

**PRACTICES ON MENSTRUAL HYGIENE  
MANAGEMENT AMONG GIRLS AGED 9 TO 17 YEARS  
IN MATHIOYA SUB-COUNTY, MURANG'A COUNTY**

**NYARENCHI JANET BOSIBORI**

**A Thesis Submitted in Partial Fulfilment of the Requirement for Conferment of  
Degree of Master of Science in Sanitation in Meru University of Science and  
Technology, Kenya**

**2025**

## DECLARATION

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

EG407/201526/21

Signed: .....

Date: .....

**Nyarenchi Janet Bosibori**

## DECLARATION BY SUPERVISORS

This thesis has been submitted with our approval as university supervisors.

Signed: .....

Date: .....

**Dr. Mary Amatu, Ph.D.**

Meru University of Science and Technology, Kenya

Signed: .....

Date: .....

**Dr. Josephine Mutembei, Ph.D.**

Meru University of Science and Technology, Kenya

## **DEDICATION**

As I complete this milestone in my academic journey, I want to express my gratitude and love for the unwavering support that you (Eng. Joshua Mosigisi, Melissa Kwamboka and Lemmy Charana) have given me throughout my research work. To my daughter, Melissa Kwamboka, you have been a source of inspiration and motivation every step of the way. Your unwavering faith in me has pushed me to work harder and strive for excellence. To my son, Lemmy Charana, you have brought me joy and laughter during the moments of stress and exhaustion. Your boundless energy and enthusiasm have reminded me the importance of taking breaks and enjoying life. My husband, Eng. Joshua Mosigisi, thank you for your patience and understanding during the long hours I spent researching and writing, while still present in your life. This research work is not just an academic accomplishment for me but a testament to the love and support of my family. I dedicate this work to my beloved daughter and son with all my heart. May it serve as a reminder of the love and appreciation I have for each of you (Eng. Joshua Mosigisi, Melissa Kwamboka and Lemmy Charana).

## **ACKNOWLEDGEMENT**

First and foremost, I would like to express my sincere gratitude to Meru University of Science and Technology and the Bill and Melinda Scholarship for their financial support. I must also thank the Murang'a County Government and Mathioya Sub-county for allowing me to conduct this project in their region. A special thanks to my master's supervisors, Dr. Mary Amatu (PhD) and Dr. Josephine Mutembei (PhD), for the opportunity to be part of this project and always being there when I needed their support, reviewing my progress constantly, and guiding me through my master's studies. I thank my family for their support and the valuable discussions we had throughout my education.

## TABLE OF CONTENTS

<b>DECLARATION</b> .....	<b>ii</b>
<b>DEDICATION</b> .....	<b>iii</b>
<b>ACKNOWLEDGEMENT</b> .....	<b>iv</b>
<b>TABLE OF CONTENTS</b> .....	<b>v</b>
<b>LIST OF TABLES</b> .....	<b>viii</b>
<b>LIST OF FIGURES</b> .....	<b>ix</b>
<b>LIST OF APPENDICES</b> .....	<b>x</b>
<b>ABBREVIATIONS AND ACRONYMS</b> .....	<b>xi</b>
<b>OPERATIONAL DEFINITION OF TERMS</b> .....	<b>xiii</b>
<b>ABSTRACT</b> .....	<b>xvi</b>
<b>CHAPTER ONE: INTRODUCTION</b> .....	<b>1</b>
1.1 Background Information.....	1
1.2 Problem Statement.....	7
1.3 Justification of the Study.....	9
1.4 Research Questions.....	11
1.5 Research Objectives.....	11
1.5.1 Main objective.....	11
1.5.2 Specific objectives.....	11
1.6 Significance of the Study.....	12
1.7 Limitations.....	12
1.8 Delimitation.....	12
<b>CHAPTER TWO: LITERATURE REVIEW</b> .....	<b>14</b>
2.1 Introduction.....	14
2.2 Theoretical Framework.....	14
2.2.1 Social learning theory.....	14
2.2.2 Theory of planned behavior (TPB).....	15
2.3 Menstrual Hygiene Management.....	15
2.4 Personal Hygiene Practices During Menstruation.....	20
2.5 Menstrual Management Materials.....	23
2.6 Types of Disposal Methods Practiced Among Girls.....	33
2.7 Conceptual Framework.....	47
<b>CHAPTER THREE: RESEARCH METHODOLOGY</b> .....	<b>50</b>
3.1 Research Design.....	50
3.2 Study Variables.....	50
3.3 Study Location.....	50
3.4 Study Population.....	51
3.4.1 Inclusion criteria.....	51
3.4.2 Exclusion criteria.....	51
3.5 Sampling Technique.....	51
3.6 Sample Size Determination.....	51
3.7 Data Collection Procedure.....	52
3.8 Research Instrument.....	53
3.8.1 Questionnaire.....	53
3.9 Piloting the Questionnaire.....	54
3.10 Validity.....	54
3.11 Reliability.....	54
3.12 Data Analysis.....	54

3.13 Logistical and Ethical Considerations .....	56
<b>CHAPTER FOUR: RESULTS AND DISCUSSION.....</b>	<b>57</b>
4.1 Introduction .....	57
4.2 Demographic Characteristics of the Respondents .....	57
4.2.1 Respondents age .....	57
4.2.2 Respondents current education level .....	58
4.2.3 Respondents current living situation .....	59
4.2.4 Respondents religion .....	60
4.2.5 Respondents current school attendance rate .....	60
4.2.6 Respondents current school performance .....	61
4.3 Personal Hygiene Practices .....	62
4.3.1 Maintaining personal hygiene .....	62
4.3.2 Washing of hands during changing menstrual management materials .....	63
4.3.3 Frequency of change of menstrual management materials .....	64
4.3.4 Cleaning of genitalia during the menstrual period .....	65
4.3.5 Use of soap/ other cleaning agent during menstruation .....	66
4.3.6 Health risks associated with poor personal hygiene practices .....	67
4.4. Menstrual Management Materials .....	68
4.4.1 Type of menstrual management materials .....	68
4.4.2 Acquiring of menstrual management materials .....	70
4.4.3 Challenges in accessing menstrual management materials .....	70
4.4.4 Information/education on different menstrual management options .....	72
4.4.5 Feeling about the menstrual management materials .....	72
4.4.6 Other menstrual hygiene management materials .....	73
4.4.7 Sharing of menstrual management materials .....	73
4.4.8 Improvement in access to and use of menstrual hygiene products .....	74
4.5. Disposal Options of Menstrual Wastes .....	75
4.5.1 Access to proper disposal facilities .....	75
4.5.2 Dispose of menstrual management materials .....	76
4.5.3 Environmental impacts of improper disposal of menstrual management materials .....	77
4.5.4 Education or guidance on proper disposal methods .....	77
4.6 General Menstrual Hygiene Management Practices .....	78
4.6.1 Discussing menstrual hygiene management practices .....	78
4.6.2 Visiting the health facility for menstrual hygiene management .....	79
4.6.3 Improvement of menstrual hygiene management practices .....	80
<b>CHAPTER FIVE: CONCLUSION, RECOMMENDATIONS AND PUBLICATION .....</b>	<b>82</b>
5.1 Introduction .....	82
5.2 Summary of Findings .....	82
5.2.1 Personal hygiene practices among girls .....	82
5.2.2 Types of menstrual management materials used .....	83
5.2.3 Types of disposal mechanisms practiced among girls .....	83
5.3 Conclusion of the Study .....	84
5.3.1 Personal hygiene practices among girls .....	84
5.3.2 Type of menstrual management materials used .....	84
5.3.3 Types of disposal mechanisms practiced among girls .....	84
5.4 Recommendations of the Study .....	84
5.5 Publication .....	85
<b>REFERENCES .....</b>	<b>86</b>

<b>APPENDICES .....</b>	<b>114</b>
-------------------------	------------

## LIST OF TABLES

Table 3. 1 Sample Matrix .....	52
Table 4. 1 Respondents Current Education Level .....	59
Table 4. 2 Respondents current living situation .....	59
Table 4. 3 Respondents current school attendance rate .....	61
Table 4. 4 Frequency of changing menstrual management material .....	64
Table 4. 5 Acquisition of menstrual management materials .....	70
Table 4. 6 Information on different menstrual management materials .....	72
Table 4. 7 Feeling about the current menstrual management material used .....	72
Table 4. 8 Willingness to use other menstrual management materials .....	73
Table 4. 9 Access to and use of menstrual management materials .....	74
Table 4. 10 Pit latrines .....	76
Table 4. 11 Awareness on effects of inappropriate disposal of menstrual waste .....	77
Table 4. 12 Menstrual waste disposal methods .....	77
Table 4. 13 Seeking advice at health facilities .....	79
Table 4. 14 Improvement on menstrual hygiene management practices .....	80

## LIST OF FIGURES

Figure 2.1 Menstrual tampons .....	29
Figure 2.2 Menstrual cup .....	30
Figure 2.3 Reusable sanitary pads .....	31
Figure 2.4 Disposable sanitary pad .....	33
Figure 2.5 Chute disposal system .....	44
Figure 2.6 Disposal bins .....	45
Figure 2.7 Conceptual Framework .....	47
Figure 4. 1 Respondents age .....	58
Figure 4. 2 Respondents Religion .....	60
Figure 4. 3 Respondents current school performance .....	61
Figure 4. 4 Personal hygiene practices during menstruation .....	62
Figure 4. 5 Washing hands during change of menstrual management materials .....	63
Figure 4. 6 Cleaning of genitalia during menstruation .....	65
Figure 4. 7 Use of soap or other cleaning agent during menstruation .....	66
Figure 4. 8 Health risks associated with poor Personal hygiene practices .....	67
Figure 4. 9 Type of menstrual management materials used .....	69
Figure 4. 10 Challenges faced in accessing menstrual management materials .....	71
Figure 4. 11 Sharing of menstrual management materials .....	73
Figure 4. 12 Access to appropriate disposal facilities .....	75
Figure 4. 13 Discussing menstrual hygiene management practices .....	78

## LIST OF APPENDICES

Appendix A. Map of Mathioya Sub-County .....	114
Appendix B. Consent Letter .....	115
Appendix C. Questionnaire .....	116
Appendix D. Plagiarism report .....	121
Appendix E. Journal article .....	122

## ABBREVIATIONS AND ACRONYMS

AVE	Average Variance Extracted
DSK	Dushtha Shasthya Kendra
CR	Composite Reliability
EcoFem	Eco-friendly Feminism
KPHC	Kenya Population and Housing Census
KWE	Korea Women's Environmental
LMIC	Low Middle Income Countries
MH	Menstrual Hygiene
MHM	Menstrual Hygiene Management
MMM	Menstrual Management Materials
MoE	Ministry of Education
MIRERC	Meru University of Science and Technology Institutional Research Ethics Review Committee
MUST	Meru University of Science and Technology
RTI	Reproductive Tract Infection
SDG	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
SSIDC	Swedish International Development Cooperation
STI	Sexually Transmitted Infection
TPB	Theory of Planned Behavior
TSS	Toxic Shock Syndrome
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UTI	Urinary Tract Infection

WASH      Water Sanitation and Hygiene

WHO      World Health Organization

## OPERATIONAL DEFINITION OF TERMS

Adolescents	Refer to individuals typically between the ages of 10 and 19, marking a crucial developmental phase bridging childhood and adulthood. This period is characterized by physical, cognitive, emotional and social changes as they navigate their identities, relationships and responsibilities. They often undergo puberty, experiencing significant bodily transformations including the development of secondary sexual characteristics and hormonal fluctuations. This age is pivotal for laying the foundation of future health habits, emotional well-being and social interactions hence shaping their trajectories into adulthood (Gultie <i>et al.</i> , 2014).
Disposal	Pertains technologies, types and methods employed to dispose used Menstrual Management Materials among menstruating women and adolescent girls. These methods can vary among individuals. Proper disposal practices are essential to maintain environmental cleanliness, prevent pollution and mitigate health hazards (Hameed <i>et al.</i> , 2024).
Menstrual Hygiene Management practices	Encompass a range of behaviors and interventions aimed at promoting the physical, psychological and social well-being of individuals experiencing menstruation. This includes access to menstrual products, sanitation facilities and education on menstrual health. Implementing good MHM practices involves ensuring the availability of hygienic materials, facilities and information as well as fostering a

supportive environment that respects the dignity and rights of menstruating individuals (Deriba *et al.*, 2022).

#### Menstruation

Is a natural biological process experienced by people with uteruses, typically occurring monthly when the lining of the uterus sheds in the absence of fertilization, resulting in vaginal bleeding. This menstrual cycle is regulated by hormonal fluctuations and usually lasts between 21 to 35 days, though variations are common. This process marks a significant aspect of reproductive health and is often accompanied by physical and emotional changes such as cramping, mood swings and fatigue (Critchley *et al.*, 2020).

#### Personal hygiene

Refers to the practices and behaviors individuals undertake to maintain cleanliness and promote overall health and well-being. This encompasses various activities such as bathing, hand washing and wearing clean clothing. Effective personal hygiene habits are important for preventing the spread of infections, minimizing body odor and preserving skin health. Additionally, personal hygiene contributes to individual's self-esteem, social interactions and overall quality of life (Deriba *et al.*, 2022).

#### Reproductive Tract Infections (RTIs)

Are infections that affect the reproductive organs and can be caused by bacteria, viruses, fungi or parasites. These infections may affect various parts of the reproductive system including the uterus, cervix and vagina. Common RTIs include sexually transmitted infections (STIs) such as genital

herpes as well as non-sexually transmitted infections like yeast infections and bacterial vaginosis. RTIs can lead to a range of symptoms including vaginal discharge, genital itching or pain, painful urination, pelvic pain and infertility if left untreated (Ademas *et al.*, 2020).

Water, Sanitation and Hygiene (WASH) facilities Encompass infrastructure, services and behaviors aimed at ensuring access to safe and clean water for washing, functional and private sanitation facilities with proper disposal mechanisms for used menstrual products, and hygiene facilities such as hand washing stations with soap. Ensuring access to WASH facilities promotes good menstrual hygiene practices, reduces the risk of infections and contributes to the overall health and dignity of menstruating women and adolescent girls (Hussein *et al.*, 2022).

## ABSTRACT

Menstrual Hygiene Management is an essential component of women's lives. More than 50% of teenage girls in low and middle income countries (LMICs) engage in inadequate Menstrual Hygiene Management (MHM) practices with a larger proportion in rural areas. Limited information regarding the magnitude of the problem of Menstrual Hygiene Management among adolescent females from these areas is known. In addition, limited data regarding the present-day approaches to Menstrual Hygiene Management has been recorded. Majority of published research papers on Menstrual Hygiene Management have primarily examined the types of Menstrual Management Materials as the main obstacles to achieving good MHM practices. This study was important to gain a deeper understanding of MHM practices among adolescent females below 18 years of age. This study's objectives were to evaluate the existing personal hygiene habits, the type of menstrual management material utilized, and the disposal techniques employed to improve menstrual hygiene practices and overall well-being among adolescent girls in Mathioya sub-county, Murang'a County. The study adopted a descriptive cross-sectional design and utilized a stratified random sampling technique. For participation, the study recruited a cohort of 387 adolescent females aged 9 to 17 years. Findings showed that 80% of the girls continuously adhered to appropriate personal hygiene practices by showering regularly, whereas 20% held a divergent viewpoint. Ninety-four (94%) of the female participants in the study reported changing their menstrual products every 4–6 hours, whereas 6% changed them twice within that time frame, depending on the intensity of their menstrual flow. Majority (98%) utilized soap and water for hand washing, whereas a small minority, around 2%, relied solely on water. Eight-six (86%) of the female participants utilized a cloth, soap, and water to cleanse their genitalia, whereas 14% relied solely on a cloth and water. In addition, almost all (95%) of these girls used disposable sanitary pads to efficiently manage their menstrual periods. Because of poverty, they faced numerous challenges in acquiring these items (89%). Only 92% of the female participants showed a preference for disposable sanitary pads, despite having received information about various menstrual management options. Due to the issue of period poverty, 85% of people have stated that the government and ministry of education should offer complimentary sanitary products to meet their needs. In the end, 97% of participants indicated that the most efficient approach for disposing of menstrual waste was to dispose of it in pit latrines. However, only 10% had the opportunity to use such latrines, and a substantial 83% of those individuals were unaware of the adverse repercussions associated with the inappropriate disposal of menstrual waste. Following the study findings, the research recommends that the State Department of Basic Education in the MOE should include menstrual hygiene management into the National School Health strategy as part of their education strategy, with the goal of enhancing personal hygiene behaviors among girls. The Murang'a county government and school administration should collaborate to offer support in supplying sanitary items and undergarments to adolescent females. Additionally, schools should provide materials for the proper disposal of menstrual waste and explore alternate alternatives to minimize waste.

## CHAPTER ONE: INTRODUCTION

This chapter presents background information, problem statement, justification, research questions, objectives, study significance, limitations, and delimitations.

### 1.1 Background Information

Menstrual hygiene management encompasses the actions and circumstances that guarantee females may handle their menstrual cycle in a sanitary, secure, and respectful way (Elledge *et al.*, 2018). This encompasses the provision of secure and reasonably priced menstrual management materials or products for the purpose of collecting or absorbing blood, the ability to change them in a private setting, the availability of soap and clean water for personal hygiene, and the provision of safe and easily accessible sanitary facilities for the disposal of used menstrual management materials. Furthermore, it is crucial to provide them with pertinent information about menstruation and its proper handling (UNICEF, 2019). Furthermore, ensuring proper menstrual hygiene management necessitates the inclusion of several key elements: hygienic absorbents, regular changing of absorbents, bathing, proper disposal, privacy for managing menstruation, and appropriate disposal of used menstrual management materials (Ahmed Shallo *et al.*, 2020).

