menarche					
9	0 (0.0%)	2(0.6%)			
10	2(6.5%)	8(2.3%)			
11	9(29.0%)	30(8.6%)			
12	7(22.6%)	156(44.7%)			
13	10(32.3%)	127(36.4%)			
14	3(9.7%)	26(7.4%)	17.202	5	.004
Family able to afford	19(61.3%)	258(73.9%)			
Yes	12(38.7%)	91(26.1%)	2.300	1	.129
No					

4.6.2. Level of Knowledge and Menstrual Hygiene Practices

The analysis examined the relationship between various factors related to menstrual hygiene practices and the overall knowledge level of individuals. Significant associations were found between knowledge level and changing absorbents at school ($X^2(1, N = 380) = 16.200$, $p < .001$), cleaning genital areas during menstruation ($X^2(1, N = 380) = 36.841$, $p < .001$), frequency of cleaning genitals ($X^2(2, N = 380) = 57.937$, $p < .001$), materials used

for cleaning ($X^2(3, N = 380) = 11.747$, $p = .008$), and hand washing after changing sanitary materials ($X^2(1, N = 380) = 19.096$, $p = .000$) (Table 8). Participants with good knowledge were more likely to change their absorbent at school (98.6%) and clean their genital area during menstruation (98.9%). They also tended to clean themselves twice daily (96.0%) and were more likely to use soap and water (58.1%). Additionally, they reported washing hands after changing sanitary materials (98.9%).

On the other hand, several factors did not significantly correlate with overall knowledge level. These included the source of information on menstrual hygiene ($X^2(6, N = 380) = 5.953$, $p = .429$), type of sanitary material used ($X^2(5, N = 378) = 1.299$, $p = .935$), storage of protection materials ($X^2(5, N = 380) = 7.940$, $p = .160$), disposal of sanitary materials at school ($X^2(4, N = 380) = 8.362$, $p = .079$), and restrictions placed on girls during periods ($X^2(1, N = 380) = 0.492$, $p = .483$) (Table 8). The most common sources of information, regardless of knowledge level, were mothers and schools. Most participants in both knowledge groups used sanitary pads (over 90%) and disposed of them in school latrines. Storage methods and the experience of restrictions during menstruation also did not differ significantly between groups. These findings suggest that specific hygiene practices, such as changing absorbents at school, cleaning practices, and hand hygiene, are associated with better knowledge of menstrual hygiene practices. However, the source of information, type of sanitary material, and certain cultural practices do not significantly impact overall knowledge levels. This highlights the importance of targeted education on practical menstrual hygiene management to improve knowledge and practices.

Table 8: Association Between Level of Knowledge and Menstrual hygiene Practices

Variable	Poor Knowledge (n (%))	Good Knowledge (n (%))	X^2	Df	P - value
Sources of information					
Mother	16(51.6%	160(45.8%			
Sister	4(12.9%	39(11.2%			
Aunties	0(0.0%	8(2.3%			
Peers	1(3.2%	34(9.7%			
School	9(29.0%	94(26.9%			
Church	1(3.2%	2(0.6%			
Media	0(0.0%	12(3.4%	5.953	6	.429
Types sanitary material used	1(3.2%	8(2.3%			
Cloth	0(0.0%	1(0.3%			
Tampoon	29(93.5%	327(94.2%			
Sanitary pad	0(0.0%	5(1.4%			
Menstrual cup	1(3.2%	5(1.4%			
Toilet paper	0(0.0%	1(0.3%	1.29	5	.935
Cotton wool					
Changing Absorbent while at school	27(87.1%	344(98.6%			
Yes	4(12.9%	5(1.4%	16.20	1	.000
No					
Cleaning genital area during menstruation	25(80.6%	345(98.9%			
Yes	6(19.4%	4(1.1%			
No			36.841	1	.000
Frequency of cleaning genitals	6(19.4%	10(2.9%			
Once a day	19(61.3%	335(96.0%			
Twice a day	6(19.4%	4(1.1%	57.937	2	.000
I do not clean at all					
Material used for cleaning genitals	7(22.6%	184(52.7%			
Plain water	6(19.4%	47(13.5%			
Luke warm water	18(58.1%	113(32.4%			
Soap and water	0(0.0%	5(1.4%	11.747	3	.008
Antiseptics					
Storage of sanitary protection materials					
Bathroom	2(6.5%	20(5.7%			
Box	17(54.8%	123(35.2%			
Bag	8(25.8%	140(40.1%			
Don't store	2(6.5%	9(2.6%			
Store with routine clothes	2(6.5%	47(13.5%			

Others	0(0.0%	10(2.9%	7.940	5	.160
Disposal of sanitary material at school	0(0.0%	4(1.1%			
Burn it	0(0.0%	5(1.4%			
Throw it in routine waste	25(80.6%	318(91.1%			
School latrines	6(19.4%	21(6.0%			
Sanitary bucket	0(0.0%	1(0.3%	8.362	4	.079
Others					
Wash Hands After Changing sanitary materials	27(87.1%	345(98.9%			
Yes	4(12.9%	4(1.1%	19.096	1	.000
No					
Restriction during periods					
Yes	5(16.1%	75(21.5%			
No	26(83.9%	274(78.5%	.492	1	.483

4.7. Hypothesis Testing

The null hypothesis (H0) in this study stated that there was no significant relationship between adolescent girls' knowledge of menstrual hygiene and their practices. To test this hypothesis, bivariate analysis was conducted to examine the relationships between overall knowledge levels about menstrual hygiene practices and various sociodemographic factors and menstrual hygiene practices themselves.

The bivariate analysis involved examining the associations between knowledge levels and sociodemographic factors such as age, type of school, class level, age of menarche, and the capability of parents to provide sanitary pads. Additionally, the analysis assessed menstrual hygiene practices, including sources of information on menstrual hygiene, types of sanitary materials used, frequency and methods of cleaning the genital area, changing absorbents at school, storage, and disposal of sanitary materials, handwashing after changing sanitary materials, and restrictions placed during menstruation.

For each variable examined, the researchers calculated chi-square (χ^2) test statistics and associated p-values to determine whether there was a statistically significant association between the variables under consideration and overall knowledge levels. A p-value less than 0.05 was considered statistically significant, indicating that the observed relationship between variables was unlikely to be due to chance.

In this study, the bivariate analysis results indicated several significant associations between sociodemographic factors, menstrual hygiene practices, and overall knowledge levels. For example:

Class level and age of menarche were found to be significantly associated with knowledge levels. Higher class levels corresponded with better knowledge about menstrual hygiene practices; older age at menarche was also associated with higher knowledge levels (Table 7).

Changing sanitary pads at school, cleaning genital areas during menstruation, frequency of cleaning genitals, materials used for cleaning, and hand washing after changing sanitary materials were significantly associated with knowledge levels (Table 8*).*

However, factors such as age, type of school attended, and parents' capability to provide sanitary pads did not significantly influence overall knowledge levels.

Therefore, based on the bivariate analysis results, the researchers rejected the null hypothesis and concluded that there was a significant relationship between adolescent girls' knowledge of menstrual hygiene and their practices. This implied that knowledge levels about menstrual hygiene practices were associated with various sociodemographic factors and specific menstrual hygiene practices.

CHAPTER 5: DISCUSSIONS

5.1 Introduction

The discussion chapter explores and interprets the study's findings regarding the knowledge and menstrual hygiene practices among adolescent girls in primary schools in Narok South sub-county. It provides insights into the implications of the study findings and offers recommendations for future interventions and initiatives to improve menstrual health and hygiene among adolescent girls in Narok South sub-county.

5.2 Level of Knowledge of Menstrual Hygiene

The findings of this study reveal a predominantly high level of knowledge regarding menstrual hygiene among adolescent girls in primary schools in Narok South sub-county. Approximately 91.8% (n = 349) of participants demonstrated good knowledge about menstrual hygiene. This indicated that the majority of the girls in primary schools possessed accurate comprehension of menstrual hygiene concepts, including its definition, the importance of maintaining hygiene before and during menstruation, and the association between poor hygiene and infections. According to Ahmed et al. (2019), such widespread awareness, particularly before the onset of menstruation, underscores the effectiveness of existing educational initiatives and the essential role of familial and educational channels in disseminating knowledge. Recognizing various menstrual hygiene products, particularly disposable sanitary pads, indicates an understanding of available options for managing menstruation. However, the preference for readymade sanitary pads over other products suggests potential areas for further education and exploration of alternative menstrual hygiene solutions to cater to diverse needs and preferences. Moreover, the lack of significant associations between knowledge levels and factors such as the source of

information and type of sanitary material used suggests the need for comprehensive menstrual hygiene education beyond mere awareness to address practical aspects of hygiene management.

The findings align with previous literature and studies on adolescent girls' knowledge and practices. Educational efforts and awareness programs have played a pivotal role in enhancing this knowledge (Ahmed et al., 2019), emphasizing the need for policy improvement in this aspect. However, 8.2% (n = 31) of participants with poor knowledge levels highlight the persistent need for targeted interventions and educational programs to reach marginalized groups and enhance their understanding. Tailored approaches recommended for marginalized populations should be integrated into policy strategies.

The study highlights the importance of strong knowledge levels in menstrual hygiene management, echoing prior research (Miiro et al., 2018). However, it emphasizes that knowledge alone is insufficient. Access to suitable menstrual hygiene products, adequate Water, Sanitation, and Hygiene (WASH) facilities, and supportive social norms are equally crucial, supported by existing literature (Van Eijk et al., 2016; Ahmed et al., 2019)). The study advocates for a comprehensive policy approach that integrates education with access to products, facilities, and supportive social environments, aligning with previous recommendations (Ahmed et al., 2019). It underscores the ongoing need for a well-structured policy addressing these multifaceted aspects to ensure the holistic well-being of adolescent girls in the region. The interventions should entails not only providing information but also addressing socio-cultural factors, access to affordable and appropriate menstrual hygiene products, and ensuring supportive environments that enable girls to manage menstruation with dignity and comfort. Additionally, ongoing monitoring and

evaluation of such interventions are crucial to assess their effectiveness in improving both knowledge and behavior related to menstrual hygiene. By addressing these challenges holistically, stakeholders can contribute to promoting menstrual health and empowering adolescent girls to navigate menstruation with confidence and dignity.

5.3 Menstrual Hygiene Practices

The objective of this study was to identify menstrual hygiene practices among adolescent girls in primary schools in Narok South sub-county. The findings reveal insightful information regarding the preferences and behaviours of these girls concerning sanitary products, hygiene routines, storage, disposal, and any associated restrictions during menstruation. The majority of participants preferred sanitary pads, with minimal usage of other products such as cloth, tampons, menstrual cups, toilet paper, and cotton wool. Additionally, the study highlighted the sources of sanitary materials, indicating that a significant portion of respondents acquired them from both home and school. Changing absorbents at school was a common practice, typically occurring two to three times during school hours. Moreover, maintaining genital hygiene was prevalent, with most girls cleaning themselves at least twice a day using various methods such as plain water, soap and water, or antiseptics.

The findings conform to the broader trends in menstrual hygiene practices among adolescent girls, despite variations that exist based on contextual factors. Existing studies have consistently shown a preference for sanitary pads among girls due to their convenience, absorbency, and perceived comfort (Hennegan et al., 2016). This aligns with the predominant choice of sanitary pads observed in the current study, indicating a shared preference across diverse settings. For instance, while the majority of girls in this study

reported changing absorbents two to three times during school hours, some studies have found that girls in low-resource settings may change less frequently due to limited access to sanitary products or inadequate facilities (Akanzum, & Pienaah, 2023). These differences underscore the importance of context-specific approaches to menstrual hygiene management interventions. Moreover, the sources of sanitary materials identified in this study—primarily home and school—reflect efforts to address accessibility challenges (Schmitt, et al., 2022). Similar findings have been reported in other studies, highlighting the role of schools as key providers of menstrual hygiene resources in some communities. However, disparities in access may still exist, particularly in marginalized or rural areas where schools may lack adequate facilities or supplies (Schmitt, et al., 2022). Furthermore, the hygiene practices observed in this study, such as cleaning genital areas with plain water or soap and water, resonate with recommendations from global health organizations for maintaining menstrual hygiene (Mantsebo, 2021). While the use of antiseptics was less common in this study, it highlights the importance of understanding local preferences and available resources when designing hygiene interventions.