Adolescent females in schools face a significant challenge worldwide. Many schools suffer from inadequate water, sanitation, and hygiene facilities, as well as insufficient information on puberty. This causes anxiety and humiliation for students who have menstrual bleeding, leading to high rates of school absenteeism. The necessity of maintaining concealment from their own family members, along with the need to wash and dry these reusable menstrual cloths, compelled the girls to stay up late and wake up early. They took this action to conceal the clothes from their family members. These factors significantly added to the difficulties faced by females in managing their menstrual cycles. Poor menstrual hygiene management habits have resulted in negative

health consequences associated with menstruation, such as reproductive tract infections (Rossouw *et al.*, 2021). Poor management of menstrual hygiene can have detrimental effects on various aspects of human rights, particularly in the areas of sanitation, health, water, education, and employment (Kaur *et al.*, 2018). Therefore, ensuring proper menstrual hygiene management is essential for upholding these rights. However, there is limited empirical information available to illustrate the extent of issues related to inadequate menstrual hygiene management (MHM). Hence, MHM practices are crucial for comprehending the prevalence of inadequate MHM among girls aged 9 to 17 years (Rupe *et al.*, 2022).

Menstruation signifies the initiation of a girl's reproductive phase and is therefore a regular and inherent occurrence in the maturation of the female body into maturity. The onset of this condition often occurs during the age range of 9 to 17, although there are cases when it may manifest earlier or later in certain girls (Lee, 2021). Hereditary variables, environmental factors, nutritional status, overall health, and physical activity all contribute to the variation in the frequency of this process (Rakic, 2020). Menstruation typically has a monthly occurrence and can persist for duration of 2–7 days. Throughout this period, a female's body undergoes a variety of physiological and hormonal transformations, typically characterized by abdominal cramps, bloating, breast tenderness, mood swings, and exhaustion. These symptoms have a substantial impact on the well-being of females.

For instance, certain societies regard the commencement of menstruation as a natural and customary phenomenon, neither openly discussed nor shamed. People view it as a traditional event that entails specific customs and rituals, carrying expectations for roles and obligations that signify readiness for sexual or marital involvement (Kawata *et al.*, 2022).

In certain regions of Africa, Asia, and the Pacific, the commencement of menstruation signifies the transition into adulthood, womanhood, and the ability to bear children (Belayneh *et al.*, 2019). On the other hand, certain cultures associate menstruation with feelings of shame, impurity, taboos, limitations, and misunderstandings (Amatya *et al.*, 2018). Their society prohibits menstruating girls from participating in any religious or significant events. They were prohibited from making physical contact with other individuals and inanimate items. Additionally, the village compelled them to live outside, like in the livestock stable, during their menstruation. The restrictions mostly stemmed from the mistaken belief that menstrual blood is unsanitary, leading to the perception that women and bleeding girls are filthy (Hennegan *et al.*, 2019).

Similarly, in Ghana, religious activities prohibited women experiencing menstruation. Menstruation was considered taboo, and there was a widespread misunderstanding that women and girls who were menstruating were impure. These cultural taboos and misconceptions have led to a culture of silence. Moreover, this has resulted in challenges for adults to provide education to adolescent girls regarding menstruation prior to its commencement (Mohammed *et al.*, 2020). Asumah *et al.* (2022), state that Northern Ghana prohibits menstruating women from cooking or sharing a bed with their husbands. However, these misunderstandings have a negative impact on gender equality, access to education, health, well-being, fairness, empowerment, and human rights.

Consequently, the process of menstruation has become a perplexing and emotionally charged phase for several girls as they undergo the journey into womanhood, impeding their ability to handle their menstrual cycle with grace and respect (Chandra-Mouli, 2017). Nevertheless, the implementation of MHM varies based on factors such as adolescents' comprehension of menstruation, the presence of appropriate facilities, and the social or cultural context (Asumah *et al.*, 2022). Furthermore, individual preferences

and levels of comfort significantly influence the adoption of MHM activities. Furthermore, these habits vary among girls based on their geographical location, whether they are at their residence or outside of it (Kaur *et al.*, 2018). Nevertheless, these girls appear to have insufficient information and expertise about menstruation. Therefore, it is crucial to provide girls with precise knowledge and instruction regarding menstruation hygiene, along with the availability of menstruation management materials and WASH facilities (Torondel *et al.*, 2018).

Over 50% of adolescent girls in developing nations exhibit inadequate menstrual hygiene management, primarily among those residing in rural regions and attending public schools. This is due to insufficient assistance from educators, peer harassment, insufficient support from family, and a lack of societal acceptance for alternative menstrual products. Furthermore, economic difficulties make it difficult to afford sanitary products, and inadequate water and sanitation facilities in schools and communities exacerbate the problem (Kuhlmann *et al.*, 2017). Kumbeni *et al.*'s (2020) study in Northern Ghana confirms the persistent lack of menstrual hygiene facilities in basic schools.

The menstrual hygiene management (MHM) sector lacks adequate hygiene practices, despite their widespread availability. For instance, over 57 percent of women and young girls who experience menstruation in India produce approximately 12 million tons of garbage annually. As a result of insufficient and easily reachable sanitary facilities, they incinerate or reuse sanitary products during menstruation. However, it takes more than 800 years for sanitary pads to undergo decomposition. Consequently, this practice results in the contamination of soil and air, which in turn has a negative impact on the food chain (Elledge *et al.*, 2018).

Reports claim that young girls and other menstruating women dispose of these sanitary pads. However, these pads obstruct sewer systems, hence endangering the lives of sanitation personnel (Ahmed Shallo *et al.*, 2020). A significant majority of the female high school students in Ambo City, Ethiopia, do not have access to safe menstrual hygiene management (MHM). Nevertheless, MHM behaviors vary among these females based on factors such as age, frequency of discussing menstruation with their mothers, dads' level of education, and the source of information regarding menses and other aspects of MHM among adolescent girls. Adolescent girls frequently lack an understanding of menstrual hygiene management (MHM) practices, resulting in the use of inappropriate materials and inadequate hygiene practices during their period (Nalugya *et al.*, 2020).

Women and adolescent girls in many regions, particularly low-resource countries like Nigeria, Democratic Republic of Congo (DRC), Ethiopia, Ghana and India lack comprehensive biological knowledge about menstruation (Rossouw, I., *et al.*, 2021). The mothers' inability to transmit pertinent knowledge to their children stems from their own insufficient understanding and reticence in addressing menstruation-related subjects with adolescent girls (Swe, Z. Y., *et al.*, 2022). A significant proportion of females in Nigeria were unaware of the etiology of menstruation (Fehintola *et al.*, 2017). In Ghana, a significant number of girls lack knowledge about the origin of menstrual blood (Nsomo *et al.*, 2020). The lack of comprehensive biological data on MHM is concerning, as it holds significant importance (Hennegan *et al.*, 2022).

In Uganda, Kansime *et al.* (2020) conducted a separate study which revealed that females had limited knowledge about menstruation and often relied on unsanitary items like leaves and newspapers. Additionally, the study revealed that adolescent females who had received instruction on menstrual hygiene management (MHM) exhibited enhanced

understanding and were more inclined to utilize suitable MH products throughout their menstrual periods. Consequently, they needed further knowledge regarding menstruation and its handling, as well as access to cost-effective tools for managing menstruation, in order to ensure the practice of safe menstrual hygiene management. To do this, it is necessary to raise awareness in the local dialect of the target population, as many females have limited literacy skills (Ahmed Shallo *et al.*, 2020).

In Kenya, as in many other developing countries, menstrual hygiene management (MHM) is a significant challenge for adolescent females (Shenkman, J. L., *et al.*, 2023). The WASH, public health, and education sectors have not adequately addressed the significant issues associated with MHM. A study among females from pastoralist communities in Kenya has revealed the presence of inadequate menstrual hygiene management (MHM) practices. The school provided the girls with sanitary towels in this instance, but the distribution of these supplies was irregular. However, these girls exhibited a delay of over 6 hours in changing their absorbents, and those who used reusable absorbents stored them in unsanitary and concealed locations (Korir *et al.*, 2018).

By using menstrual hygiene materials and replacing them 3–8 times daily, girls in Kibera demonstrated satisfactory menstrual hygiene management behaviors (Mokaya *et al.*, 2022). The Gates Foundation's report, titled "Menstrual Health in Kenya," reveals that 65% of women and teenage girls in Kenya lack the financial means to purchase sanitary pads, and 42% of school-going girls have never had access to sanitary pads. The majority of people choose unsanitary handmade substitutes, such as rags, mattress scraps, blankets, tissue paper, and cotton wool. This empirical observation corroborates the perspective that girls residing in rural regions are susceptible to harm as a result of inadequate access to sanitary pads.

As a result, the objective of this study was to assess the strategies used for menstrual hygiene management among female individuals aged 9 to 17 years in Mathioya Sub-County, located in Murang'a County. This study resulted in the development of suitable interventions and strategies at both local and national levels to ensure the provision of essential facilities, education, and utilities for the effective implementation of menstrual hygiene management practices among girls.

## **1.2 Problem Statement**

Effective management of menstrual hygiene is essential for developing strategies to advance equal access to education, gender equality, women's empowerment, health, and environmental sustainability in accordance with the Sustainable Development Goals (SDGs). However, it presents considerable obstacles for numerous adolescent girls in low-resource environments (Alam *et al.*, 2022).

Menstrual Hygiene Day was established on May 28th to increase awareness of the challenges faced by adolescent girls due to menstruation and advocate for solutions to address these challenges. Despite these efforts, a significant proportion of adolescent girls lack sufficient prior information about menstruation and the proper sanitary procedures connected with it, leading to unsatisfactory menstrual hygiene practices (Hema-Priya *et al.*, 2017). Hennegan *et al.* (2016) conducted a study that reveals over 50% of teenage girls in low- and middle-income countries (LMICs) engage in inadequate menstrual hygiene management (MHM) practices, with a larger proportion in rural areas compared to urban areas.

Engaging in certain hygienic practices during menstruation has resulted in a higher likelihood of getting reproductive tract infections (RTIs) (Baker *et al.*, 2017), urinary tract infections (UTIs) (Zulaika *et al.*, 2019), and lower rates of school attendance (Mirro *et al.*, 2018). Hence, inadequate menstrual hygiene practices can directly or indirectly

affect the achievement of Sustainable Development Goals 3, 4, 5, and 6 (Sharma *et al.*, 2017). Coast *et al.*'s study demonstrates how managing menstrual hygiene can have non-physiological implications for young girls who are menstruating. According to Coast *et al.* (2019), if a girl lacks sufficient knowledge about menstruation, her first experience of it might be distressing and unpleasant. Menstruation can also impact women's involvement in social and religious activities as a result of cultural norms (Deriba *et al.*, 2022). Individually, this can impact the self-esteem of girls (Girod *et al.*, 2017).

Sebert *et al.* (2020) state that there is a scarcity of information regarding the magnitude of the problem of menstrual hygiene among low-income adolescent females. Furthermore, there is a scarcity of data regarding present-day approaches to menstrual hygiene management (Hennegan, 2018). The majority of published research papers on menstrual hygiene management (MHM) have primarily examined the types of absorbents used as the main obstacles to achieving good MHM practices. In addition, the studies have focused on school-based approaches, resulting in insufficient research on community-based approaches (Mokaya *et al.*, 2022).

Due to the scarcity of data on menstrual hygiene management (MHM) practices, it is unclear how girls aged 9 to 17 years in Mathioya sub-county, Murang'a County, manage their menstrual hygiene. However, Shallo *et al.* (2020) have observed that girls below 18 years of age are more likely to engage in unsafe MHM practices compared to those who are 18 years or older. The lack of sufficient understanding regarding MHM practices among this particular demographic may lead to negative health consequences and psychological difficulties for these girls. Consequently, there is a lack of research that specifically examines the behaviors of teenage girls in Mathioya sub-county, Murang'a County. The objective is to identify the current difficulties, deficiencies, and potential for enhancing menstrual hygiene practices and overall welfare among teenage girls in the

area. This study aims to contribute to the advancement of specific interventions and policies that can have a positive influence on the menstrual health and empowerment of adolescent girls in Mathioya sub-county, Murang'a County.

### **1.3 Justification of the Study**

Menstrual hygiene management (MHM) is highly significant. Tackling MHM directly contributes to the achievement of Sustainable Development Goal 3 (SDG-3), which focuses on promoting good health and well-being. Poor menstrual hygiene management (MHM) might hinder the achievement of SDG-4, which aims to ensure quality education, by indirectly contributing to school absenteeism. The presence of a gender discrepancy will impede the achievement of SDG-5, which aims to advance gender equality and empower women. SDG 6 aims to ensure accessibility and long-term conservation of water and sanitation.

The adoption of sufficient and proper menstrual hygiene management (MHM) would have a significant effect on lowering maternal mortality. Menstrual hygiene management practices have been a substantial difficulty in several regions of the world, particularly in rural and low-income communities such as Mathioya Sub County in Murang'a County. Thus, the objective of this study was to gain a deeper understanding of menstrual hygiene management habits among adolescent females in Mathioya sub-county.

The findings can be valuable in formulating strategies to enhance MHM practices, given its association with significant elements such as public health significance, educational influence, social and cultural aspects, and policy advancement potential. First and foremost, there is a close connection between MHM and the outcomes and effects on public health. Inadequate management of menstrual hygiene can result in significant health consequences, such as reproductive tract infections (RTIs) and urinary tract infections (UTIs). Gaining insight into the prevailing MHM practices in the Mathioya

sub-county is critical for recognizing health hazards and formulating targeted interventions to improve hygiene practices and health outcomes. Addressing these concerns can help reduce the prevalence of these health issues among teenage girls. Moreover, MHM has a significant impact on girls' education.

Poor management of menstrual hygiene can result in absence from school, less engagement, and increased rates of discontinuation among female students. The objective of this study is to assess the impact of menstrual hygiene management on the educational experiences of girls in Mathioya sub-county. We can use the study's findings to develop strategies that foster a nurturing and inclusive educational environment. These measures will help girls safely and respectfully manage their menstruation, leading to enhanced attendance, academic performance, and student retention rates in schools. Furthermore, there is a growing recognition of the importance of policies and programs that promote menstrual hygiene management.

In order to design effective policies, it is essential to have reliable and comprehensive data on existing practices, difficulties, and requirements. This project will yield significant data to guide local and national policy decisions, promoting the allocation of resources for facilities and education to enhance menstrual hygiene. Advocates can use the results as a foundation to advocate for improved sanitation amenities at educational institutions, affordable and easily accessible menstrual products, and comprehensive menstrual education initiatives. The study's findings may also enhance the existing knowledge on menstrual hygiene management practices in rural parts of Kenya. The potential impact on public health, education, and policy development justifies the study on menstrual hygiene management (MHM) habits among girls aged 9 to 17 years in Mathioya sub-county, Murang'a County.

The study intends to enhance the overall well-being of adolescent girls by focusing on these crucial areas. It seeks to enable them to manage their menstruation in a way that upholds their dignity and does not negatively impact their health, education, or social status. The results of this study will be crucial in directing programs and policies that encourage improved menstrual hygiene management (MHM) and facilitate the comprehensive development of girls in this particular area.

#### **1.4 Research Questions**

- i. What are the personal hygiene practices among adolescent girls aged 9 to 17 years in Mathioya Sub-County?
- ii. What types of Menstrual Management Materials are commonly used by adolescent girls aged 9 to 17 years in Mathioya Sub-County?
- iii. What disposal methods are adopted among adolescent girls aged 9 to 17 years in Mathioya Sub-County?

#### **1.5 Research Objectives**

##### **1.5.1 Main objective**

To investigate menstrual hygiene management practices among girls aged 9 to 17 years in Mathioya Sub-County, Muranga County.

##### **1.5.2 Specific objectives**

- i. To establish personal hygiene practices among girls aged 9 to 17 years in Mathioya Sub-County.
- ii. To investigate the type of Menstrual Management Materials used among girls aged 9 to 17 years in Mathioya Sub-County.
- iii. To examine types of disposal methods practiced among girls aged 9 to 17 years in Mathioya Sub-County.

## **1.6 Significance of the Study**

The findings of this study had important implications for policy and practice efforts to enhance the health and well-being, educational quality, and gender equality of teenage girls in the sub county. The results could be used to guide interventions aimed at enhancing menstrual hygiene management (MHM) behaviors among teenage girls in the sub county. These interventions involved providing information on MHM and improving access to adequate water, sanitation, and hygiene (WASH) facilities. The study's findings also enhanced MHM practices among adolescent females, leading to improved school attendance, reduced health issues from improper disposal of MHM materials, and an expanded understanding of MHM practices in rural parts of Kenya among adolescent females residing in the Mathioya sub-county, as well as policymakers and stakeholders.

## **1.7 Limitations**

There wasn't enough literature available in the field of study that addressed this topic adequately. The language barrier is another obstacle that may impact the quality and extent of the research findings. To address these concerns, the researcher undertook the task of instructing a community health worker from Mathioya sub-county on the research objectives. The research assistant would therefore be available to assist participants who are unable to effectively communicate in either English or Kiswahili.

## **1.8 Delimitation**

The study's delimitations spell out the exact limits and restrictions that keep some parts from being included. This study only looked at girls between the ages of 9 and 17 who lived in the Mathioya sub county, which is in Murang'a County. The study only looked at how people manage their menstrual hygiene (MHM). Subsequently, the results of this study may not apply to people outside of the specified age range, they can't be used to make predictions about other sub-counties in the county or other parts of the country, and

they may only apply to habits related to managing menstrual hygiene. Understanding these limitations improved the scope and quality of future research on how teenage girls manage their menstrual hygiene.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter provided an overview of current research on menstrual hygiene management practices, with a specific focus on three main areas: personal hygiene habits during menstruation, the types of materials used for menstrual management, and the means of disposing of old menstrual management materials.

### **2.2 Theoretical Framework**

This study was based on two theories: The Social Learning Theory and the Theory of Planned Behavior. These theories focus on people's behavior and the factors that shape it.