The implications of these findings are significant in terms of public health and education policy. Proper menstrual hygiene management is crucial for the well-being and dignity of adolescent girls, impacting their health, education, and overall quality of life (Schmitt, et al., 2022). Therefore, there is a clear need for interventions that address infrastructure gaps in schools, provide access to affordable and sustainable sanitary products, and offer comprehensive menstrual hygiene education and support. Moving forward, further research could delve deeper into specific challenges faced by adolescent girls in managing menstrual hygiene, particularly in regions with limited resources (Mantsebo, 2021).

Additionally, interventions should be developed and implemented to improve facilities, increase accessibility to sanitary products, and promote menstrual health education in schools and communities. Ultimately, by addressing these issues, we can empower adolescent girls to manage their menstruation with dignity and ensure their continued participation and success in education and broader society.

5.4 Availability of WASH facilities

The objective of this study was to determine the availability of WASH facilities to support adolescent girls during menstruation in primary schools in Narok South sub-county. The findings reveal a concerning lack of adequate facilities, indicating significant gaps in menstrual hygiene management support for schoolgirls. Only a small percentage of schools had designated changing rooms for girls, access to sanitary materials, basins or buckets, and washrooms adjacent to girls' changing rooms or latrines. Moreover, water and soap availability in washrooms were severely lacking, further exacerbating the challenges faced by adolescent girls during menstruation. The observed inadequacy WASH facilities in supporting adolescent girls during menstruation in Narok South sub-county can be attributed to a combination of socioeconomic constraints, cultural stigmas surrounding menstruation, and institutional shortcomings in policy implementation and resource allocation (Usman Adam et al., 2023; Yaliwal et al., 2020). Cultural norms surrounding menstruation also influence the availability and accessibility of menstrual hygiene facilities in schools. In some communities, menstruation is stigmatized, leading to a lack of open discussion and support for menstrual hygiene management (Usman Adam et al., 2023; Yaliwal et al., 2020). This stigma may contribute to the neglect of girls' specific needs in school settings, perpetuating a cycle of shame and silence surrounding menstruation.

Michael et al. (2020), stated that Limited funding and resources, coupled with cultural taboos and societal silence around menstruation, contribute to the neglect of girls' specific needs in school settings. Weak governance structures and inadequate policy frameworks further exacerbate the situation, resulting in insufficient prioritization of menstrual hygiene management in school planning and budgeting processes (Michael et al., 2020). Therefore, addressing these multifaceted challenges requires a comprehensive approach involving investment in infrastructure, promotion of menstrual hygiene awareness, and advocacy for policy changes to ensure equitable access to menstrual hygiene support for adolescent girls in schools

Access to clean and private toilets designed explicitly for menstrual hygiene management is crucial, requiring policy focus in educational institutions (WaterAid, 2020). The study correlates the availability of sanitary facilities with menstrual hygiene knowledge, underscoring the pivotal role of appropriate restroom amenities (Miiro et al., 2018). Gender-segregated facilities and changing rooms positively influence girls' knowledge and experiences, emphasizing the need for infrastructure respecting girls' privacy (Sommer et al., 2021; VanLeeuwen et al., 2021). Proper handwashing after changing sanitary materials is essential, although continuous education is necessary (WHO, 2019). Addressing menstrual restrictions is crucial, necessitating efforts to create an inclusive environment (Hennegan et al., 2019). The study highlights the critical role of well-maintained WASH facilities in promoting effective menstrual hygiene management, including separate areas, changing rooms, and handwashing provisions. Educational institutions, policymakers, and stakeholders must prioritize these facilities, creating a supportive school environment for girls' menstrual hygiene needs (UNICEF, 2019).

Overall, the study highlights the multifaceted challenges of menstrual hygiene management, addressing policy, education, infrastructure, and cultural norms. While participants demonstrated good knowledge of menstrual hygiene practices, the study underscores insufficient knowledge, emphasizing the critical need for access to appropriate menstrual hygiene products (Hennegan et al., 2019). Adequate facilities, including gender-segregated toilets and changing rooms, are essential for fostering good hygiene practices, emphasizing the interconnectedness of policies and infrastructure (UNESCO, 2019). The study also stresses the importance of proper handwashing practices, with ongoing education necessary to reinforce these behaviors. Additionally, challenging menstrual restrictions and promoting menstrual equity are vital policy avenues to create a supportive environment, enhancing the emotional well-being of menstruating girls (UNICEF, 2019). These findings underscore the necessity of comprehensive policies and collaborative efforts to ensure effective menstrual hygiene management for adolescent girls.

5.5. Policy Implications

The findings underscore the imperative for comprehensive policy initiatives to address menstrual hygiene management among adolescent girls in Narok South sub-county. Firstly, this study confirmed that there is a pressing need for educational policies that extend beyond mere awareness, emphasizing practical aspects of hygiene management). Such policies should ensure the implementation of tailored menstrual hygiene education programs in schools, reaching marginalized groups effectively and covering topics like access to menstrual products and proper disposal methods as recommended by UNESCO (2019). Concurrently, infrastructure policies should prioritize investments in WASH facilities, ensuring gender-segregated toilets, changing rooms, and handwashing stations

are readily available in schools to support menstrual hygiene needs. Furthermore, these policies should focus on challenging stigma and cultural norms surrounding menstruation, fostering an inclusive environment that promotes open discussions and supports girls' menstrual health needs.

Policy efforts should also ensure equitable access to affordable menstrual hygiene products. Policies should explore measures like subsidizing the cost of sanitary products or implementing distribution programs to reach underserved communities, particularly in rural areas (Sommer et al., 2021; VanLeeuwen et al., 2021). Moreover, continuous monitoring and evaluation mechanisms should be integrated into policy frameworks to assess interventions' effectiveness and identify areas for improvement (WHO, 2019). By addressing these multifaceted policy implications, stakeholders can contribute to fostering a supportive environment that empowers adolescent girls to manage menstruation with dignity, ultimately promoting their overall health and well-being.

CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusion

The study revealed that a significant majority of the girls exhibit good knowledge and practices regarding menstrual hygiene. Most participants used sanitary pads and changed absorbents at school, while nearly all cleaned their genital areas during menstruation. The majority of the girls preferred the use of disposable sanitary pads over cotton wool or clothes; thirdly, the study identified significant gaps in WASH facilities, such as inadequate toilets, changing rooms, and handwashing facilities, which exacerbate the challenges faced by girls during menstruation. Lastly, this study demonstrated a significant relationship between knowledge levels among adolescent girls and their menstrual hygiene practices. The current identified several sociodemographic factors, including class level, age of menarche, and specific menstrual hygiene practices, that were significantly associated with higher knowledge levels.

6.2. Recommendations

The first recommendation is to implement comprehensive menstrual hygiene education programs in primary schools. The study revealed that while most adolescent girls have good knowledge of menstrual hygiene, there are still gaps in understanding and practical application, particularly among young girls aged between 10 and 14 years. Integrating a comprehensive menstrual hygiene management curriculum into the school syllabus is essential to equip adolescent girls with vital knowledge and skills for maintaining proper menstrual hygiene. This initiative aims to normalize menstruation, empower girls, and ensure equitable access to essential health education across diverse school settings. This is an effective strategy, as confirmed by Vayeda et al. (2022), who stated that implementation

of menstrual hygiene education programs in schools through a comprehensive menstrual hygiene management curriculum enables the pupils to get comprehensive information on the menstrual cycle, hygiene practices, the use of various menstrual products, and how to handle menstruation-related challenges. Additionally, training teachers to deliver this curriculum effectively and support students is essential. Therefore, in doing so, there should be community engagement, such as involving parents and community leaders, to reduce stigma and promote open discussions about menstruation. The Ministry of Education should oversee the integration of this curriculum, with support from NGOs for teacher training and community education. School administrators and teachers will implement the curriculum and support students.

The second recommendation is to improve access to menstrual hygiene products. The study highlighted a strong preference for disposable sanitary pads among the participants but also revealed disparities in access, particularly in low-resource settings. Therefore, it is imperative that government or NGO-led programs should be established to subsidize the cost of sanitary products, making them affordable for all students. UNICEF (2019) confirmed the benefit of this recommendation. UNICEF (2019) stated that distribution networks within schools should be set up to provide free or low-cost sanitary products to students. Educating girls on the use of sustainable menstrual products, such as menstrual cups and reusable pads, and providing these options at subsidized rates can also help in broadening their choices (UNICEF, 2019). The government, through the Ministry of Health and Ministry of Education, should provide funding and oversight for these subsidy and distribution programs, while NGOs and international agencies can support procurement

and distribution efforts as well as educational campaigns. School administrators will play a key role in managing the distribution of menstrual hygiene products within schools.

The third recommendation is to enhance WASH facilities in schools. The study found significant gaps in the availability and quality of these facilities, which are crucial for effective menstrual hygiene management. Improving WASH facilities will address the practical challenges girls face during menstruation, such as inadequate toilets, changing rooms, and handwashing stations. This can be achieved through substantial investment in infrastructure, including building and maintaining adequate WASH facilities with gender-segregated toilets, changing rooms, and handwashing stations equipped with soap and water. Regular maintenance and cleaning of these facilities are also essential to keep them functional and hygienic. Additionally, policy implementation is necessary to mandate the provision of adequate WASH facilities in all schools. The government, particularly the Ministry of Education and Ministry of Water and Sanitation, should allocate funds and oversee the implementation and maintenance of these facilities. School administrators should ensure proper use and upkeep of the facilities, while community leaders can support and advocate for the importance of WASH facilities in schools.

6.3. Suggestions for Future Research

Future studies should build upon the findings of this research to further explore and address the gaps in understanding menstrual hygiene practices among adolescent girls. Firstly, it would be valuable if future studies could investigate the long-term impact of comprehensive menstrual health education programs on knowledge retention, behavior change, and overall menstrual health outcomes. This could involve longitudinal studies that track participants over an extended period to assess the sustainability and effectiveness

of educational interventions. Additionally, the future studies should not only explore the perspectives and experiences of girls, but also the male caregivers in relation to menstrual hygiene practices. This would provide insights into the broader social dynamics and facilitate the development of inclusive and gender-sensitive interventions. Furthermore, qualitative research methods such as interviews and focus groups could be employed to delve deeper into the underlying factors influencing menstrual hygiene practices, including social norms, cultural beliefs, and environmental factors. Lastly, examining the role of technology, including digital platforms and mobile applications, in promoting menstrual health education and providing support to adolescent girls could be a fruitful area of exploration. By addressing these research gaps, future studies can contribute to the development of evidence-based interventions and policies that effectively support the menstrual health and well-being of girls.

REFERENCES

Ahlawat, P., Batra, N., Sharma, P., Kumar, S., & Kumar, A. (2018). Knowledge and attitude of adolescent girls and their mothers regarding cervical cancer: A community-based cross-sectional study. *Journal of Mid-Life Health*, *9*(3), 145–149. https://doi.org/10.4103/jmh.JMH_45_18

Ahmed, R., Farooq, N., & Ali, A. (2019). Impact of health education on knowledge and practices about menstrual hygiene among adolescent girls. *Journal of Pakistan Medical Association*, 69(3), 346-350.

Akanzum, J., & Pienaah, C. K. (2023). Review of the effects of adequate sanitary facilities on the participation and performance of the school girl child in Ghana. *ISABB Journal of Health and Environmental Sciences*, 8(1), 1-14.

Anukriti, S., & Dasgupta, S. (2018). Marriage markets in developing countries. In S. L. Averett, L. M. Argys, & S. D. Hoffman (Eds.), *The Oxford Handbook of Women and the Economy* (pp. 96–120). Oxford: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780190628963.013.5

Anbesu, E. W., & Asgedom, D. K. (2023). Menstrual hygiene practice and associated factors among adolescent girls in Sub-Saharan Africa: A systematic review and meta-analysis. *BMC Public Health*, *23*(1), 1-14.

Andani, P. R. (2020). Knowledge, attitude and practice of menstrual hygiene among primary school adolescents in Surabaya, Indonesia. *Indian Journal of Forensic Medicine & Toxicology*, *14*(3).

Belayneh, Z., & Mekuriaw, B. (2019). Knowledge and menstrual hygiene practice among adolescent school girls in Southern Ethiopia: A cross-sectional study. *BMC Public Health*, *19*(1), 1595. https://doi.org/10.1186/s12889-019-7973-9

Bhatt, M. D., & Kadam, D. M. (2020). Knowledge, attitude and practice regarding menstrual hygiene among adolescent girls in a rural private school. *International Journal of Community Medicine Public Health*, *7(1)*, 236-42.

Bhusal, C. K., Bhattarai, S., Kafle, R., Shrestha, R., Chhetri, P., & Adhikari, K. (2020). Level and Associated Factors of Knowledge regarding Menstrual Hygiene among School-Going Adolescent Girls in Dang District, Nepal. *Advances in preventive medicine*, *2020*(1), 8872119.