#### **2.2.1 Social learning theory**

Previous learning experiences influence an individual's behavior, according to the Social Learning Theory (Ajzen, 2018). According to the theory, individuals acquire new behaviors by observing and copying others, undergoing conditioning, and obtaining feedback and reinforcement for their own actions (Yilmaz *et al.*, 2020). Within the framework of menstrual hygiene management practices, this theory was applicable in comprehending how girls acquire knowledge and embrace appropriate menstrual hygiene practices. Females, for example, can learn about menstrual hygiene routines by watching their mothers, elder sisters, or peers and then mimicking their actions. Positive reinforcement, such as providing praise for adopting appropriate hygiene routines, can strengthen this behavior and encourage additional learning. Additionally, it can aid in identifying potential obstacles to the appropriate maintenance of menstrual hygiene, such as societal conventions or cultural beliefs that hinder open dialogue regarding the proper management of menstruation.

### **2.2.2 Theory of planned behavior (TPB)**

The Theory of Planned Behavior (TPB) is a social cognitive theory that elucidates human conduct by considering the impact of attitudes, social norms, and perceived behavioral control. This theory posits that individuals are driven to participate in actions that they perceive as advantageous. Their attitudes towards the behavior, their perception of societal norms surrounding the behavior, and their confidence in their ability to regulate their behavior influence their inclination to engage in such actions.

We employed the Theory of Planned Behavior (TPB) to examine the determinants that influence adolescent girls' intention to adopt appropriate menstrual hygiene management (MHM) practices. For instance, the way individuals feel about using menstrual hygiene materials, their perception of societal norms related to MHM practices, and their confidence in being able to manage their menstrual hygiene practices will impact their intention to adopt appropriate MHM practices. By understanding these traits, both theories can help come up with ways to treat these behaviors and encourage positive change, which will make it easier for teenage girls to adopt healthy MHM practices. The Social Learning Theory places significant emphasis on the act of seeing and imitating others, whereas the Theory of Planned Behavior underscores the significance of attitudes, subjective norms, and perceived behavioral control.

### **2.3 Menstrual Hygiene Management**

Menstrual hygiene management encompasses a variety of behaviors and conditions aimed at assisting adolescent girls in managing their menstrual periods in a clean, safe, and dignified manner (Majeed, J., *et al.*, 2022). Essential components of this provision include the availability of safe and affordable materials for managing menstruation, private facilities for changing, access to soap and clean water for washing, and safe and easily accessible facilities for disposing of used menstrual materials (Sommer, M., *et al.*,

2021). Furthermore, education on menstrual hygiene practices and proper disposal methods is crucial to ensuring the overall well-being of adolescent girls (Schmitt, M. L., *et al.*, 2017). Providing access to information and resources can help reduce stigma and empower girls to confidently manage their periods (Elledge *et al.*, 2018).

UNICEF (2019) emphasizes the need to provide people with essential information about menstruation and how to manage it. Managing menstrual hygiene also requires the following: using sanitary absorbents, replacing them regularly and consistently, taking regular baths, using the right disposal methods, keeping your period private, and getting rid of used menstrual management materials in the right way (Ahmed Shallo *et al.*, 2020). Adolescent females globally encounter a significant obstacle in effectively handling their menstrual hygiene (Shumie, Z. S., *et al.*, 2022). Many educational institutions lack adequate water, sanitation, and hygiene facilities, which lead to issues related to adolescence, learning, and the embarrassment and stigma associated with menstrual blood leakage (Daniel, N., *et al.*, 2023). Limited resources can result in girls missing school during their periods, impacting their education and overall well-being (Betsu, B. D., *et al.*, 2024).

In order to address this issue, it is crucial for governments and organizations to prioritize providing access to proper menstrual hygiene management resources in schools. As a result, there are high rates of school absenteeism (Van Eijik *et al.*, 2016). Due to their need for privacy from their family members and the need to clean and dry these reusable menstrual cloths, the girls adopted late-night and early-morning sleep schedules to prevent family members from seeing the cloths (Mohammed, S., *et al.*, 2020). This issue contributed to the difficulties they faced in successfully managing their menstrual cycles. Inadequate menstrual hygiene management has resulted in negative health consequences associated with menstruation, such as the development of reproductive tract infections

(Mehta *et al.*, 2021). Inadequate management of menstrual hygiene (MHM) can have detrimental effects on social and economic human rights, particularly in areas such as sanitation, health, water, education, and employment (Kaur *et al.*, 2018). However, there is little information to substantiate the extent of issues related to inadequate menstrual hygiene management (MHM) (Sharma *et al.*, 2020). Hence, it is crucial to examine MHM practices to ascertain the magnitude of inadequate MHM among females aged 9 to 17 (Rupe *et al.*, 2022). Understanding the prevalence of inadequate MHM is essential for implementing effective interventions and policies to address this issue and improve the overall well-being of women and girls. Research in this area can help inform programs that promote proper menstrual hygiene practices and empower individuals to manage their menstruation with dignity and confidence (Sharma *et al.*, 2020). However, the way menstrual hygiene management (MHM) is carried out differs due to factors such as teenagers' understanding of menstruation, the availability of suitable facilities, and the social or cultural environment they are in (Asumah *et al.*, 2022).

Furthermore, personal preferences and varying degrees of comfort have a significant impact on the choice of MHM procedures (Sharma *et al.*, 2020). Moreover, these practices exhibit variations among girls depending on their geographic location, whether it is within their homes or outside of households (Kaur *et al.*, 2018).

Nevertheless, the knowledge and understanding regarding menstruation seem to be inadequate for these adolescent females. Therefore, it is crucial to provide accurate information and education about menstrual hygiene, as well as ensure the availability of menstrual management materials and WASH facilities for females (Torondel *et al.*, 2018). Menstrual hygiene management (MHM) behaviors differ among females due to factors such as age, frequency of discussing menstruation with their mothers, dads' level of education, sources of information about menstruation, and other aspects of Menstrual

Hygiene Management among adolescent girls. It is important to consider these factors when designing interventions to improve menstrual hygiene practices among adolescent females (Ha *et al.*, 2022).

By addressing these unique factors, we can better tailor education and resources to meet the specific needs of this population and ultimately promote better menstrual health outcomes (Hennegan *et al.*, 2019). A considerable proportion of teenage females lack adequate knowledge about menstrual hygiene management (MHM) practices, leading to the use of inappropriate materials and inadequate hygiene practices throughout their menstrual cycles (Nalugya *et al.*, 2020).

In addition, cultural beliefs and taboos surrounding menstruation can also impact how girls perceive and manage their periods (Sahiledengle *et al.*, 2022). By understanding and addressing these cultural factors, interventions can be more effective in promoting proper menstrual hygiene practices among adolescent females. Ultimately, improving access to education and resources tailored to the unique needs of this population is crucial for promoting better menstrual health outcomes. Educational programs that incorporate cultural sensitivity and community involvement can help break down stigmas and empower girls to take control of their menstrual health (Uwadia *et al.*, 2022). By creating a supportive environment that respects cultural beliefs, girls can feel more comfortable seeking information and resources to manage their periods effectively. These programs can also provide girls with the necessary tools and knowledge to make informed decisions about their menstrual health, leading to improved overall well-being (Baird *et al.*, 2022). Additionally, involving community members in these initiatives can help foster a sense of solidarity and understanding around the importance of menstrual hygiene. This can help break down barriers and encourage open conversations about menstruation, ultimately leading to greater acceptance and support for girls. By

normalizing the discussion around menstrual health, these programs can contribute to destigmatizing periods and promoting gender equality (Levy *et al.*, 2020).

Ultimately, empowering individuals with the necessary tools and knowledge about menstrual health can lead to increased confidence and agency in managing their own well-being. This can also help create a more inclusive and supportive environment for all individuals, regardless of gender (Ssewanyana *et al.*, 2019). By fostering a culture of understanding and acceptance, we can work towards eliminating the shame and taboo often associated with menstruation. In doing so, we can create a more equitable society where everyone feels comfortable discussing and addressing their menstrual health needs. This can contribute to breaking down barriers and stigmas surrounding menstruation and promoting open and honest conversations about a natural bodily process. Through education and awareness, we can strive towards a society where menstrual health is viewed as a normal and important aspect of overall well-being (Adane *et al.*, 2024).

By providing accurate information and support, we can empower individuals to make informed decisions about their menstrual health. This can lead to improved access to resources and services that promote menstrual hygiene and well-being for all individuals (Shibeshi *et al.*, 2021). Additionally, promoting menstrual hygiene can also help address issues such as period poverty and lack of access to menstrual products. By prioritizing menstrual health, we can work towards creating a more inclusive and equitable society for all individuals. Overall, breaking the stigma surrounding menstrual hygiene can lead to greater awareness and acceptance of the natural processes that individual's experience. This can ultimately contribute to a more supportive and understanding environment for those who menstruate (Method *et al.*, 2024).

## 2.4 Personal Hygiene Practices During Menstruation

The importance of cleanliness behaviors during menstruation among adolescent females lies in their substantial influence on health and well-being. Proper hygiene practices can help prevent infections and discomfort during menstruation, ultimately leading to a better overall quality of life for young women. Additionally, promoting cleanliness habits can empower adolescent females to feel confident and in control of their bodies during this natural process. Hennegan *et al.*, (2020) defines personal hygiene as the knowledge, beliefs, and actions individuals take to maintain cleanliness and avoid the spread of disease. In addition, it includes the activities of cleaning, rinsing, and drying (Deriba *et al.*, 2022). Personal hygiene is essential for overall health and well-being.

By practicing proper hygiene, individuals can prevent the spread of diseases and maintain a sense of confidence and control over their bodies. Afiaz *et al.*, (2021) emphasizes the importance of cleanliness habits in promoting a better quality of life for young women. Ensuring efficient menstrual hygiene management relies heavily on properly maintaining reusable menstruation management materials. To properly wash the goods, soap and water must be used, followed by drying them immediately under sunlight. The sun acts as a natural sterilizer, eradicating any bacterial growth on these reusable materials that may cause menstrual health problems (Bloomfield *et al.*, 2011). Additionally, it is crucial to store the materials in a clean and dry place to prevent contamination. Proper menstrual hygiene practices not only promote physical health but also contribute to a young woman's overall well-being and confidence. Therefore, it is imperative to uphold adequate cleanliness practices throughout menstruation to safeguard the health of the reproductive organs (Namuwonge *et al.*, 2025).

Maintaining hygiene is essential for evaluating the well-being of the reproductive organs of menstrual adolescent females. It aids in the prevention of various infectious diseases

and associated disorders, including vaginal discharge, cervical cancer, genital skin irritation, allergies, and inflammation in the genital area (Angrainy *et al.*, 2021). Although sun-drying reusable menstruation management materials (MMM) is highly important, many adolescent girls feel ashamed and lack privacy, so they resort to drying them in the poorly illuminated corners of their rooms. An investigation in Uganda documented this occurrence among adolescent female students who felt self-conscious when washing their used garments in public. This lack of proper drying methods can lead to the growth of harmful bacteria and fungi on the MMM, increasing the risk of infection (Hennegan *et al.*, 2016).

Providing safe and private spaces for girls to dry their reusable menstrual products can help address this issue and promote better menstrual hygiene practices. Therefore, they were required to carry out this activity at night and then air-dry their clothing in their living quarters (Hennegan *et al.*, 2016). Therefore, practicing adequate personal hygiene will protect people from being vulnerable to reproductive tract infections (RTIs), urinary tract infections (UTIs), and other problems related to menstrual hygiene (Holmes *et al.*, 2021). Recurrent episodes of respiratory tract infections (RTIs) have the potential to lead to infertility. Insufficient personal hygiene practices, such as failing to change menstrual management materials at least four times a day, using unsuitable materials, neglecting to change underwear twice a day during menstruation, and not replacing menstrual management materials after urinating, defecating, or bathing, contribute to the impacts mentioned (Nabiryo *et al.*, 2023).

Adolescent females in rural Puducherry expressed satisfaction with the practice of substituting soaked sanitary pads, according to a study. Nevertheless, certain girls asserted that they would only replace the materials when they were essential, in contrast to others who replaced them on a daily basis. 67.9% of adolescent females engaged in

genital hygiene throughout their menstrual flow. In addition, little more than 1.4% of respondents opted to use ash and dirt for hand washing, whereas the majority used water and soap. These findings highlight the varying practices and attitudes towards menstrual hygiene among adolescent females in rural Puducherry. It is important to continue exploring ways to promote consistent and effective menstrual hygiene practices in this population to ensure overall health and well-being (Karthikayini *et al.*, 2021).

Despite the widespread use of menstruation management items, allegations of unhygienic practices have surfaced. Hence, it is crucial to give priority to the regularity of cleansing the external genitalia and the selection of appropriate sanitary materials for this purpose (Hema-Priya *et al.*, 2017). Asumah *et al.* (2022) conducted a study in the Savannah Region of Ghana and recorded heightened levels of hygiene. Just 44.4% of participants indicated that they used their menstruation management items. Most adolescent girls in this group cleaned their reusable materials by washing them with soap and water and thereafter drying them under sunlight. Asumah *et al.* (2022) conducted a study that revealed that 1.4% of adolescent girls only took one shower during their menstrual cycle, despite the majority bathing twice. Moreover, there is a dearth of specific information addressing the suggested frequency of bathing during menstruation. Therefore, it is vital to uphold adequate hygiene and adhere to a consistent bathing regimen, as this will bolster the self-assurance of adolescent females while experiencing menstruation.

Mathenge *et al.* (2020) conducted a study in Kenya that revealed that over 84% of adolescent females engaged in genital cleanliness practices during menstruation. The washing procedure entailed the use of both water and soap (Mathenge *et al.*, 2020). It is important to note that maintaining proper hygiene during menstruation not only promotes physical health but also contributes to overall well-being and confidence. By following

recommended practices for bathing and genital cleanliness, adolescent females can navigate their menstrual cycles with comfort and ease. However, Hamoonga *et al.* (2019) discovered in their research that using soap and water to clean the genitalia can cause vaginal douching. This, in turn, can promote the growth of harmful bacteria and potentially trigger menstrual-related diseases. Therefore, Hamoonga *et al.* (2019) recommend against using soap to cleanse the vaginal region. Instead, they suggest using warm water and a mild, unscented soap to maintain proper hygiene during menstruation. Additionally, practicing good menstrual hygiene including changing sanitary products regularly and wearing breathable underwear can help prevent infections and discomfort. It is important to prioritize proper hygiene practices during menstruation to avoid potential health risks. By following these recommendations, individuals can maintain a healthy vaginal environment and reduce the likelihood of developing menstrual-related complications. Maintaining proper hygiene during menstruation is essential for overall health and well-being. It is also recommended to avoid using douches or scented products in the vaginal region to prevent irritation and infections. Additionally, changing sanitary pads or tampons frequently and washing the genital area with mild soap can also contribute to maintaining good hygiene during menstruation. It is crucial to listen to your body and seek medical attention if you experience any unusual symptoms or discomfort (Hamoonga *et al.*, 2019). It is always important to prioritize your health and well-being.

## **2.5 Menstrual Management Materials**

Menstrual Management Materials can be classified into two categories: internal and external hygienic materials. The vagina introduces various internal hygienic materials, such as menstrual tampons, menstrual cups, and menstrual sponges. On the other hand, exterior hygienic materials include disposable or washable sanitary pads and period panties (Anaba *et al.*, 2022). Additionally, we can categorize them into two types:

disposable items like disposable pads and tampons, or reusable items like cloth pads, washable and reusable cloth pads, menstrual cups, and period panties (Choi *et al.*, 2021). Individual preference, cultural suitability, financial feasibility, local market availability, menstrual flow intensity, duration of the menstrual cycle, geographic background, and received information influence girls' selection of a particular menstruation management material or product (Gharacheh *et al.*, 2021). It is important for girls to have access to a variety of menstrual products in order to choose what works best for them based on their unique needs and circumstances.

Providing education and resources on the different options available can help empower girls to make informed decisions about their menstrual health. Despite the intentional selection of these materials, their adverse effects on the female body prompt efforts to minimize their use. This can include promoting reusable and environmentally friendly options as well as advocating for policies that make menstrual products more accessible and affordable. By raising awareness about the potential risks associated with certain materials, we can work towards creating a safer and more sustainable approach to menstruation management. As a result, the Ministry of Food and Drug Safety has categorized MHM materials as quasi-drug goods under the Pharmaceutical Affairs Act. The purpose of this classification is to guarantee the quality and safety of these products (Marcelis *et al.*, 2022). This classification ensures that menstrual products undergo rigorous testing and meet specific standards before being sold to consumers.

By prioritizing safety and quality, individuals can feel more confident in their choices when it comes to managing menstruation. Additionally, this classification also helps to regulate the market and prevent the sale of potentially harmful or substandard products. Overall, this move by the Ministry of Food and Drug Safety is a positive step towards promoting women's health and well-being. Ecofem, an organization in South Korea,

initiated a comprehensive effort and released a report in 2017 to guarantee the safety of menstrual hygiene management (MHM) products (Kwak *et al.*, 2019). This report highlighted the importance of proper regulation and oversight in the manufacturing and distribution of these products. It also emphasized the need for transparency and accountability from companies in the industry to ensure consumer trust and safety.

Similarly, Western Kenya conducted a preliminary investigation to evaluate the safety of menstruation cups among rural school girls. The study found that the cups were a viable and safe alternative to traditional menstrual hygiene products, promoting sustainability and cost-effectiveness in the long term. The results of this investigation have led to increased awareness and adoption of menstrual cups in the region, contributing to improved menstrual health management among young girls. The study found limited data suggesting that the cups were not harmful and had no adverse health consequences for women. However, customers have noted a lack of comprehensive and unbiased information regarding the quality and safety of MHM products, despite the efforts made to address this issue (Juma *et al.*, 2017). Aside from ensuring quality and safety, it is imperative to have a sufficient supply of menstrual management materials. These materials are either locally or commercially manufactured.

Local manufacturing can help create economic opportunities for women in the region, while commercial manufacturing ensures the consistent availability of products. Both approaches are crucial in addressing the challenges of menstrual health management and promoting overall well-being among women and girls. Cultural conventions restrict local production to pads, as young girls do not accept the insertion of foreign objects into their bodies (Mason *et al.*, 2019). In rural India, groups such as sakhi sanitary pads and saathi sanitary pads are involved in the production and marketing of sanitary napkins, according to review studies. These organizations aim to make sanitary napkins easily

available and affordable for underprivileged girls and women (Bhagwat *et al.*, 2020). Their efforts also include providing education on menstrual hygiene and breaking the stigma surrounding menstruation in these communities.

By increasing access to affordable and culturally acceptable sanitary products, these organizations are helping to improve the overall well-being and quality of life for women and girls in rural India. In recent times, there has been a surge in efforts to distribute menstrual products and raise awareness about menstrual hygiene management (MHM) in both the United States and India. Two notable projects include the New York City legislative bill (Gruer *et al.*, 2021) and Ecofem, which is located in Tamil Nadu, India. In this context, women generate income by making reusable and launderable fabric sanitary pads. In addition, the organization holds courses on menstruation hygiene specifically targeted at adolescent girls (Aparnavi *et al.*, 2024).

Furthermore, it implements the Pad for Pad initiative, which offers these girls alternative cloth pads (Achuthan *et al.*, 2021). In a similar vein, the government of Kenya has made a pledge to distribute sanitary pads in schools, ensuring that girls receive them every term. Nevertheless, in practical terms, government assessments have recognized that the supply networks that underpin this program are deficient. Efforts to improve access to menstrual hygiene products are crucial to promoting girls' education and overall well-being. Collaborations between the government, NGOs, and community organizations are essential to address the gaps in distribution and ensure sustainable access to sanitary pads for all girls. In addition, a significant number of girls and young women who experience menstruation are unable to obtain menstrual hygiene items, resulting in the utilization of unsanitary alternatives during their menstrual cycles (Oppenheim, 2018).

Women in India encounter substantial obstacles in accessing mental health goods as a result of limited finances (Ram *et al.*, 2020). Similarly, a study in Nepal found that the

exorbitant cost of menstrual hygiene products significantly hindered their use among adolescent girls. As a result, some girls resorted to utilizing outdated garments and rags throughout their menstrual cycles. Furthermore, a study in Kenya found that adolescent girls perceived financial limitations as a significant barrier to managing menstrual hygiene effectively, a finding that aligns with findings from Bangladesh (Alam *et al.*, 2022).

According to a survey in Kenya, the school distributes sanitary towels to the majority of girls as part of a government strategy. Korir *et al.* (2018) reported that some individuals kept their reusable absorbents in unsanitary and concealed locations. Western Kenya conducted a pilot study to assess the adoption and long-term use of menstruation cups among adolescent female students. The study found that the girls who used menstrual cups reported higher satisfaction levels compared to those using traditional methods, indicating a potential solution to the challenges faced in managing menstrual hygiene. The pilot study also highlighted the importance of education and awareness campaigns to promote the use of menstrual cups as a sustainable and cost-effective option for adolescent girls. These girls received menstrual cups after completing training, guidance on usage, puberty information, and instructions for maintaining menstrual hygiene. During the nurses' follow-up visit, it became apparent that the girls were able to use the cups based on the observed color change in the previously distributed menstrual cups (Van-Eijik *et al.*, 2018). Joy *et al.* (2022) conducted a study in Kibera and found that 98% of menstruating girls used a variety of menstrual absorbent materials.

According to self-reported usage, having access to sanitary pads is essential because of their absorbent qualities. Women and girls worldwide employ various methods to handle menstruation due to restricted options, lack of knowledge, bias, expenses, and concerns about safety. They experiment with different menstrual products accessible on the

market (Sebert *et al.*, 2020). Women and girls in low- and middle-income countries (LMICs) who are experiencing menstruation frequently resort to using cloth-based materials, such as rags. These materials are washed and reused.

In addition, they may also use toilet paper, gauze, newspaper, mattress stuffing, dried leaves, grass, or cow dung (Soeiro *et al.*, 2021). These unhygienic methods are used because of a lack of access to proper hygiene materials, insufficient purchasing resources, limited availability of water, sanitation, and hygiene facilities, and low socioeconomic status. Additionally, local traditions, inadequate knowledge, and cultural and religious beliefs also play a role in influencing menstrual hygiene management practices (Hennegan *et al.*, 2019). Improving access to affordable and sustainable menstrual hygiene products, along with education on proper menstrual hygiene practices, is essential to addressing these challenges and promoting women's health and well-being.

Implementing community-based programs that take into account cultural norms and beliefs can help break the stigma surrounding menstruation and encourage safe and hygienic practices. Consequently, it is imperative for women to acquire knowledge regarding the attributes of these substances in order to make optimal decisions (Ren *et al.*, 2022). Empowering women with information about the different types of menstrual hygiene products available and their benefits can help them make informed choices that suit their needs and preferences. By promoting open discussions and providing resources, women can take control of their menstrual health and break barriers to accessing necessary products. There are numerous menstrual products available on the market for managing menstrual blood, including:

**Menstrual tampons:** These are the varieties of absorbent materials that provide interior protection. Implanted vaginal plugs, made of pliable plastic, absorb menstrual blood prior to its expulsion from the body. Menstrual tampons are typically inserted into the

vaginal canal and are designed to be comfortable and discreet. They are a popular choice for women during their menstrual cycle due to their convenience and effectiveness in preventing leaks. They are costly and environmentally unfriendly due to their slow decomposition (Shearston *et al.*, 2024).

Menstrual tampons are also known for their ease of use and ability to be worn during physical activities. You can classify menstrual tampons as either reusable or disposable. Reusable menstrual tampons are made of materials like silicone or cotton, which can be washed and reused multiple times, making them a more sustainable option. Disposable menstrual tampons, on the other hand, are single-use products that are convenient for those who prefer not to wash and reuse their menstrual products. Failure to maintain cleanliness and regularly change tampons can result in the development of toxic shock syndrome (TSS) (Nonfoux *et al.*, 2018). It is important to follow the manufacturer's instructions for the proper insertion and removal of menstrual tampons to reduce the risk of TSS. Additionally, it is recommended to use the lowest absorbency tampon needed for your flow and to never leave a tampon in for longer than 8 hours.

### **Figure 2.1**

*Menstrual tampons*



*Source: Women Voices.org*

Menstrual cups, made of medical-grade silicone rubber, are simple to fold and insert into the vagina to collect menstrual blood (Pokhrel *et al.*, 2021). They are reusable, eco-friendly, and can hold more blood than tampons or pads. Additionally, many users find

them to be more comfortable and leak-proof than traditional menstrual products. The duration of wear for these products might range from 4 to 8 hours, depending on the volume of menstrual flow (Zulaika *et al.*, 2019). It is important to sterilize the cup between uses to prevent infections. Some users may need some practice to perfect the insertion and removal technique, but once mastered, menstrual cups can be a convenient and cost-effective option for managing periods.

Regular and frequent removal and emptying are required. It is also important to ensure proper cleaning and storage of the menstrual cup to maintain hygiene. Users should follow the manufacturer's instructions for care and maintenance to prevent any potential issues. Menstrual cups are a sustainable and eco-friendly option that can reduce waste compared to disposable pads and tampons (Van Eijik *et al.*, 2021). They offer numerous benefits due to their high compatibility with physical activities, low water requirements for cleaning, reusability, and minimal environmental impact. It is recommended to boil the menstrual cup in water for a few minutes before and after each cycle to sterilize it. Additionally, it is important to replace the menstrual cup every few years to ensure optimal performance and hygiene. Hence, they provide a sustainable and economically viable option in areas with inadequate sanitation conditions (Gharacheh *et al.*, 2021).

## **Figure 2.2**

*Menstrual cup*



*Source: Ruby Cup*

Fabric constructs reusable sanitary pads, which present a potentially sustainable menstrual hygiene alternative. These pads are made from soft, absorbent materials that

are gentle on the skin and can be washed and reused multiple times. They help reduce waste from disposable pads and are a cost-effective option for women in need of menstrual products (Peterson *et al.*, 2023).

Additionally, Fabric's reusable pads are designed to be leak-proof and comfortable for all-day wear. They provide a more environmentally friendly option without compromising on performance or comfort. However, to maintain proper hygiene, it is imperative to thoroughly cleanse and dry them under sunlight. The sun's radiant energy possesses inherent sterilizing properties, effectively eliminating microorganisms and drying objects placed beneath it, rendering them sterile and suitable for future use. By following these care instructions, Fabric's reusable pads can be used for an extended period of time, making them a sustainable and economical choice for women (Hennegan *et al.*, 2017).

Additionally, the sun's natural disinfecting properties help to ensure that the pads remain clean and safe for reuse. Due to their reusability, these items are cost-effective, readily accessible, and environmentally friendly. In order to prevent contamination, it is necessary to store them in a clean and dry location for future usage. Proper storage will also help maintain the effectiveness of the pads and prolong their lifespan. It is recommended to wash them thoroughly before storing them to remove any residual bacteria and debris (Mehta *et al.*, 2022).

### **Figure 2.3**

*Reusable sanitary pads*



*Source: Etsy*

Commercial sanitary pads, commonly known as disposable sanitary pads, are widely available. They are designed for single-use and are typically made of absorbent materials like cotton or synthetic fibers. These pads are convenient for women to use during their menstrual cycles and can be easily disposed of after use. According to Kim *et al.* (2018), you can find these products in numerous retail establishments, and they are user-friendly (Kim *et al.*, 2018).

Additionally, disposable sanitary pads come in various sizes and absorbencies to accommodate different flow levels. Many brands also offer options with added features like odor control or wings for extra protection. High-quality products enjoy widespread recognition and excellent absorbency. It is important for women to choose pads that are comfortable and provide adequate protection to prevent leaks. It is recommended to change pads regularly throughout the day to maintain hygiene and freshness (Kim, 2023). Overall, disposable sanitary pads are a convenient and reliable option for managing menstrual flow. With the wide range of choices available, women can easily find the right product to suit their individual needs and preferences. It is important to consider factors such as comfort, absorbency, and special features when selecting the best sanitary pad for personal use. Additionally, they are not reusable and do not contribute to environmental sustainability. Therefore, it is important to dispose of them properly in order to minimize their impact on the environment. Choosing eco-friendly alternatives, such as reusable cloth pads or menstrual cups, can be a more sustainable option for managing menstrual flow (Kim *et al.*, 2022).

## Figure 2.4

*Disposable sanitary pad*



*Source: Kaur et al.,(2018)*

### **2.6 Types of Disposal Methods Practiced Among Girls**

Researchers have conducted numerous studies on the availability of materials for managing menstruation. These studies have found that access to affordable and hygienic menstrual products is a major challenge for many individuals, particularly in low-income communities. Additionally, the lack of education and stigma surrounding menstruation further compound the issue, highlighting the need for comprehensive solutions to address this global problem. However, our understanding of what happens after menstruating women and adolescent girls use these materials is limited, and we haven't documented the entire life cycle of these menstrual management materials (Anand *et al.*, 2022).

Understanding the environmental impact of disposable menstrual products, as well as exploring sustainable alternatives, is crucial for addressing the ecological footprint of menstruation. Research into the disposal and decomposition of these materials can provide valuable insights for developing more environmentally friendly solutions in menstrual hygiene management. It is crucial to consider the complete lifespan of these materials, particularly when developing the sanitary infrastructure for WASH programs, which encompasses various elements such as toilets, bathing facilities, washing and drying facilities, incinerators, and solid waste management services (Robinson *et al.*, 2021). Furthermore, due to the exponential growth of the population and the process of

industrialization, there has been a significant surge in the utilization of menstrual management materials. This has led to increased environmental pollution and waste generation, highlighting the urgent need for sustainable alternatives in menstrual hygiene management. Implementing eco-friendly practices and materials can help mitigate the negative impact on the environment while promoting better overall health and well-being for individuals (Schmitt *et al.*, 2021).

According to Van Eijik *et al.* (2016), disposable menstrual management products produce more trash annually than reusable menstrual management products. Additionally, the chemicals and plastics used in disposable products can have harmful effects on both the environment and personal health. Therefore, transitioning to reusable options like menstrual cups or cloth pads can greatly reduce the environmental footprint of menstrual waste (Bhagwat *et al.*, 2020).

Additionally, educating individuals on the benefits of sustainable menstrual hygiene practices can lead to widespread adoption and positive change for both the environment and personal health. Whether to classify waste from menstrual management materials as solid trash, hazardous waste, or bio-medical waste remains ambiguous. This lack of clarity makes it challenging to obtain specific guidance on how to properly dispose of used menstrual management materials. Clarifying the classification of menstrual waste can help establish proper disposal protocols and ensure that these materials are handled in an environmentally responsible manner (Pachauri *et al.*, 2019).

Implementing clear guidelines can also help alleviate confusion and promote consistent sustainable practices across communities. These factors have also led to the adoption of improper and hazardous methods for disposing of used menstrual management materials. Moreover, community-based research exhibits a notably higher prevalence of improper and hazardous disposal methods as compared to institution-based studies. Proper

education and awareness campaigns are essential in addressing the issue of improper disposal of menstrual waste in communities. By empowering individuals with knowledge on safe and sustainable disposal practices, we can work towards reducing the environmental impact of menstrual waste. Inadequate management may be the cause of the disparity in sanitary facility conditions between the community and institution levels (Hartmann *et al.*, 2015).

Menstruating women and adolescent girls are currently the most susceptible population in terms of water, sanitation, and hygiene (WASH) issues on a global scale. It is crucial to prioritize education and access to proper disposal methods to protect both the environment and public health (Ali *et al.*, 2010). Implementing comprehensive WASH programs can help address these disparities and improve overall menstrual hygiene management practices. This is due to the neglect of the provision of menstrual management materials (MMM). In addition, addressing cultural taboos and stigmas surrounding menstruation is also essential to promoting proper menstrual hygiene practices. By involving key stakeholders such as community leaders, educators, and health professionals, sustainable solutions can be developed to ensure the well-being of menstruating individuals (Foster *et al.*, 2021).

Researchers conducted a study among Rohingya adolescent girls aged 13 to 18 years residing in Kutupalong refugee camps in Ukhiya, Cox's Bazar, Bangladesh, and found that these girls face numerous challenges in managing their menstrual hygiene materials (MMM). This is due to inadequate cleaning and disposal facilities, a lack of privacy, overcrowding, and an unsupportive environment in the camps (Pandit *et al.*, 2022). These challenges can have detrimental effects on the physical and mental health of these adolescent girls, highlighting the urgent need for targeted interventions to improve their menstrual hygiene management. By working closely with stakeholders and

implementing sustainable solutions, we can address these challenges and promote the well-being of menstruating individuals in refugee camps. Various factors influence individuals' behaviors and choices when it comes to disposing of menstruation management materials. These factors can include cultural beliefs, access to proper disposal facilities, and education on proper menstrual hygiene practices (Yeasmin *et al.*, 2017).

Understanding and addressing these factors can help improve overall menstrual hygiene management and ensure the well-being of adolescent girls in these settings. Gaining insight into these factors would aid in formulating efficient approaches to encourage proper disposal methods, thereby mitigating the environmental and health consequences linked to improper disposal of menstrual waste. Implementing community-based education programs and providing access to affordable and environmentally friendly menstrual products can also play a crucial role in promoting proper menstrual hygiene practices. By working collaboratively with local stakeholders, organizations can help create sustainable solutions that address the complex challenges surrounding menstrual waste disposal. The reasons mentioned are socio-cultural norms, taboos around menstruation and menstrual blood, the availability and accessibility of sanitary facilities, and sufficient information and awareness regarding menstruation and menstrual hygiene management (Robinson *et al.*, 2021). Taboos and stigma often accompany menstruation in numerous countries. Social norms stigmatize menstruation, viewing it as dirty or humiliating. These beliefs can lead to inadequate menstrual waste management practices, such as improper disposal of sanitary products.

By working with local stakeholders to challenge these norms and provide education on proper waste disposal, organizations can help improve menstrual hygiene practices and reduce environmental impact. This has resulted in a feeling of secrecy and hiding.

Adolescent females may have feelings of embarrassment or discomfort while publicly discussing or disposing of menstrual waste, as this contradicts societal norms and expectations. Therefore, individuals opt to improperly dispose of waste or conceal it to evade scrutiny or judgment. The established standards of privacy and secrecy have influenced menstrual disposal behaviors (Yeasmin *et al.*, 2017). This behavior not only perpetuates the stigma surrounding menstruation but also poses health and environmental risks. By promoting open discussions and providing access to proper disposal methods, we can work towards breaking the taboo and creating a more sustainable and hygienic environment for all individuals.

Adolescent girls place a high value on preserving their privacy during menstruation, which can influence their subtle disposal methods in order to avoid attracting attention or creating discomfort (MacRae *et al.*, 2019). This can lead to improper disposal in concealed areas or even flushing the menstrual management materials down the toilets, which can cause plumbing problems and environmental contamination (Mattsson *et al.*, 2015). The presence and ease of use of sanitary facilities also influence how adolescent girls manage their menstrual waste (Jahan *et al.*, 2020). Having well-maintained facilities in place allows for proper management of menstrual hygiene and safe disposal of menstrual waste for adolescent females.

Providing accessible sanitary facilities, such as toilets or washrooms, ensures that adolescent girls have a designated and private area to change their menstrual products and dispose of waste in a suitable manner. Providing a hygienic and secluded space with appropriate waste management facilities promotes responsible disposal practices among adolescent girls and preserves their dignity and privacy during menstruation (Habtegiorgis *et al.*, 2021). Conversely, limited sanitary facilities present difficulties for adolescent females in handling their menstrual waste. These circumstances will compel

teenage girls to turn to alternative means of disposing of waste that are less sanitary and eco-friendly. They might choose to dispose of the waste in exposed locations, such as fields or bodies of water, or use inappropriate disposal methods, such as flushing things down the toilet (Hemeed *et al.*, 2024).

Accessible facilities offer adolescent girls a suitable and secluded area to handle their menstruation and dispose of waste in a proper manner. Conveniently situated, clean, and well-maintained facilities motivate adolescent girls to practice appropriate disposal methods that enhance cleanliness, safeguard their health, and support environmental sustainability. Furthermore, having information and awareness about menstruation significantly influences the attitudes and actions of adolescent females when it comes to disposing of menstrual waste. Providing educational resources and promoting open discussions about menstruation can help empower adolescent girls to make informed decisions regarding menstrual waste disposal, ultimately contributing to a healthier and more sustainable environment.