Birech, J. K. (2019). Innovative ways of dealing with menstrual health among the marginalized communities in Kenya. *Advances in Social Sciences Research Journal*, *6*(2).

Bulto, G. A. (2021). Knowledge on menstruation and practice of menstrual hygiene management among school adolescent girls in Central Ethiopia: A cross-sectional study. *Risk Management and Healthcare Policy*, 911-923.

Caruso, B., Davis, J., & Sommer, M. (2021). Menstrual hygiene management in schools: Midline findings and implications of the MHM in Ten study. *Waterlines*, 40(3), 243-263.

Chandra-Mouli, V., & Patel, S. V. (2020). Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low-

and middle-income countries. *The Palgrave handbook of critical menstruation studies*, 609-636.

Chandra-Mouli, V., Ferguson, B. J., Plesons, M., Paul, M., Chalasani, S., Amin, A., … Caffe, S. (2019). The political, research, programmatic, and social responses to adolescent sexual and reproductive health and rights in the 25 years since the international conference on population and development. *Journal of Adolescent Health*, *65*(6), S16–S40. https://doi.org/10.1016/j.jadohealth.2019.09.011

Chinyama, J., Chipungu, J., Rudd, C., Mwale, M., Verstraete, L., Sikamo, C., ... & Sharma, A. (2019). Menstrual hygiene management in rural schools of Zambia: A descriptive study of knowledge, experiences and challenges faced by schoolgirls. *BMC Public Health*, *19*, 1-10.

Choudhary, N., & Gupta, M. K. (2019). A comparative study of perception and practices regarding menstrual hygiene among adolescent girls in urban and rural areas of Jodhpur District, Rajasthan. *Journal of Family Medicine and Primary Care*, *8*(3), 875.

Diamond-Smith, N., Onyango, G. O., Wawire, S., & Ayodo, G. (2020). Knowledge of menstruation and fertility among adults in rural Western Kenya: Gaps and opportunities for support. *PLoS One*, *15*(3), e0229871.

Edet, O. B., Bassey, P. E. M., Esienumoh, E. E., & Ndep, A. O. (2020). An exploratory study of menstruation and menstrual hygiene knowledge among adolescents in urban and rural secondary schools in Cross River State, Nigeria. *African Journal of Biomedical Research*, *23*(3), 321-326.

El Zaatari, W., & Maalouf, I. (2022). How the Bronfenbrenner bio-ecological system theory explains the development of students' sense of belonging to school? *SAGE Open*, *12*(4), 21582440221134089.

Fialkov, C., Haddad, D., Ajibose, A., Le Flufy, C., Ndungu, M., & Kibuga, R. (2021). The impact of Menstrual Hygiene Management and gender on psychosocial outcomes for adolescent girls in Kenya. *International Journal of Adolescence and Youth*, *26*(1), 172-184.

Ha, Md. A. T., & Alam, Md. Z. (2022). Menstrual hygiene management practice among adolescent girls: An urban–rural comparative study in Rajshahi Division, Bangladesh. *BMC Women's Health*, *22*(1), 86. https://doi.org/10.1186/s12905-022-01665-6

Hameed, A., Kadir, M. M., Khan, M. M., & Ahmed, B. (2019). Impact of knowledge and socio-economic determinants on menstrual hygiene practices among adolescent girls in Bangladesh. *International Journal of Environmental Research and Public Health*, 16(13), 2408.

Hennegan, J., Dolan, C., Wu, M., Scott, L., & Montgomery, P. (2019). Measuring the prevalence and impact of restrictive menstrual hygiene management practices: A systematic review and meta-analysis. *BMJ Global Health*, 4(3), e001891.

Hennegan, J., Dolan, C., Wu, M., Scott, L., & Montgomery, P. (2016). Schoolgirls' experience and appraisal of menstrual absorbents in rural Uganda: A cross-sectional evaluation of reusable sanitary pads. Reproductive Health, 13, 1-12.

Jyothi, B., & Hurakadli, K. (2019). Knowledge, practice and attitude of menstrual hygiene among school going adolescent girls: An interventional study in an urban school of Bagalkot City. *Medica Innovatica, 8*, 16-20.

Kaur, K. N., Nandi, D., Ramachandran, K., Mohanan, L., Subhashini, S., Segan, M., ... & Janardhanan, R. (2023). Knowledge, attitude, and practice of menstrual blood-derived mesenchymal stem cells among female healthcare workers in India. *Frontiers in Public Health*, *11*, 1102016.

Korir, E., Okwara, F. N., & Okumbe, G. (2018). Menstrual hygiene management practices among primary school girls from a pastoralist community in Kenya: A cross sectional survey. *The Pan African Medical Journal*, *31*, 222. https://doi.org/10.11604/pamj.2018.31.222.13521

Kumbeni, M. T., Otupiri, E., & Ziba, F. A. (2020). Menstrual hygiene among adolescent girls in junior high schools in rural Northern Ghana. *Pan African Medical Journal*, *37*(1).

Majeed, J., Sharma, P., Ajmera, P., & Dalal, K. (2022). Menstrual hygiene practices and associated factors among Indian adolescent girls: A meta-analysis. *Reproductive Health*, *19*(1), 1-13.

Mantsebo, T. (2021). *Addressing the menstrual health and hygiene needs of girls and young women in Zimbabwe*. Published Masters Thesis KIT (Royal Tropical Institute)/Vrije Universiteit Amsterdam, The Netherlands.

Michael, J., Iqbal, Q., Haider, S., Khalid, A., Haque, N., Ishaq, R., ... & Bashaar, M. (2020). Knowledge and practice of adolescent females about menstruation and

menstruation hygiene visiting a public healthcare institute of Quetta, Pakistan. *BMC Women's Health*, *20*, 1-8.

Miiro, G., Rutakumwa, R., Nakiyingi-Miiro, J., Nakuya, K., Musoke, S., Namakula, J., ... & Wanyenze, R. K. (2018). Menstrual health and school absenteeism among adolescent girls in Uganda (MENISCUS): A feasibility study. *BMC Women's Health, 18*(1), 4.

Mohammed, S., & Larsen-Reindorf, R. E. (2020). Menstrual knowledge, sociocultural restrictions, and barriers to menstrual hygiene management in Ghana: Evidence from a multi-method survey among adolescent schoolgirls and schoolboys. *Plos One*, *15*(10), e0241106.