Additionally, access to hygienic products and proper waste disposal facilities can alleviate the stigma and discomfort often associated with menstruation, allowing girls to manage their periods with dignity and confidence. The low levels of schooling distinguish countries with low and moderate incomes. Research on menstrual hygiene management focuses primarily on understanding the specific requirements related to MHM in educational institutions alone (Cronk *et al.*, 2021). Mathiyalagen *et al.* (2017) argue that having adequate knowledge is crucial in preventing menstrual-related disorders and infections, hence boosting the overall health and well-being of adolescent girls. Roxburgh *et al.* (2020) argue that there is a deficiency in understanding how to monitor the menstrual cycle among adolescent girls, highlighting the necessity for education on the fundamental biology of menstruation.

According to the writers, menstrual blood is considered to have medicinal properties because of cultural traditions. Many menstruating women and adolescent girls stored their menstrual hygiene products for future use, such as during times of illness or accidents within their families. Additionally, the women would obtain consent from their husbands before discarding the menstrual hygiene cloths (Roxburgh *et al.*, 2020). Furthermore, women and girls who are experiencing menstruation should exercise caution in managing their menstrual hygiene in order to mitigate their susceptibility to witchcraft (Kashyap *et al.*, 2023). Girls in such circumstances are uninformed and deficient in knowledge about menarche (Chandra *et al.*, 2017) and its administration. It is necessary to propose recommendations that aim to increase knowledge among teenagers in order to prevent them from experiencing reproductive tract disorders (Majeed *et al.*, 2022). Consequently, teenagers may experience difficulties handling low self-confidence and inadequate personal growth (Chandra *et al.*, 2017).

According to Borjigan *et al* (2019), teenage girls whose mothers have a higher level of education tend to have better menstrual hygiene practices compared to those whose mothers have a lower level of education. Optimal menstrual hygiene practices are associated with improved physical well-being, increased self-assurance, and enhanced self-worth (Yilmaz *et al.*, 2020). Hence, it is crucial to provide parental education to improve the adoption of proper menstrual hygiene practices among teenage girls attending school. Additionally, utilizing both official and informal communication channels is essential for effectively disseminating information on this topic (Oliveira *et al.*, 2023). In contrast to the findings in Gambia, the majority of girls in Ethiopia has prior knowledge about menstruation and receives information on this topic mostly from their mothers.

Nevertheless, only a small fraction of girls is adequately prepared for their initial menstruation, while a significant majority exhibit inadequate menstrual hygiene management. Furthermore, the study revealed that approximately 25% of the female participants were aware of the availability of sanitary pads for purchase, but they lacked knowledge about the source of menstrual blood (Nnennaya *et al.*, 2021). However, several other individuals involved in this research asserted that menstruation originated from the abdomen or the vagina, not the uterus, and attributed it to a medical condition or divine punishment (Ahmed Shallo *et al.*, 2020). This highlights the necessity of developing effective awareness and advocacy strategies for adolescent girls and the general public to enhance their understanding of menstruation and associated proper hygiene practices.

Males lack sufficient knowledge regarding menstruation and its proper handling. Males have a significant impact on society as they hold the primary responsibility for making decisions and providing for others. Previous research consistently excluded boys, leading them to develop negative perspectives on menstruation and its management. Mothers believed that boys did not require any information or guidance regarding menstruation and associated hygiene, despite their strong curiosity and desire for further discussions on the subject. Thus, involving women in initiatives aimed at enhancing MHM can significantly contribute to tackling this issue (Shah *et al.*, 2019). An Ethiopian study reveals that there is variation in the discourse surrounding menstrual hygiene management (MHM) between rural and urban regions.

Furthermore, it emphasized that females living in urban regions have greater access to media in comparison to those from rural households. As a result, they have been able to collect further data on menstrual hygiene management behaviors (Shibeshi *et al.*, 2021). Various factors have been impacting the strategies employed in treating mental health,

such as the educational standing of adolescent girls and their access to media. Individuals with higher levels of education and greater access to media were more likely to engage in effective menstrual hygiene management techniques (Afiaz *et al.*, 2021). As a result of the lack of discussion and information on menstrual hygiene management (MHM), women and girls who are menstruating encounter difficulties in storing and carrying MHM supplies. The logistical issues stem from the lack of transparency in procuring MHM supplies, congested housing, inadequate privacy for storing these goods, and insufficient sanitary infrastructure that caters to the needs of women (Krusz *et al.*, 2019). We need more research to deepen our comprehension of the effectiveness and implementation of various techniques, given the hypothesis that young girls learn menstrual hygiene management practices from their mothers.

Parents and instructors are typically considered the primary sources of information on menstruation and how to manage it hygienically for adolescent girls. However, they often feel uncomfortable discussing these topics due to feelings of shame and a lack of sufficient and accurate information. Learning institutions provide educational training and mass communication mediums like radio to acquire knowledge (Afiaz *et al.*, 2021). Previously, policies prioritized training both male and female instructors to establish a supportive atmosphere in schools for girls and facilitate conversations on menstruation and its handling (Phillips *et al.*, 2021). The scarcity of female educators, particularly in low- and middle-income nations, has hindered the widespread adoption of this strategy. As a result, many girls continue to face barriers to accessing accurate information and support regarding menstruation. Efforts to increase the number of female educators in these regions could help address this issue and promote better menstrual health education for all adolescent girls.

For instance, in rural Gambia, male teachers experience discomfort while discussing menstruation, despite their recognition of the significance of menstrual education in schools. Furthermore, they had a lack of confidence in their ability to educate teenagers about menstruation and how to handle it (Nabwera *et al.*, 2021). Consequently, the issue of a male-dominated teaching staff in a school where girls deserve this training remains unresolved. This highlights the need for recruiting and training more female educators in these regions to ensure that all students receive comprehensive menstrual health education. Female teachers can provide a more comfortable and knowledgeable environment for discussing menstruation with adolescent girls, ultimately promoting better understanding and practices surrounding menstrual health. Adolescent girls, who have a precise and thorough understanding of menstruation, including its biological process, cleanliness habits, and the negative effects of inappropriate disposal, are well prepared to make educated decisions about waste management.

Furthermore, recognizing the need for proper menstrual disposal as a crucial element in menstrual hygiene management, adolescent girls will assume accountability for their own health and welfare. Moreover, acquiring knowledge and developing awareness contribute to cultivating a sense of accountability and possession about the management of menstrual waste (Roxburgh *et al.*, 2020). Individuals who comprehend the ecological consequences of improper disposal are more likely to embrace environmentally conscious behaviors. They acknowledge that their actions have repercussions and that appropriate disposal methods contribute to a more pristine and healthier environment (Elledge *et al.*, 2018). During menstruation, women and adolescent girls utilize several techniques to discard their spent menstrual management materials, such as disposing of them in open areas, ponds, latrines, burning or burying them, or using routine waste disposal systems.

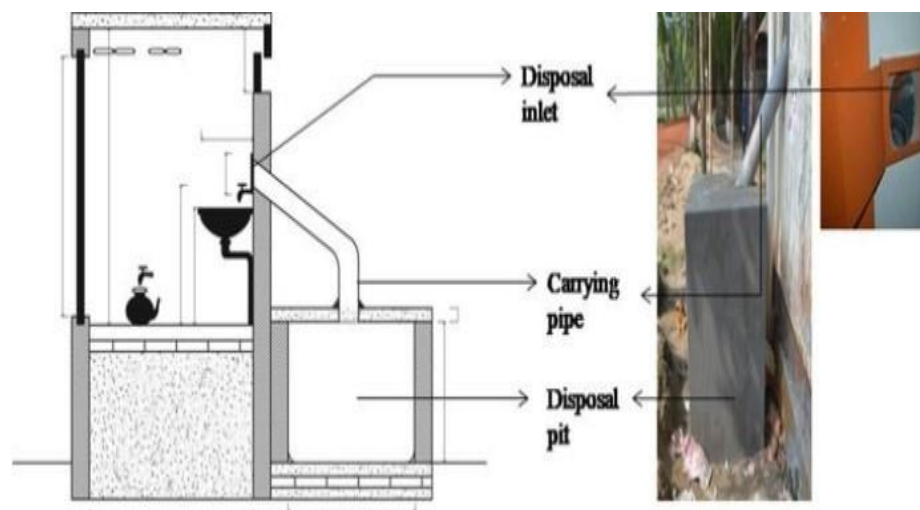
A study in low- and middle-income countries like Dhaka, Bangladesh, revealed that older women would wash and reuse their menstrual cloths. However, younger women felt embarrassed and disgusted, so they would wrap the used clothes in plastic bags before disposing of them in drains and ditches (Yeasmin *et al.*, 2017). We can categorize the disposal strategies into traditional, modern, or novel methods. Conventional methods for disposing of menstrual management materials (MMM) involve burying, incinerating, or discarding them. Many low- and middle-income countries (LMICs), where adequate waste management facilities are scarce, have long employed these approaches. The contemporary approach to disposing of menstrual waste, known as MMM, involves using specific garbage bins such as swing-top bins, pedal bins, and lidded buckets. Local markets easily provide these bins. However, the effectiveness of these bins in preventing environmental contamination and promoting proper waste disposal practices varies depending on factors such as accessibility, awareness, and cultural norms. Therefore, education and awareness campaigns are crucial in promoting the adoption of modern disposal methods for menstrual waste. These technologies are transient, possess a limited capacity (10–30 liters), are portable, inexpensive, quick to install, can be positioned anywhere, necessitate minimal to no manual touch, lack durability, and necessitate regular emptying (Jahan *et al.*, 2020).

Alternatively, there are various inventive methods for disposing of menstrual waste. These include reusable menstrual management materials, a chute disposal system, and incinerators, biodegradable MMM production, and improved techniques such as specialized bins to prevent direct handling. Additionally, wrapping the MMM in biodegradable paper bags can facilitate proper disposal. The chute disposal method disposes of menstrual management materials (MMMs) directly into a deep, covered pit outside a toilet. Two non-profit groups, namely Water Aid and Dushtha Shasthya Kendra

(DSK), initially developed this particular MMM waste disposal method. The robustness and high 765-liter capacity of this system set it apart. It requires ample space and technical support during installation but does not necessitate regular emptying. Furthermore, it demands a higher initial investment and ongoing maintenance costs. The connecting pit typically measures 3 feet by 3 feet by 3 feet, and the length of the pipe varies depending on the toilet's location relative to the pit (Jahan *et al.*, 2020). The MMM waste disposal method is especially beneficial in areas with limited access to water and sanitation facilities, as it helps prevent contamination of groundwater sources. Additionally, this system has been successful in reducing the spread of diseases caused by improper waste disposal practices. Overall, the MMM waste disposal method is a cost-effective and environmentally friendly solution for managing human waste in resource-constrained areas. It provides a sustainable way to safely dispose of waste without harming the surrounding environment or community health (Winter *et al.*, 2022).

**Figure 2.5**

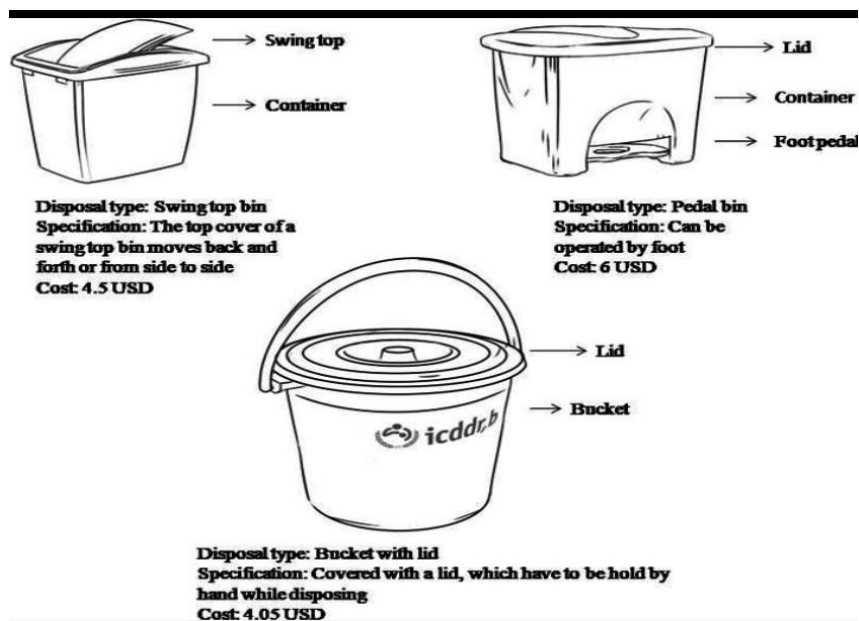
*Chute disposal system*



*Source: Jahan et al., (2020)*

**Figure 2.6**

*Disposal bins*



*Source: Jahan et al., (2020)*

Menstrual hygiene management, particularly the proper disposal of menstrual management materials, can have an impact on the environment (Scorgie *et al.*, 2016). Improper disposal of menstrual products can lead to pollution of water sources and harm aquatic life. Education and access to proper disposal methods are essential for minimizing these environmental impacts. The lack of proper disposal choices for menstrual management materials might result in improper practices that contribute to the contamination of land and water sources, as well as the obstruction of water channels (Kaur *et al.*, 2018). Because there are no suitable disposal options for women and adolescent girls to safely and respectfully manage their menstrual hygiene, they resort to using open and public spaces to dispose of their used menstrual materials. This not only poses a risk to their health but also contributes to environmental pollution.

Providing proper disposal facilities can help address these issues and promote better menstrual hygiene practices. This behavior increases the risk of exposing their immediate surroundings to human waste, which in turn leads to environmental

contamination (Schmitt *et al.*, 2017). Furthermore, menstrual management materials, such as sanitary pads, consist primarily of 90% plastic, which requires around 500 to 800 years undergoing decomposition. Research suggests that women who menstruate, including adolescent girls who have access to menstruation management materials, can use between 10,000 and 12,000 of these materials throughout their lifetime. This has resulted in significant challenges in waste management on a global scale (Anand *et al.*, 2022).

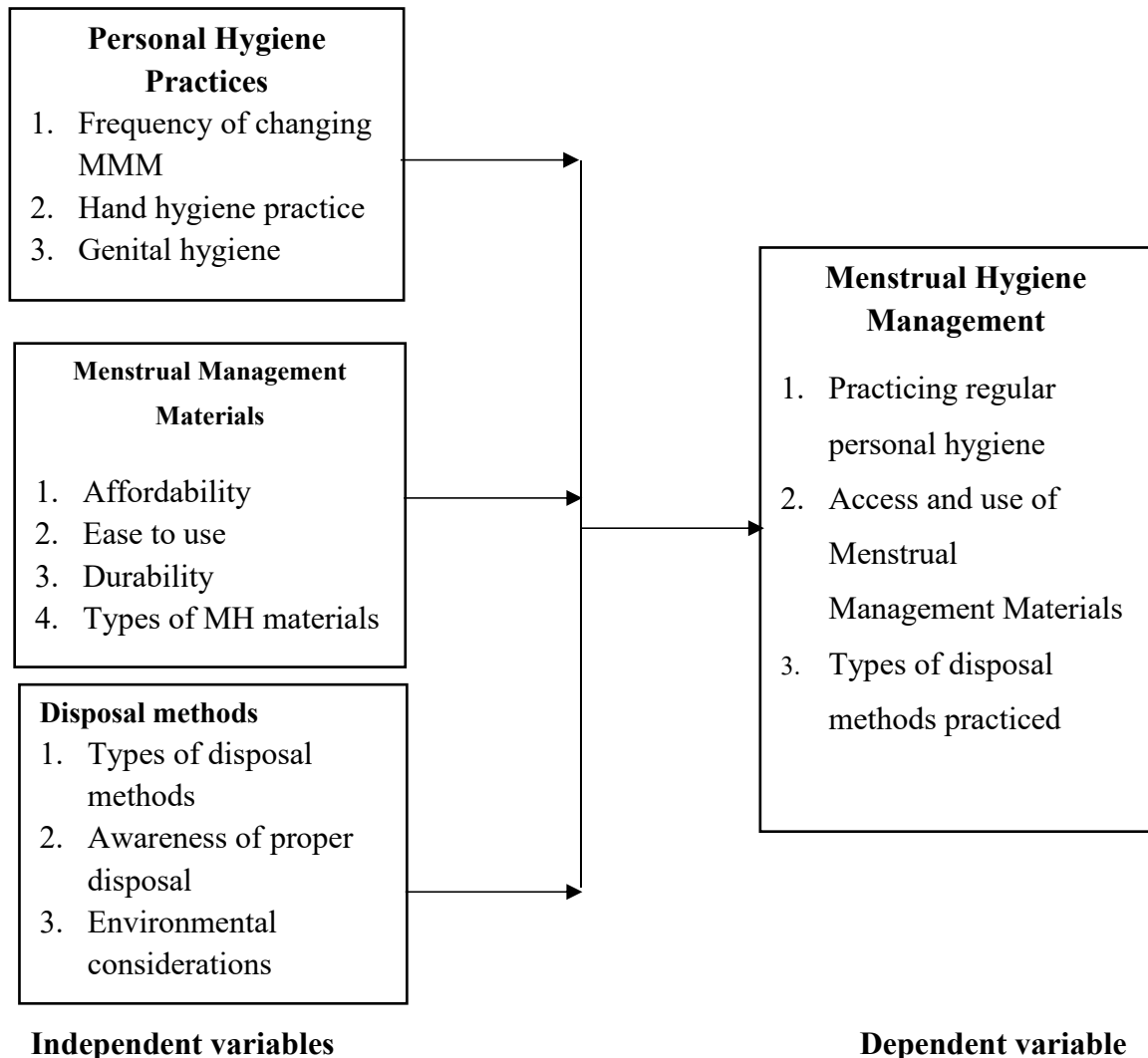
A comparable study in India estimates the annual production of sanitary waste at 9000 tons. The inadequate management of this trash, from the household level to the local government, leads to its discharge into water bodies and waterways. Improper and uncontrolled disposal of menstrual waste, such as burying it, can result in the release of harmful substances into water bodies through a process called leaching (Waller *et al.*, 2017). The incineration of these wastes has resulted in an increase in greenhouse gas emissions, which in turn has caused health issues for humans.

Additionally, when released into the environment, the plastics used to package menstrual management materials degrade into micro plastics, which humans eventually consume. A global study analyzing tap water samples observed this phenomenon, revealing heavy contamination of drinking water with small plastic particles. The study found that 83% of the samples collected worldwide and up to 94% of those collected in the USA included such pollution. The impact of these minuscule particles on human health remains uncertain (Lancet Planetary Health,2017).

## 2.7 Conceptual Framework

Figure 2.7

*Conceptual Framework*



*Source: Researcher, (2023)*

There is a strong link between the independent variables (personal hygiene practices, menstrual management materials, and disposal methods) and the dependent variable (menstrual hygiene management). This link is important for understanding how different factors affect how girls ages 9 to 17 in Mathioya sub-county, Murang'a County, handle their periods overall. Personal hygiene practices play a fundamental role in determining menstrual hygiene management.

The frequency of bathing or showering, change of undergarments, hand hygiene practices, and genital hygiene all have a direct impact on adolescent females' ability to effectively manage their menstrual hygiene. Girls who consistently practice personal cleanliness are more inclined to adhere to appropriate menstrual hygiene practices, thereby decreasing the likelihood of infections and other health issues related to menstruation. Moreover, the choice of menstrual management materials utilized by females who are menstruating has a substantial impact on menstrual hygiene management. Various materials, including sanitary pads, tampons, reusable sanitary pads, and menstrual cups, provide different amounts of absorption and comfort. The selection of menstrual products can have an effect on the comfort, self-assurance, and capacity of girls to participate in their everyday activities while menstruating. Access to inexpensive and suitable menstruation management products is crucial for fostering efficient menstruation hygiene management among girls aged 9 to 17 years in Mathiyoia sub-county, Murang'a County.

Finally, it is crucial to appropriately dispose of old menstrual materials in order to prevent environmental contamination, unpleasant smells, and the transmission of diseases. Adolescent females who are experiencing menstruation and use proper and sanitary methods of disposing of menstrual waste, such as utilizing authorized receptacles or latrines, play a role in maintaining the cleanliness of the community and minimizing the potential for contamination. On the other hand, incorrect methods of getting rid of menstrual waste, such as burning or burying it, can create health and environmental risks, which in turn weaken attempts to manage menstrual hygiene. In general, these variables are interrelated. By thoroughly addressing the independent variables, stakeholders can enhance the outcomes of menstrual hygiene management

among girls in Mathioya sub-county, ultimately leading to improvements in their health, well-being, and quality of life.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

This section presents the methodology that was used in the study. It is divided into different sections: research design, research site/study location, study population, inclusion and exclusion criteria, sampling techniques, sample size determination, research instruments, data collection procedures, data management and ethical considerations.

### **3.1 Research Design**

A descriptive, cross-sectional design was used. The study aimed to understand the current MHM practices among girls aged 9 to 17 in the Mathioya sub-county. This design was ideal as it involved collecting data at a specific point in time. The design also guaranteed that the study would take place in the community where the issue is prevalent.

### **3.2 Study Variables**

Menstrual hygiene management is the dependent variable; personal hygiene practices, menstrual management materials, and disposal methods of menstrual management materials were considered independent variables.

### **3.3 Study Location**

The study was conducted in Mathioya Sub-County, located in Murang'a County, central Kenya. Murang'a County is one of the five counties in the central region of the Republic of Kenya. Nyeri borders it to the north, Kiambu to the south, Nyandarua to the west, and Kirinyaga to the east. It lies between latitudes 0° 34' South and 1° 07' South and longitudes 36° East and 37° 27' East. Murang'a comprises eight subcounties, namely: Kiharu, Mathioya, Kangema, Gatanga, Kigumo, Kandara, Kahuro, and Murang'a South. The Mathioya subcounty consists of three wards: Kamacharia, Kiru, and Gitugi. Mathioya Sub-County occupies 178 sq. km. and has a population of 92,814 people (KPHC, 2019). The population is mostly members of the Kikuyu ethnic group.

### **3.4 Study Population**

The study targeted adolescent girls aged 9 to 17 years within Mathioya sub-county to take part in the study.

#### **3.4.1 Inclusion criteria**

Girls who have attended menarche, willing to participate, and are between the ages of 9 and 17 years participated in the study.

#### **3.4.2 Exclusion criteria**

Girls who were not willing to participate and who had not started menstruating

### **3.5 Sampling Technique**

This study employed a stratified random sampling technique. The population of girls aged 9 to 17 years was divided into three strata based on their level of education: primary school, secondary school, and do not know (KPHC, 2019). The sample from each substratum was randomly selected to ensure a representative sample. The sample size from each stratum was proportional to the size of the population stratum.

### **3.6 Sample Size Determination**

The Yamane formula below was used to calculate sample size of adolescent girls aged 9 to 17 years who participated in the study.

$$n = \frac{N}{1+N(e)^2} \dots\dots\dots\text{Equation 1}$$

Where;

n= sample size

N = size of the population

e = margin error or level of precision (0.05)

According to 2019 Kenya Population and Housing Census, the population of girls aged 9 to 17 years were 12,147. Therefore

$$n = \frac{12147}{1 + 12147(0.05)^2}$$

$$n = 387.248$$

$$n = 387$$

Using this equation, the sample size was 387 participants. Then, proportionately determined the sample size from each stratum;

Primary school level  $(8397/12147 \times 387) = 267.52$ ; Secondary school level  $(3725/12147 \times 387) = 118.67$ ; and Do not know level  $(25/12147 \times 387) = 0.79$

### Sample Matrix

**Table 3. 1**

*Sample Matrix*

Education level	Total population (N)	Sample size (n)
Primary school	8397	268
Secondary school	3725	118
Do not know	25	1

*Source: Researcher, 2023*

### 3.7 Data Collection Procedure

Several factors were considered when selecting research assistants for this study on menstrual hygiene management among girls aged 9 to 17 years in Mathioya sub-county to ensure the efficiency and credibility of the research. First and foremost, competence and understanding of menstrual hygiene management were essential requirements. The study assistants possessed a comprehensive comprehension of menstrual health issues and hygiene habits. With this understanding, they were able to properly interact with the research participants. Additionally, they possessed fluency in both English and the native language spoken in Mathioya sub-county, enabling effective contact with the participants. Possessing excellent interpersonal skills, empathy, and cultural sensitivity were essential for establishing a connection with participants, earning their trust, and establishing a

secure and comfortable atmosphere for data collection. Furthermore, it was crucial to possess flexibility and agility in order to effectively function in dynamic field settings, such as Mathioya sub-county. The research assistants successfully adapted to unexpected obstacles, such as fluctuations in weather conditions and transportation difficulties, and altered their methodology accordingly. Two research assistants received training on the study objectives and the data collection method in order to assist with conducting the interviews.

Ethical concerns of voluntary involvement and information confidentiality were addressed. Preliminary household survey using population enumeration as a guide to identify homes with teenage girls within the desired age range was carried out. This survey ensured representation from various socio-economic backgrounds and geographical regions within the Mathioya sub-county. A validated questionnaire from a pilot study was used to interview respondents during the data collection phase.

### **3.8 Research Instrument**

#### **3.8.1 Questionnaire**

In Mathioya Sub-County, Murang'a County, a standardized and validated questionnaire was developed to gather data on girls aged 9 to 17 years' understanding of menstrual hygiene management practices, the specific menstrual management materials utilized, and the methods of disposing of menstrual waste during menstrual hygiene management. The survey included questions that required detailed written responses. This equipment was suitable for adolescent females who had commenced menstruation. Prior to the actual data collection, the tool underwent a pretesting phase to verify its clarity and user-friendliness. The interviewer conducted the interviews in person, giving the researcher a chance to clarify any unclear questions and ensure all participants understood the inquiries.

### **3.9 Piloting the Questionnaire**

This was conducted using a limited sample of adolescent girls, aged 9 to 17 from Kamacharia ward, who were excluded from participating in the actual study. It was done to confirm that the questions were correctly worded and that the questionnaire gathered the intended information. The pilot phase prompted modifications to enhance this data-gathering instrument. I conducted this method to ensure that the research tool adhered to the following principles: simplicity, comprehensiveness, acceptance, and utility.

### **3.10 Validity**

The validity or credibility of this research was established by ensuring the integrity of the research process. This included transparently documenting the methodology, data collection methods and data analysis procedures. Measures were employed to enhance the accuracy and credibility of the data collected. Additionally, trained and culturally sensitive data collectors were trained who could establish rapport with the research participants and facilitated open communication hence contributing to the validity of the findings.

### **3.11 Reliability**

Testing reliability of the data collection tools was important to ensure that data which was collected was accurate and could be used to make meaningful conclusions. It was done through conducting a split-half reliability method. This involved dividing the questionnaire into two halves and administering each half to the same group of adolescent girls. The responses obtained from the participants in both halves was compared to determine the level of consistency.

### **3.12 Data Analysis**

After data collection was completed, thematic analysis was used. Thematic analysis is the systematic identification of patterns or themes in qualitative data. Thematic analysis

was a technique rather than a comprehensive approach, making it adaptable and accommodating to a variety of tasks. This study utilized Clarke and Braun's 6-step framework for analyzing the obtained data. The steps were to familiarize oneself with the data, produce initial codes, look for themes, review them, define them, and write up the findings (Clarke & Braun, 2019). The researcher thoroughly analyzed the data obtained from semi-structured surveys. The transcripts were examined to obtain a thorough comprehension of the dataset. This step entailed the identification of trends, recurring themes, and distinctive insights pertaining to menstrual hygiene management practices among females in the Mathioya sub county.

Initial codes were generated by identifying and categorizing significant units of information related to menstrual hygiene management. This entailed emphasizing essential terms, concepts, and ideas that encapsulated the experiences, behaviors, and obstacles encountered by girls in managing their menstrual hygiene. The codes encompassed various categories, including personal hygiene practices, menstrual management supplies, and disposal procedures. The data collected was systematically arranged and categorized into possible themes or patterns that represented the main difficulties and concerns of menstrual hygiene management in Mathioya sub-county. Subsequently, a thorough analysis was carried out to discover themes, hence verifying the accuracy in capturing the comprehensive scope and profound nature of the material. The level of support for each topic was evaluated based on the coded extracts, and it was determined if any themes were overlapping or redundant, requiring further refinement or consolidation. This step consisted of systematically reviewing and improving the theme map to guarantee its cohesion and relevance.

In addition, the researcher provided precise definitions for each discovered theme, explaining the core notion or idea it represented and supporting it with illustrative

instances from the data. She meticulously chose evocative titles for each subject that encapsulated its core and set it apart from other themes. This step entailed amalgamating the discoveries into a logical and cohesive account that effectively communicated the fundamental concepts of menstrual hygiene management among girls in the Mathioya sub county. Ultimately, the researcher documented the results of the thematic analysis by providing the selected themes, supporting evidence, and interpretive insights in a concise and structured fashion. The report incorporated selected passages or citations from the data to exemplify each theme and offer a framework for the investigation. The findings have important implications for policy, practice, and future studies. They point out that it takes intervention and more investigation to enhance menstrual hygiene management outcomes in the Mathioya community.

### **3.13 Logistical and Ethical Considerations**

Before initiating the study, the research obtained approval from the MUST Institutional Research Ethics Review Committee (MIRERC) and adhered rigorously to a do-no-harm principle. The study's objectives and aims were elucidated to both the parents and the adolescent girls, aged 9 to 17. Therefore, prior to the study's commencement, the parents of the enrolled girls signed a document confirming their consent. Rigorous steps were implemented to guarantee data confidentiality due to the investigation's significant sensitivity. All research participants were informed that their involvement in the study was voluntary, permitting them to withdraw without incurring any consequences. Ultimately, coding in data collection was used to maintain confidentiality.

## **CHAPTER FOUR: RESULTS AND DISCUSSION**

### **4.1 Introduction**

This chapter provides an overview of the data collected on the practices related to menstrual hygiene management among females aged 9 to 17 years in Mathioya Sub-County, Muranga County. A study was conducted on a group of 387 participants who received questionnaires, and all of them responded, yielding a 100% response rate. The chapter begins by examining the personal information of the respondents, followed by an investigation of three themes: personal hygiene routines, the types of menstruation management items utilized, and the methods of disposal employed. Written results were provided from the open-ended questions in prose.

### **4.2 Demographic Characteristics of the Respondents**

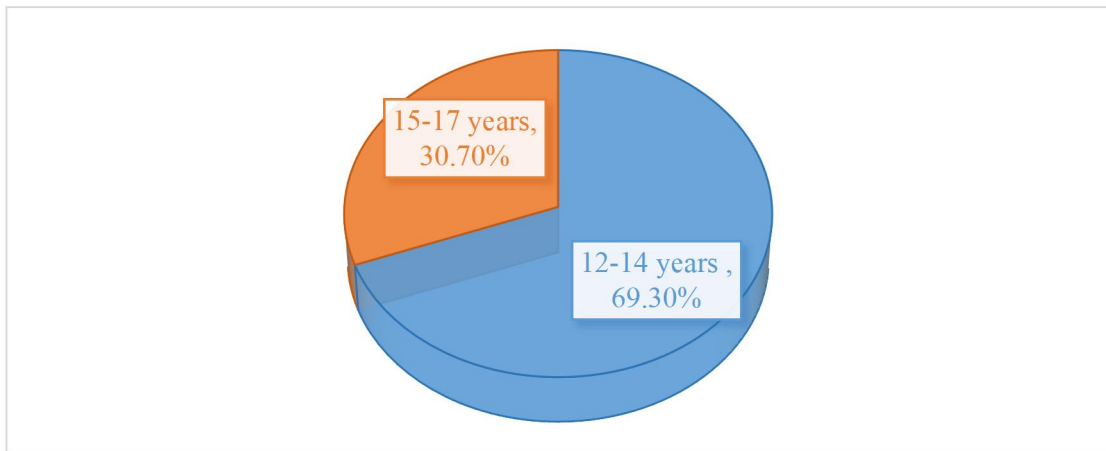
The respondents' personal information included age, current education level, current living situation, religion, current school attendance rate and current school performance. The findings are presented in subsequent headings:

#### **4.2.1 Respondents age**

Adolescent girls who participated in the study were requested to indicate their ages as grouped in the figure below:

**Figure 4. 1**

*Respondents age*



*Source: Researcher, (2024)*

The study revealed that a significant majority (69.3%) of the participants were in the age range of 12–14 years, similarly to a study carried out in rural Puducherry (53.8%) (Hema Priya *et al.*, 2017), while the remaining 30.7% fell between the age ranges of 15–17 years. On the other hand, a study conducted in Southern Ethiopia reported that most girls started menarche at age ranges of 10 to 19 years (Belayneh *et al.*, 2019). This indicates that the participants were of the age when they were going through their menstrual cycle, and hence they would provide their insights on practices related to managing menstrual hygiene. Additionally, the age distribution of the participants aligns with the typical age range for starting menstruation, suggesting that they may have relevant experiences to share. Understanding their perspectives can help adolescents improve their menstrual hygiene practices.

#### **4.2.2 Respondents current education level**

Respondents were requested to indicate their educational level. The results are presented in Table 4.1.

**Table 4. 1***Respondents Current Education Level*

<b>Education Level</b>	<b>Frequency</b>	<b>Percentage</b>
Primary school	268	69.3%
Junior secondary	4	1.00%
Secondary school	115	29.7%
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

Based on the results, the majority (69.3%) of the respondents was in primary school, 29.7% were in secondary school, and 1.0% was in junior secondary. These findings suggest that the primary school demographic was the most represented in the survey, while secondary school students also made up a significant portion of the respondents. The low percentage of junior secondary students indicates a smaller presence in the sample population. This indicates that the respondents had a moderate level of education, enabling them to respond to the questions regarding menstrual hygiene management practices.

**4.2.3 Respondents current living situation**

Respondents were requested to describe their current living situation. Table 4.2 displays the findings.

**Table 4. 2***Respondents current living situation*

<b>Current Living Situation</b>	<b>Frequency</b>	<b>Percentage</b>
Living with parents	253	65.2%
Living with other family members	116	30.1%
Living with friends	18	4.7%
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

The results revealed that the majority of respondents (65.2%) reported living with their parents, while 30.1% reported living with other family members. Only 4.7% reported living with their friends. These findings suggest that living with parents or other family

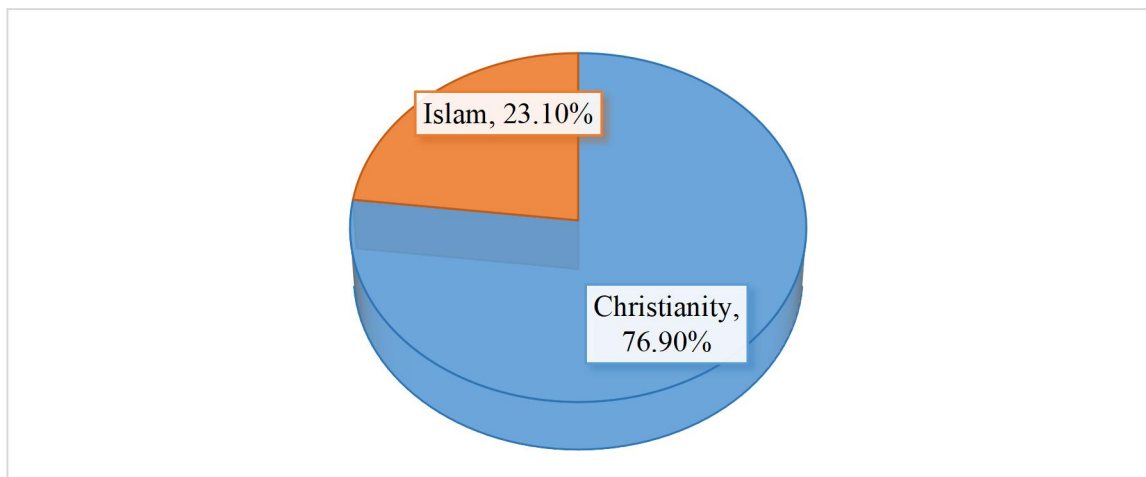
members is a common living arrangement among the respondents. It may also indicate the importance of familial support and connections in their living situations. This indicates that the respondents were residing with their parents, other family members, or friends.