Nnennaya, E. U., Atinge, S., Dogara, S. P., & Ubandoma, R. J. (2021). Menstrual hygiene management among adolescent school girls in Taraba State, Nigeria. *African Health Sciences*, *21*(2), 842-851.

Parle, J., & Khatoon, Z. (2019). Knowledge, attitude, practice and perception about menstruation and menstrual hygiene among adolescent school girls in rural areas of Raigad District. *International Journal of Community Medicine and Public Health*, *6*(6), 2490-7.

Phillips-Howard, P. A., Nyothach, E., ter Kuile, F. O., Omoto, J., Wang, D., Zeh, C., ... & Laserson, K. F. (2024). Menstrual cups and sanitary pads to reduce school attrition, and sexually transmitted and reproductive tract infections: A cluster randomised controlled feasibility study in rural Western Kenya. *BMJ Open, 6*(11), e013229.

Rastogi, S., Khanna, A., & Mathur, P. (2019). Uncovering the challenges to menstrual health: Knowledge, attitudes and practices of adolescent girls in government schools of Delhi. *Health Education Journal*, *78*(7), 839-850.

Schmitt, M. L., Gruer, C., Clatworthy, D., Kimonye, C., Peter, D. E., & Sommer, M. (2022). Menstrual material maintenance, disposal, and laundering challenges among displaced girls and women in Northeast Nigeria. *Journal of Water, Sanitation and Hygiene for Development,* 12(7), 517-528.

Scott, L., Lahiff, M., & Hennegan, J. (2023). Determinants of menstrual hygiene management practices among adolescent girls and women in Narok County, Kenya. *Reproductive Health, 20*(1), 43.

Sharma, N., Shekhawat, R., Gaur, K., Meena, K. K., Meena, G. L., Rathore, M., ... & Kewalramani, S. (2019). Assessment of knowledge and practice regarding menstrual hygiene among school going adolescent girls of Jaipur city. *Journal of Medical Science and Clinical Research*, *7*(7), 2808-15.

Shrestha, N., Dangal, G., Khanal, G., & Bhandari, T. R. (2020). Knowledge of menstrual hygiene management among adolescent girls: What does evidence show? *Nepal Journal of Obstetrics & Gynaecology*, *15*(1).

Shumie, Z. S., & Mengie, Z. A. (2022). Menstrual hygiene management knowledge, practice and associated factors Among School Girls, Northeast Ethiopia. *PLoS One*, *17*(7), e0271275.

Sommer, M., Caruso, B. A., Torondel, B., Warren, E. C., Yamakoshi, B., Haver, J., Long, J., Mahon, T., Nalinponguit, E., Okwaro, N., & Phillips-Howard, P. A. (2021).

Menstrual hygiene management in schools: Midway progress update on the "MHM in Ten" 2014–2024 global agenda. *Health Research Policy and Systems*, *19*(1), 1. https://doi.org/10.1186/s12961-020-00669-8

Ssewanyana, D., & Bitanihirwe, B. K. Y. (2019). Menstrual hygiene management among adolescent girls in Sub-Saharan Africa. *Global Health Promotion*, *26*(1), 105-108.

Sychareun, V., Chaleunvong, K., Essink, D. R., Phommavongsa, P., & Durham, J. (2020), Menstruation practice among school and out-of-school adolescent girls, Lao PDR. *Global Health Action, 13*, 1785170.

UNICEF. (2019). *Guidance on menstrual health and hygiene*. Retrieved from https://www.unicef.org/wash/files/UNICEF-Guidance-Menstrual-Health-Hygiene-2019.pdf

Usman Adam, M., Kpeebi, Y., Usman Adam, B., Adams, A., & Sahabi, S. (2023). Beyond access to adequate WASH facilities: Menstrual hygiene practices of high school adolescent girls. *Journal of Adolescence,* 95(3), 617-626.

VanLeeuwen, C., Torondel, B., Blokland, M., & Haddad, L. (2021). Girls' and women's experiences of menstruation in low-and middle-income countries: A systematic review and qualitative metasynthesis. *PLOS Medicine*, 18(2), e1003462.

Vayeda, M., Ghanghar, V., Desai, S., Shah, P., Modi, D., Dave, K., ... & Shah, S. (2022). Improving menstrual hygiene management among adolescent girls in tribal areas of Gujarat: An evaluation of an implementation model integrating the government service delivery system. *Sexual and Reproductive Health Matters*, *29*(2), 1992199.

Wamoto, A. P., Wambua, G. N., Osok, J., Madeghe, B., & Kumar, M. (2021). Attachment and its social determinants, Kenyan child and adolescent perspective from two informal settlements in Nairobi: A qualitative study. *Global Social Welfare*, 1-15.

WaterAid. (2020). *Menstrual hygiene in schools*. Retrieved from https://washmatters.wateraid.org/publications/menstrual-hygiene-in-schools

World Bank (2018). *Menstrual hygiene management enables women and girls to reach their full potential*. Available at: https://www.worldbank.org/en/news/feature/2018/05/25/menstrual-hygiene-management

World Health Organization. (2019). Hand hygiene in health care: Global hand hygiene day 5 May 2019. Retrieved from https://www.who.int/infection-prevention/campaigns/hand-hygiene/5may2019/en/

Xia, M., Li, X., & Tudge, J. R. (2020). Operationalizing Urie Bronfenbrenner's process-person-context-time model. *Human Development*, *64*(1), 10-20.

Yaliwal, R. G., Biradar, A. M., Kori, S. S., Mudanur, S. R., Pujeri, S. U., & Shannawaz, M. (2020). Menstrual morbidities, menstrual hygiene, cultural practices during menstruation, and WASH practices at schools in adolescent girls of North Karnataka, India: A cross-sectional prospective study. *Obstetrics and Gynecology International*, *2020*(1), 6238193.

APPENDICES

Appendix I: Questionnaire

QUESTIONNAIRE

Please tick appropriately and give your honest opinion where needed.

Section A: Socio demographic characteristics of the respondents.

1. How old are you? ……
2. In which class are you?

   C5 [ ]

   C6 [ ]

   C7 [ ]

   C8 [ ]

3. At what age did you first experience your menses/menstruation?

……..