#### 4.2.4 Respondents religion

Respondents were requested to specify their religion. The findings are as indicated below:

**Figure 4. 2**

*Respondents Religion*



*Source: Researcher, (2024)*

The results revealed that a significant majority (76.9%) identified themselves as Christians, whereas 23.1% identified their religious affiliation as Islam. This indicates that a large proportion of the participants had a specific religious affiliation.

#### 4.2.5 Respondents current school attendance rate

The study sought to establish the respondents' current school attendance rate. The results are presented in Table 4.3.

**Table 4. 3**

*Respondents current school attendance rate*

<b>Current School Attendance Rate</b>	<b>Frequency</b>	<b>Percentage</b>
Regularly attend school	168	43.5%
Occasionally absent from school	124	32.1%
Frequently absent from school	59	15.3%
Not currently attending school	36	9.1%
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

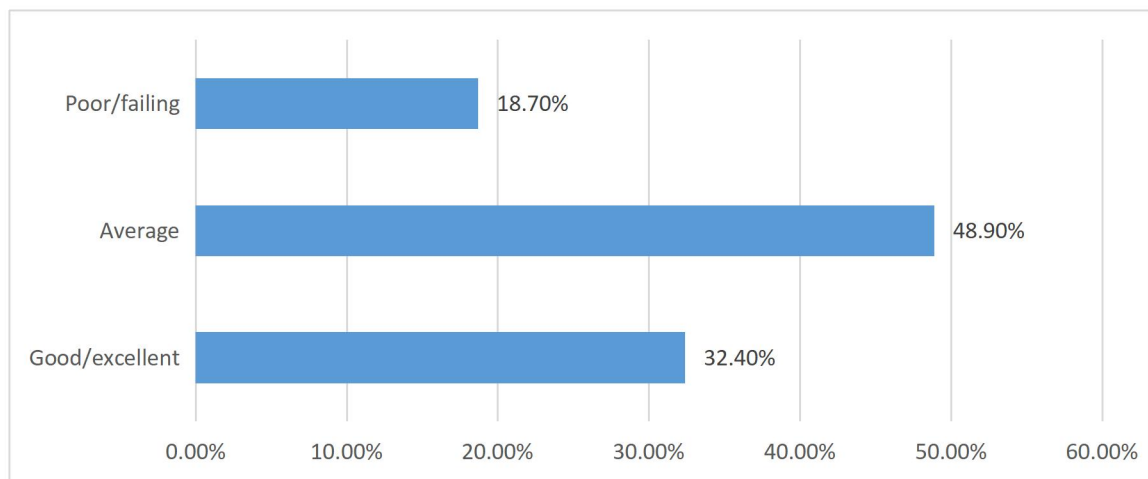
The majority of respondents (48.5%) reported regular school attendance, while 32.1% reported occasional absences, 15.3% reported frequent absences, and 9.1% reported not currently attending school. This indicates that the majority of the respondents consistently attend school.

#### **4.2.6 Respondents current school performance**

The study sought to establish the respondents' current school performance. The results are shown in Figure 4.3.

**Figure 4. 3**

*Respondents current school performance*



*Source: Researcher, (2024)*

Based on the results, the majority of respondents (48.9%) reported that their current school performance was average. A significant portion (32.4%) reported good or

exceptional performance, while a smaller percentage (18.7%) reported bad or failing performance. Most of the schools in the research area performed at a moderate level.

### 4.3 Personal Hygiene Practices

The primary aim of the study was to ascertain the personal hygiene habits of female individuals aged 9 to 17 years in Mathioya Sub-County. I organized the results of personal hygiene behaviors into different subcategories. The subsequent subsections present the results.

#### 4.3.1 Maintaining personal hygiene

##### Figure 4. 4

*Personal hygiene practices during menstruation*

<b>Personal hygiene during menstruation</b>	<b>Frequency</b>	<b>Percentage</b>
Good	310	80
Poor	77	20
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

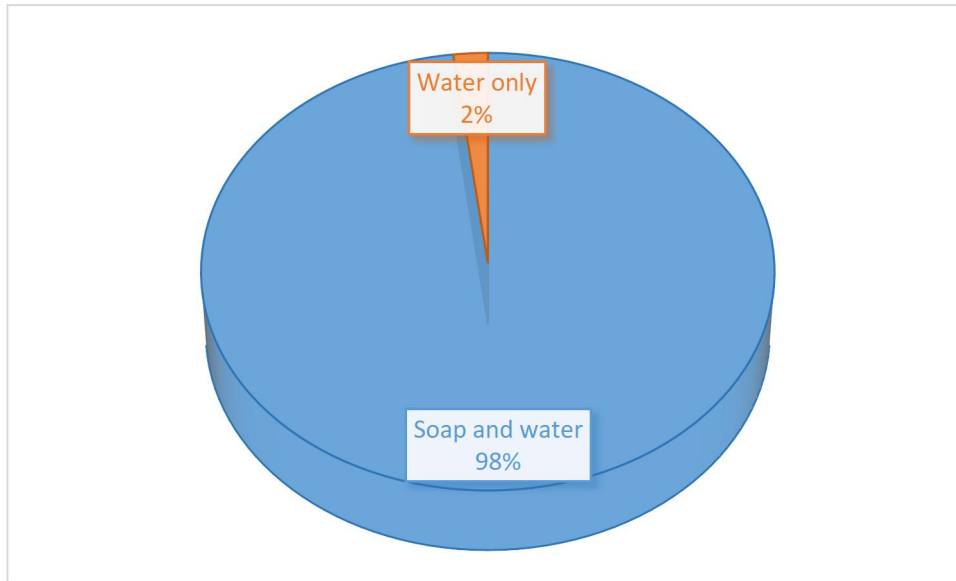
Eighty (80%) of the respondents indicated that they maintain hygiene by bathing regularly, changing sanitary pads frequently, and properly disposing of menstrual waste which was referred as “Good”, while 20% were of the contrary opinion referred as “Poor”. The findings agree with a study by Angrainy *et al.* (2021), who state that it is important to practice suitable hygiene and have a daily body wash, which will make adolescent girls more confident during menstruation. Kemigisha *et al.* (2020) in their study reported most girls had good hygiene practices including body hygiene, cleaning of reusable Menstrual materials with soap and water then dried them under the sun (Kemigisha *et al.*, 2020). These results highlight the importance of education and awareness surrounding menstrual hygiene practices. Implementing proper hygiene habits can not only promote physical health but also boost self-esteem and overall well-being during menstruation. Contrary, in Karachi, Pakistan 77.8% of menstruating females did

not have their bath regularly during menstruation with a misconception that bathing would cause irregular flow (Arshad *et al.*, 2020).

#### 4.3.2 Washing of hands during changing menstrual management materials

**Figure 4. 5**

*Washing hands during change of menstrual management materials*



*Source: Researcher, (2024)*

Ninety-eight (98%) of the respondents stated that washing hands is important, and they do so with soap and water. Angrainy *et al.* (2021) agree with the study findings, stating that hygiene during menses plays an important role in determining the health of the reproductive organs. Cleaning is one way to assess the health of menstruating adolescent girls' genital organs and ensure that they are free from various infectious diseases and other related conditions such as vaginal discharge, cervical cancer, genital skin irritation, allergies, and inflammation in the genital area.

### 4.3.3 Frequency of change of menstrual management materials

**Table 4. 4**

*Frequency of changing menstrual management material*

<b>Changing Menstrual management material</b>	<b>Frequency</b>	<b>Percentage</b>
4-6 hours	364	94
Twice a day	23	6
<b>Total</b>	<b>387</b>	<b>100</b>

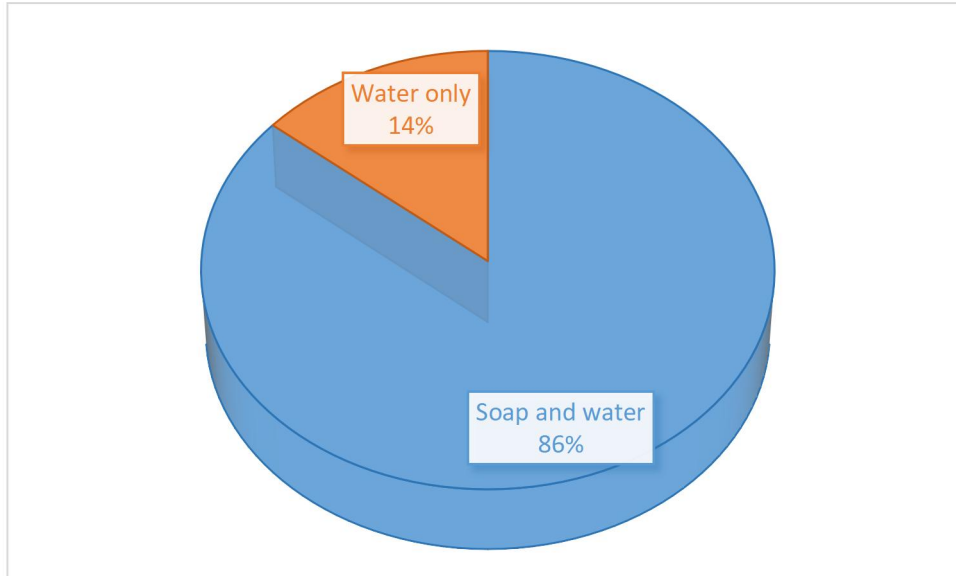
*Source: Researcher, (2024)*

Ninety-four (94%) of the respondents reported changing their menstrual management materials every 4-6 hours. The findings are in accordance with a study by Van Eijik *et al.* (2016), who indicated that the change of menstrual materials should not take long and should be between a minimum of 4-6 hours. This suggests that the majority of individuals are following recommended guidelines for menstrual hygiene. Proper and timely changing of menstrual management materials is crucial to preventing infections and maintaining overall health during menstruation. Furthermore, other respondents indicated twice a day, depending on the cycle's flow. Vayeda *et al.* (2021) reported the least number of females (11.4%) changing their menstrual materials thrice a day.

#### 4.3.4 Cleaning of genitalia during the menstrual period

Figure 4. 6

*Cleaning of genitalia during menstruation*



*Source: Researcher, (2024)*

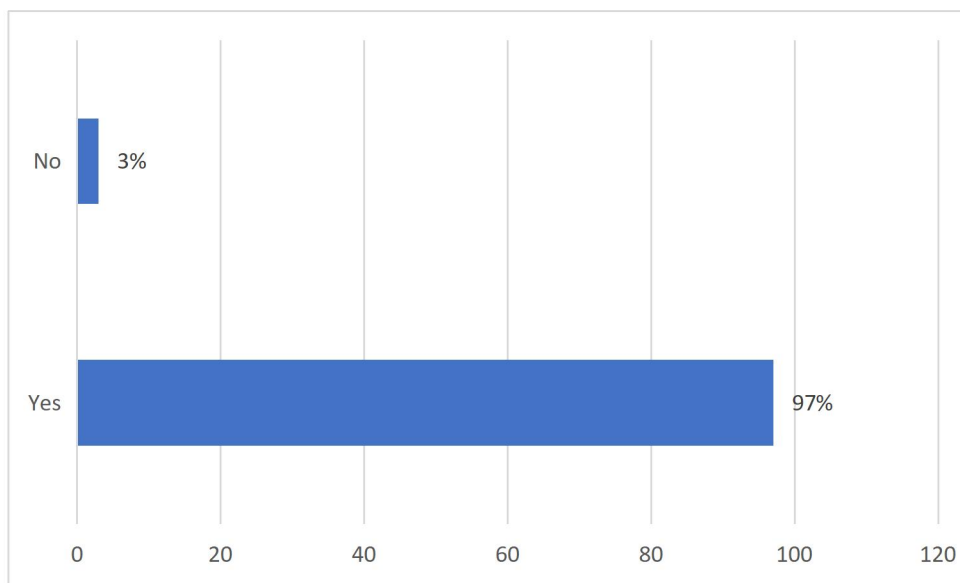
Eighty-six (86%) of the respondents said they clean their genitalia with soap and water during their menstrual period and 14% of their counterparts used water only. In contrast, 31.2% of females in Karachi, Pakistan avoided washing their genital area during menstruation (Arshad *et al.*, 2020). Hamoonga *et al.* (2019) and Belayneh *et al.* (2019) found in their studies that adolescent girls cleaned their genitalia with soap and water which resulted to vaginal douching hence leading to the overgrowth of harmful bacteria and consequently cause menstrual-related illness. Therefore, Hammonga *et al.* (2019) should discourage the use of soap for genital cleaning. Furthermore, other respondents indicated that they used a clean piece of clothing and water to better clean their genital parts.

#### 4.3.5 Use of soap/ other cleaning agent during menstruation

The objective of this inquiry was to obtain data regarding the cleanliness habits of the participants throughout their menstrual period. This data will help researchers better understand prevalent habits and potential health hazards associated with menstruation.

**Figure 4. 7**

*Use of soap or other cleaning agent during menstruation*



*Source: Researcher, (2024)*

The overwhelming majority of respondents, 97%, reported using soap or another cleaning agent during menstruation. People widely regard this practice as the most effective solution, free from any adverse effects. Only 3% of the participants indicated that they did not use any cleaning solutions while menstruating. Use caution when using soap or cleaning agents during menstruation, as certain products may disrupt the vagina's natural pH balance.

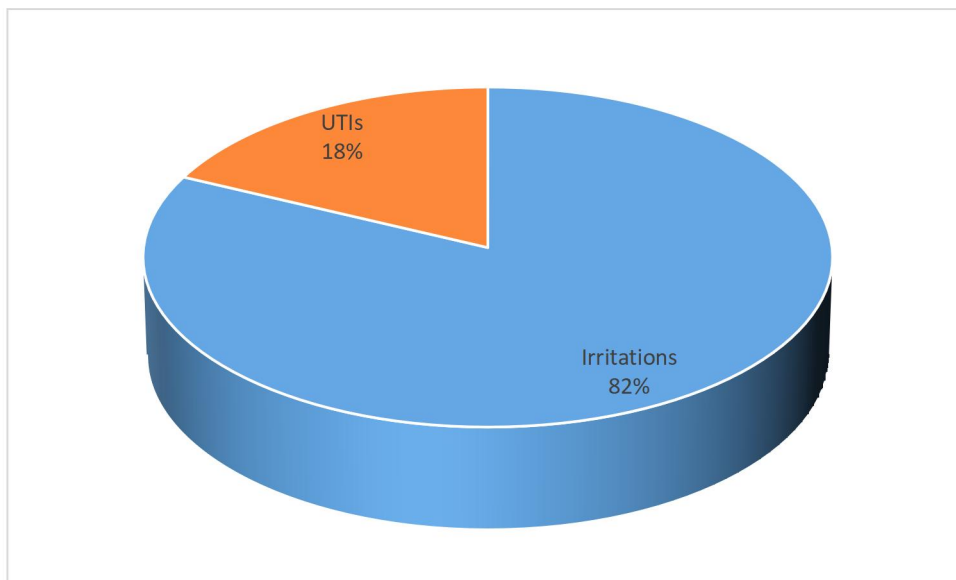
Additional investigation is required to examine alternate hygiene methods for individuals who do not utilize cleansing chemicals during menstruation. The findings are in line with research by Mathenge *et al* which found that approximately 84% of adolescent females practiced genital hygiene during menstruation. The washing process involved the

utilization of both water and soap (Mathenge *et al.*, 2020). Nevertheless, it is crucial to inform consumers about the possible hazards linked to the use of specific cleaning agents, as they can result in infections or discomfort. Furthermore, advocating for appropriate hygiene practices during menstruation can help prevent these problems and improve overall vaginal well-being. The survey also discovered that a mere 16% of adolescent girls refrained from utilizing any type of cleansing product during menstruation.

#### 4.3.6 Health risks associated with poor personal hygiene practices

**Figure 4. 8**

*Health risks associated with poor Personal hygiene practices*



*Source: Researcher, (2024)*

Eighty-two (82%) of the participants reported that inadequate personal hygiene practices during menstruation can lead to health risks such as irritation, which causes frequent itching of the genital area, and 18% reported urinary tract infections caused by the discharge that occurs during the menstrual cycle. Shah *et al.*, (2022) concurs with the research findings by asserting that practicing proper personal hygiene can effectively safeguard individuals from susceptibility to reproductive tract infections (RTIs), urinary tract infections (UTIs), and other difficulties associated with menstrual hygiene.

Recurrent episodes of respiratory tract infections (RTIs) can potentially result in infertility. These effects happen because people don't follow basic hygiene rules. For example, they might not change their menstrual management materials often enough (less than four times a day), they might use the wrong ones, they might not change their underwear twice a day while they're menstruating, and they might forget to replace their menstrual management materials after they urinate, defecate, or bathe (Shah *et al.*, 2022). It is imperative for individuals to adhere to appropriate personal hygiene practices during menstruation in order to mitigate these health concerns. Educating people about the importance of regularly changing menstruation management materials and practicing cleanliness can effectively reduce the occurrence of reproductive tract infections (RTIs) and urinary tract infections (UTIs).