4. Is your family capable of providing you with sanitary pads?

   Yes [ ]

   No [ ]

Section B: Knowledge on menstrual Hygiene(*check all that applies*)

5. What is menstrual hygiene? …….
6. Have you ever heard about menstrual hygiene before you started your periods?

   Yes [ ]

   No [ ]

7. Does poor menstrual hygiene cause infection?

   Yes [ ]

No [ ]

8. What is your source of information on menstrual hygiene?

Mother [ ]

Sister [ ]

Aunties

Peers [ ] School [ ]

Church [ ] Media (TV, radio, etc) others [ ]

9. Which of these menstrual hygiene products have you heard of?

Tampon [ ]

Disposable Sanitary Pad [ ]

Menstrual Cup [ ]

Reusable Pad that you can wash and use again e.g. Afripads, homemade pad [ ]

Cotton wool [ ]

10. What is the ideal material used during menstruation?

Any type of cloth available [ ]

Cloth kept separately for this purpose [ ]

Readymade sanitary pads [ ]

Tampons [ ]

Menstrual Cups [ ]

Cotton wool[ ]

Others [ ]

Section C: Menstrual hygiene Practices of adolescent girls

11. What Type of sanitary material do you use during your period?

Cloth [ ]

Tampon [ ]

Sanitary pad [ ]

Menstrual Cup [ ]

Toilet paper [ ] Cotton wool [ ] others specific [ ]

11. b) Source of items used?.....

12. Do you change your absorbents while at school?

Yes [ ]

No [ ]

If yes, number of times changed…….

13. Do you reuse the sanitary Pads?

Yes [ ]

No [ ]

13 .Do you clean your genital area during menstruation?

Yes [ ]

No [ ]

14 .If yes to Q 13, How often do you clean your genital area during menstruation

Once a day[ ]

Twice a day [ ]

I do not clean at all [ ]

15. if yes to Q 13 What do you use to clean the genital area?

Plain water [ ]

Luke warm water [ ]

Soap and water [ ]

Antiseptics [ ]

16. How do you store sanitary protection materials?

Bathroom [ ]

Box [ ]

Bag etc. [ ]

Don't store [ ]

Store with routine clothes [ ]

Others [ ] specify……..

17. At school, how do you dispose sanitary material at school??

Burn it [ ]

Throw it in routine waste [ ]

School latrines [ ]

Sanitary Bucket [ ]

Others [ ]

18. Are there sanitary toilets/latrines facilities at school?

Yes [ ]

No [ ]

19. If yes to above question. Which are the facilities available?

Separate toilets to girls and boys [ ]

Changing rooms for girls [ ]

Bathrooms [ ]

20. Do you wash your hands after changing sanitary material?

Yes [ ]

No [ ]

21. Are there any restrictions placed on you during periods?

Yes [ ]

No [ ]

22. If yes mention the type of restriction attached to you during menstruation.

….....

Thank you so much for your time and participation in this study

Appendix 5: Observational Checklist

Name of the school: …… Location: ……

Total number of Girls in the school (all grades):……

1: Menstrual Hygiene Management Facilities/Materials

Category	YES	NO	Number available
Changing room for girls available			
Sanitary Materials Available			
Basins/Buckets Available			
Wash rooms next to girls changing room/latrines			
Water Available in washrooms			
Soap Available in Washrooms			

2: Latrines

Type of Latrine	YES	NO	Number Available
Latrines made from Permanent structure with bricks			
Made from Iron Sheet			
Hole No Superstructure			
Latrine with No Door and Key			
Larine Outdated/No functional			
Grass thatched/Mud Walls			
Latrines made of grass			
Latrine with wall but no roof			

3: Water Sources

Category	YES	NO
Not available		
Rarely available but not functioning		
Rarely available and functioning		
Some Schools have water source within school compound		
Water source within 1KM		
Water source more than 1KM		

Water source environment clean		

4: Handwashing

Category	YES	NO
Hand washing facility available		
Facility functioning and not damaged		
Soap/Detergent/Ash used		

5: Disposable facilities

Category	YES	NO	Number Available
Disposable facility available			
Normal Dustbin Specific sanitary pad receptacles Bucket			
Facility functioning and not damaged			
Facility well placed and accessible			

Appendix II: Approval Letter from the University

amref health africa

Amref Health Africa in Kenya

REF: AMREF – ESRC P1269/2022 **October 18, 2022**

Florence Mwangi
Amref International University
P.O. Box 27691 – 00506
Nairobi, Kenya
Tel: 0723468773
Email: florencemwangi28@gmail.com

Dear Florence Mwangi,

RESEARCH PROTOCOL: ASSESSMENT OF KNOWLEDGE AND MENSTRUAL HYGIENE PRACTICES AMONG ADOLESCENT GIRLS IN PRIMARY SCHOOLS IN NAROK SOUTH SUB COUNTY, NAROK COUNTY.

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

This is to inform you that the ESRC has reviewed and approved your protocol. Your application approval number is ESRC P1269-2022. The approval period is from October 18, 2022, to October 17, 2023, and is subject to compliance with the following requirements:

a) Only approved documents (including informed consents, study instruments, advertising materials, material transfer agreements, etc.) will be used.
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 of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to Amref ESRC within 72 hours.
e) Clearance for export of biological specimen must be obtained from the relevant government authorities for each batch of shipment/export.
f) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
g) In case of late renewal, the Amref ESRC shall not be held responsible for any severe adverse events (SAEs) that may occur as a result of research activities that were carried out after the expiry of approval.
h) Submission of an executive summary report within 90 days upon completion of the study to the Amref ESRC.
i) All government regulations for prevention and control of the spread of COVID-19 including social distancing, provision of personal protective equipment for participants and research assistants should be adhered to during data collection. All research assistants should be monitored for COVID 19 symptoms and referred for testing in case they present with symptoms.

amref health africa

Amref Health Africa in Kenya

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 and also obtain other clearances needed.

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

Yours sincerely,

AMREF - ESRC P.O. Box 30125-00100 NAIROBI 18 OCT 2022

Prof. Mohamed Karama
Chair, Amref ESRC
CC: Samuel Muhula, Monitoring & Evaluation and Research Manager, Amref Health Africa in Kenya.

Appendix III: NACOSTI Permit

REPUBLIC OF KENYA

NATfiDNAL CX lMlSSfiDN **FOR MîE1CE.TE€HNULCXrY** A CN1ł3VATICłh

Ref No: **549595**

Dsteof[:cue: łfAWoveœher/2o22

RESEARCH LICENSE

Tłib b to C“crtif's tkal htm FLURE"Xč“E 6'ASfBLIl MWANC•I of Ansrrf lateraaüoa•I tfai 'ccdt . has beea lAcased to coadact reseanG cs pw the pro+'Icioa oł' tGe hełeøce, Tocboolegs' and lnao\atioa Acc, 2013 (Re+'.2014) la "'ïarok on tãe lopłe: AžîSMSÜEhT UP 1UWLE0tîE AND tENSTRt/AL H¥”c.IENE PRAtTlcîEtî1 ONtî AOOLEžîcîENT c,tRLS IN PRIMAłt'Ł' StHCN3LS łN "XAüf3K MłŁ'TH žîUB C”UllhTY. 1ARč3Ñ Cîf3Łî1T'ï”. for tke peried eoÆag : IS/"ï.oveœber/2033.

Licen•c Nc: XAč ïfiTI/P/2Z/3I30I

Applicant Idmtiłicat m Number

Dircccur Geu<ral
NATIONAL COMMISSION FOR SCIENCE.TECHNOLOG'Y” & INNOVATION

Vwificaticn QR Cede

NOTE: This is a computer $•<nmałed License. Tu verify che auił+múcítş' of ihis üocunu•nL Scan ihe OR Code usîay OR scaaacr applivatien.

0•

Appendix IV: Approval Letter from Narok County

REPUBLIC OF KENYA

MINISTRY OF EDUCATION

State Department of Early Learning and Basic Education

FAX NO. 050-22391
When replying please quote;

Ref. CDE/NRK/RES/VOL1/297

COUNTY DIRECTOR OF EDUCATION
NAROK COUNTY
P.O BOX 18
NAROK

DATE: 16TH DECEMBER, 2022

TO WHOM IT MAY CONCERN

RE: RESEARCH AUTHORIZATION – FLORENCE MWANGI.

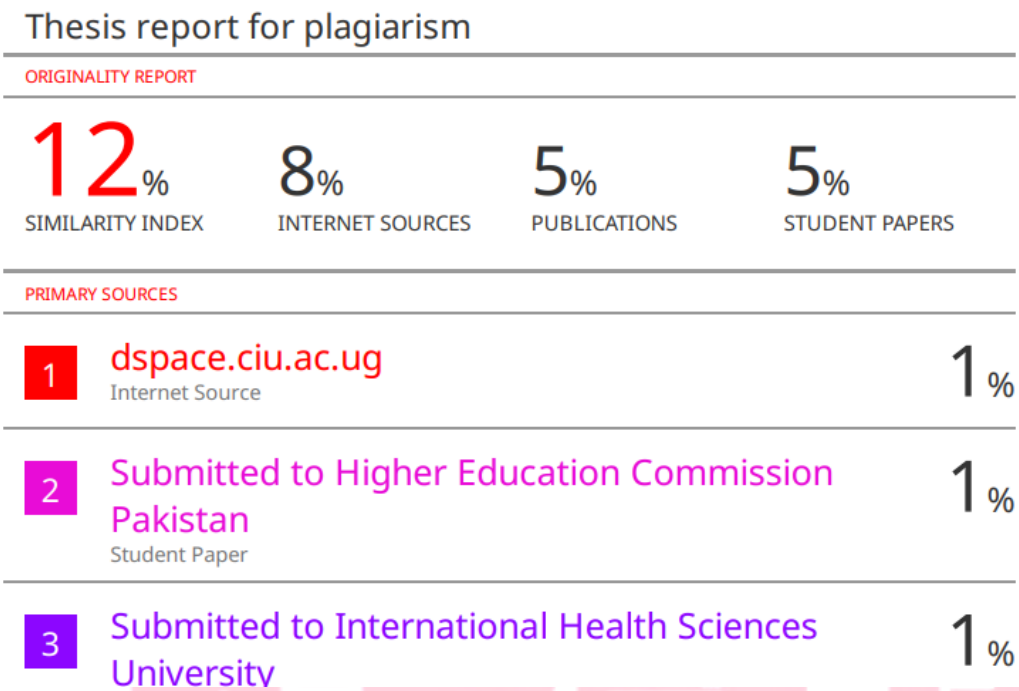
The above named is of AMREF International University.

She has been authorized to carry out research on ***"Assessment of Knowledge and Menstrual Hygiene Practices among adolescent girls in primary schools" in Narok South Sub County Narok County*** *for the period ending* **15/11/2023.**

Please accord her necessary assistance.

A.M. MAKORI
FOR: COUNTY DIRECTOR OF EDUCATION
NAROK

Appendix V: Similarity Report



Thesis report for plagiarism

ORIGINALITY REPORT

12%	8%	5%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	dspace.ciu.ac.ug Internet Source	1%
2	Submitted to Higher Education Commission Pakistan Student Paper	1%
3	Submitted to International Health Sciences University	1%

Appendix VI: Acceptance Letter for Publication

EAST AFRICAN MEDICAL JOURNAL
(ORGAN OF KENYA MEDICAL ASSOCIATION)
ESTABLISHED IN 1923

Our Ref: EAMJ/7//2024

8th July 2024

Ms. Florence Wambui Mwangi (Bsc. Public Health)
Projects Coordinator
Malteser International,
Kenya

Dear Ms. Mwangi,

KNOWLEDGE AND MENSTRUAL HYGIENE PRACTICES AMONG ADOLESCENT GIRLS IN PRIMARY SCHOOLS IN NAROK SOUTH SUB COUNTY, NAROK COUNTY, KENYA.

I am pleased to inform you that the above-referenced manuscript authored by yourself. **FLORENCE WAMBUI MWANGI, PROF.TAMMARY ESHO** and **DR. MARY JOY KAIMURI** has been accepted for publication in the East African Medical Journal and will appear in the next Issue of our Publication.

The galley proof will be forwarded for your approval in due course. Could you therefore not discuss your paper with the medical or lay press until we publish it.

Yours sincerely,

Dr. Paul Yonga
Editor-in-Chief

Kenya Medical Association, Chyulu Road, Off Ngong Road, Nairobi
Postal Address: P.O. Box 41632, 00100, GPO, Nairobi, Kenya
Tel: +254 722275695
Email: eamj@kma.co.ke
www.kma.co.ke