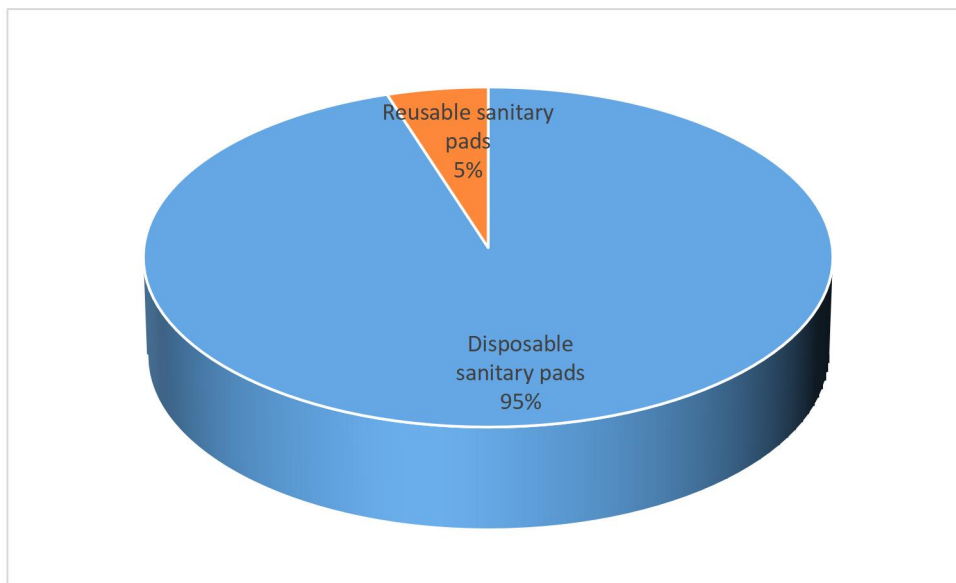
#### **4.4. Menstrual Management Materials**

##### **4.4.1 Type of menstrual management materials**

Respondents were asked to specify the types of menstrual management materials they used during their menstrual cycles. The results were as follows;

**Figure 4. 9**

*Type of menstrual management materials used*



*Source: Researcher, (2024)*

According to the respondents, the majority (95%) of them used disposable sanitary pads as the most common menstrual management material as 5% used reusable sanitary pads. This study has similarities to another by Kambala *et al.* (2020) conducted in Malawi, where the majority of participants chose to use sanitary pads instead of menstrual cups because they thought the latter were too complicated to use (Kambala *et al.*, 2020). Similarly, Arshad *et al.* (2020) conducted a study in Karachi, Pakistan where majority of the females reported to used sanitary pads to manage their menstrual flows (Arshad *et al.*, 2020). Hema Priya *et al.* made a similar observation, reporting that most of the girls in their study used sanitary pads (Hema Priya *et al.*, 2017). Furthermore, this study contradicts previous studies in Southern Ethiopia where the least number of respondents reported using sanitary pads (Belayneh *et al.*, 2019). Mehta *et al.* (2021) and Kumari *et al.* (2021) found out that none of the adolescent females in their studies used sanitary pads.

#### 4.4.2 Acquiring of menstrual management materials

**Table 4. 5**

*Acquisition of menstrual management materials*

<b>Acquisition of Menstrual management materials</b>	<b>Frequency</b>	<b>Percentage</b>
Donations	356	92
Local shops	31	8
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

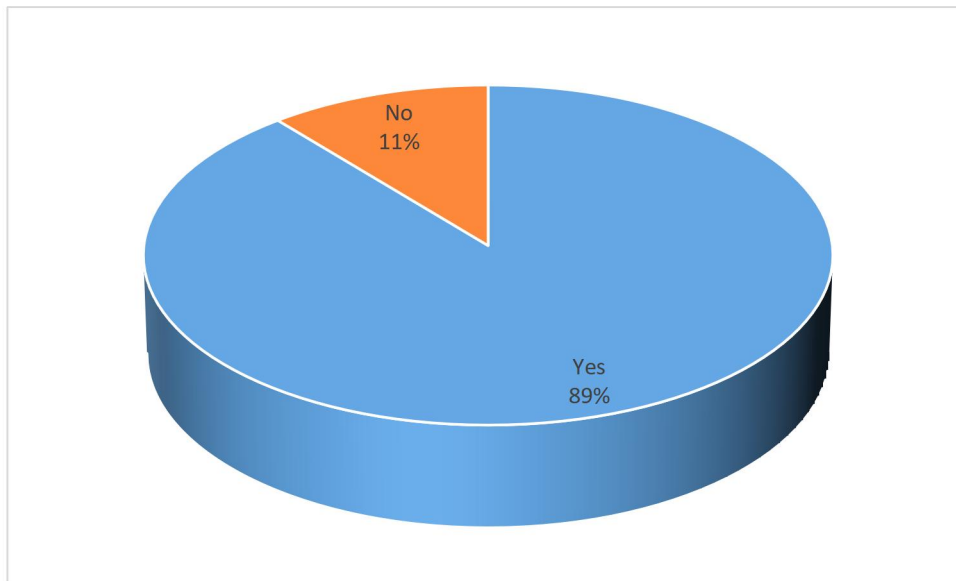
Ninety-two (92%) of the respondents indicated that the acquisition of the menstrual management materials was through donations, as most of them come from low-income households where the purchase of the sanitary pads is an issue. Furthermore, 8% of the respondents indicated that they purchase the sanitary pads from the local shop around the area they live in. This is because the sponsors provided the school with sanitary materials. This runs counter to a comparable study done in India by Jahan *et al.* (2020), which found that a person's career did affect the sanitary pad they chose to use. While those in the middle class would be more concerned with cultural taboos, those in the lower income group would be more concerned with the financial consequences of purchasing sanitary pads, while those from the lower income class would prefer to use a piece of cloth. (Jahan *et al.*, 2020).

#### 4.4.3 Challenges in accessing menstrual management materials

The respondents were asked if they had ever encountered difficulties in obtaining menstrual management materials and, if so, what those difficulties were.

**Figure 4. 10**

*Challenges faced in accessing menstrual management materials*



*Source: Researcher, (2024)*

Eighty-nine (89%) of the respondents reported experiencing challenges in accessing menstrual management materials, including insufficient funds to buy sanitary pads. According to Janoowalla *et al.* (2020), the majority of the girls in this study reported having trouble getting access to sanitary pads during school breaks, which is consistent with the findings. Since the girls would typically receive sanitary goods at school, they chose to use alternative menstruation products instead of sanitary products, which were more expensive for their guardians to buy. This study is consistent with another one in Rwanda, where the majority of girls reported using homemade alternatives because sanitary pads were too expensive (Janoowalla *et al.*, 2020).

#### 4.4.4 Information/education on different menstrual management options

**Table 4. 6**

*Information on different menstrual management materials*

<b>Information on different Menstrual management materials</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	317	82
No	70	18
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

Eighty-two (82%) of the respondents said they had received information on various menstrual management options through television, radio, and other communication channels, whereas 18% disagreed. Contrary, a least number of females (15.9%) were found to be aware of other menstrual management materials including tampons and menstrual cups in a study carried out in Karachi, Pakistan (Arshad *et al.*, 2020).

#### 4.4.5 Feeling about the menstrual management materials

**Table 4. 7**

*Feeling about the current menstrual management material used*

<b>Feeling</b>	<b>Frequency</b>	<b>Percentage</b>
Comfortable	356	92
Uncomfortable	31	8
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

Ninety-two (92%) of the respondents indicated that they feel comfortable with matters regarding menstrual management materials they use as they do have the serious side effects which may be termed as dangerous. Eight (8%) of the respondents expressed discomfort due to the material's impact on their normal bodily functions, as well as a sense of a foreign object interfering with their normal functioning. The findings agree with a study by Kaur *et al.* (2018), who stated that individual inclinations and levels of comfort significantly influence the selection of menstrual hygiene management materials

and techniques. Furthermore, these practices vary among girls based on their geographical location, whether it be at home or outside of households (Kaur *et al.*, 2018).

#### 4.4.6 Other menstrual hygiene management materials

**Table 4. 8**

*Willingness to use other menstrual management materials*

<b>Readiness to use other Menstrual management materials</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	0	0
No	387	100
<b>Total</b>	<b>387</b>	<b>100</b>

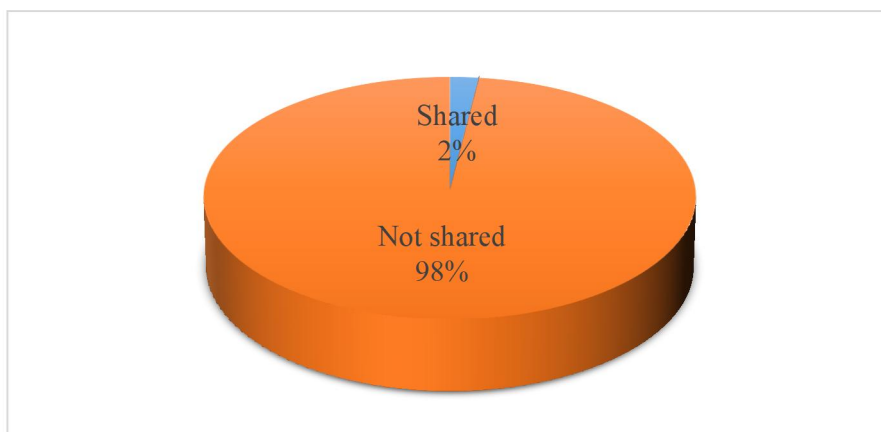
*Source: Researcher, (2024)*

One hundred (100%) of the respondents stated that they do not intend to use any other menstrual hygiene management materials because they feel that the current ones are comfortable and serve the intended purpose. Hema-Priya *et al.* (2017) contradict the study findings by indicating that the changing of soaked sanitary pads among adolescent girls was satisfactory, but on the other hand, some adolescent girls mentioned that they would change the materials

#### 4.4.7 Sharing of menstrual management materials

**Figure 4. 11**

*Sharing of menstrual management materials*



*Source: Researcher, (2024)*

Ninety-eight (98%) of respondents indicated that they have never shared the menstrual hygiene management materials with someone, as this would be dangerous to one's health, especially with the infectious diseases that affect the genital parts, while 2% were of the opposite opinion. This is similar to earlier research conducted in Ethiopia (Belayneh *et al.*, 2019), Ghana (Mohammed *et al.*, 2020), and India (Rawat *et al.*, 2023), where a large number of young women had been taught that menstruation was unclean or impure and that it was forbidden to perform "puja" or attend religious events during one's menstruation.

#### 4.4.8 Improvement in access to and use of menstrual hygiene products

**Table 4. 9**

*Access to and use of menstrual management materials*

<b>Access to and use of Menstrual management materials</b>	<b>Frequency</b>	<b>Percentage</b>
Training on good user practice	329	85
Availability of free Menstrual management materials	58	15
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

Eighty-five (85%) of the respondents suggested that training on the proper use of menstrual hygiene management materials and the provision of free sanitary towels for all female students at each school would improve access to and use of menstrual hygiene products and facilities while 15% opted for the provision of free Menstrual management materials. This would make the girls confident and, at the same time, improve their hygiene, which translates to improved performance. According to a Ugandan study, girls often resorted to using unhygienic materials like leaves and newspapers due to their limited knowledge about menstruation (Kansiime *et al.*, 2020). The study also found that adolescent girls who had received education on MHM had better knowledge and were more likely to use appropriate MH materials during menstruation.

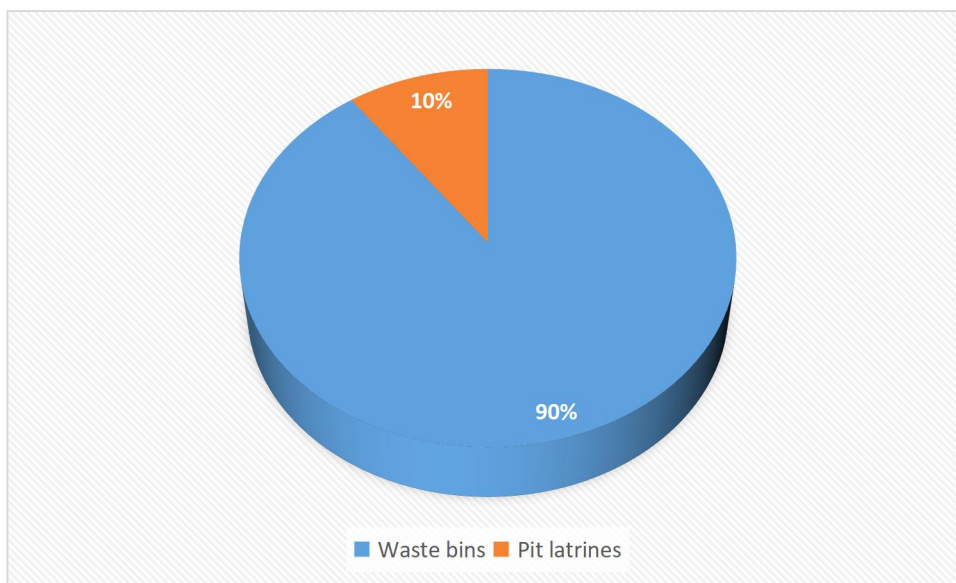
#### 4.5. Disposal Options of Menstrual Wastes

The third objective was to identify the types of disposal mechanisms practiced among girls aged 9 to 17 years in Mathioya Sub-County. This section presents findings on disposal options for menstrual waste. The following subsections display the findings.

##### 4.5.1 Access to proper disposal facilities

**Figure 4. 12**

*Access to appropriate disposal facilities*



*Source: Researcher, (2024)*

Ninety (90%) of the respondents indicated that their schools have waste bins as well as pit latrines where they can dispose of the menstrual hygiene management materials, while 10% indicated pit latrines. This finding conflict with research conducted in Northern Kenya by Korir *et al.* (2018), which found that poor MHM practices were primarily caused by a lack of latrine privacy for one-third of the pastoralist teenage females attending school.

#### 4.5.2 Dispose of menstrual management materials

**Table 4. 10**

*Pit latrines*

<b>Pit latrines</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	375	97
No	12	3
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

Ninety-seven (97%) of the respondents indicated that the best way to dispose of menstrual hygiene management materials is to throw them in the pit latrine, where they can dispose of them without any environmental impact, while 3% disagreed. This is consistent with two studies conducted in Ethiopia that noted high rates of menstrual management materials in latrines 69.3% (Gultie *et al.*, 2014) and 77.5% (Tegegne *et al.*, 2014). Another research conducted in Dhaka, Bangladesh, which showed that spent menstruation products were discarded in a variety of locations, including sanitary bins, water bodies, and toilets (Jahan *et al.*, 2020; Yeasmin *et al.*, 2017). This study differs from one conducted in Zimbabwe previously, where almost all of the participants preferred to dispose of their used menstrual products in private dumping areas far from their homes or places of education because it was considered improper for them to have their used sanitary products visible to others (Calderon-villarreal *et al.*, 2020), and Hema Priya *et al.* (2017) and Vayeda *et al.* (2021) where the majority of the girls burned or buried their used menstrual management materials in backyard dried wastes.

### 4.5.3 Environmental impacts of improper disposal of menstrual management materials

**Table 4. 11**

*Awareness on effects of inappropriate disposal of menstrual waste*

<b>Awareness on the effects of inappropriate disposal of menstrual waste</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	66	17
No	321	83
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

Eighty-three (83%) of the respondents indicated that they were not aware whether the improper disposal of menstrual management materials can have an impact on the environment, while 17% were of the contrary opinion. In their study, Scorgie *et al.* (2016) state that menstrual hygiene management, including the disposal of menstrual management materials, can have an environmental impact. Inadequate disposal options for menstrual management materials may contribute to inappropriate practices that lead to pollution of land and water sources, as well as blockages of water channels (Kaur *et al.*, 2018).

### 4.5.4 Education or guidance on proper disposal methods

**Table 4. 12** *Menstrual waste disposal methods*

<b>Menstrual waste disposal methods</b>	<b>Frequency</b>	<b>Percentage</b>
Aware	379	98
Oblivious	8	2
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

Ninety-eight (98%) of the respondents indicated that the school has offered a lesson on how they need to dispose of menstrual hygiene materials, while 2% were of the contrary opinion. This is similar to a study that Chinyama *et al.* reported in Zambia (2019). This is in line with the Menstrual Hygiene Management Policy (2014-2018) in Kenya, which

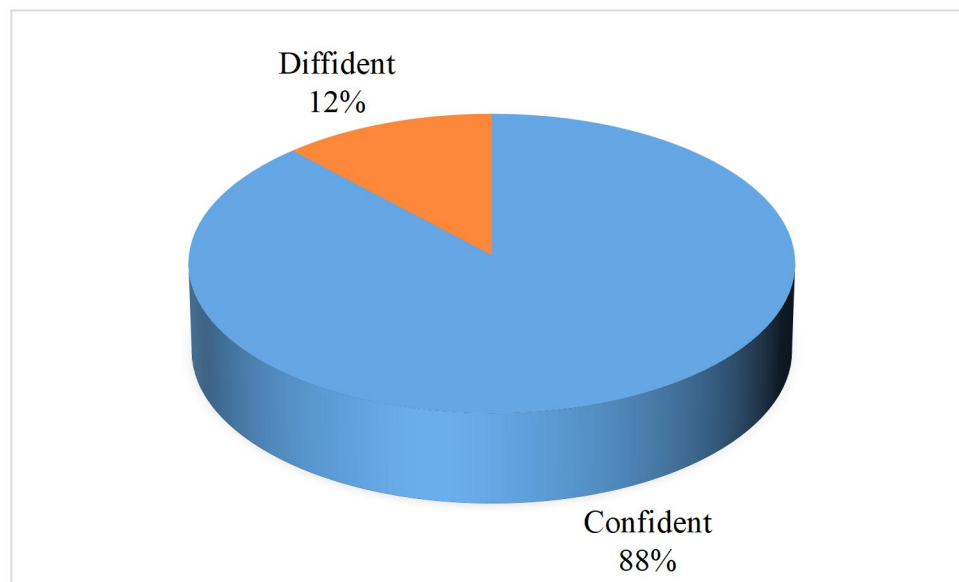
promotes that women should have access to accurate information and be well-informed about their bodies prior to menstruation in order to lessen stigma and help adolescent girls choose menstrual products based on their financial capabilities and basic needs. (Aidara *et al.*, 2020).

#### 4.6 General Menstrual Hygiene Management Practices

##### 4.6.1 Discussing menstrual hygiene management practices

**Figure 4. 13**

*Discussing menstrual hygiene management practices*



*Source: Researcher, (2024)*

Eighty-eight (88%) of the respondents expressed confidence in discussing menstrual hygiene management practices, believing it would provide valuable insights into their reproductive health and the importance of the menstrual cycle in a woman's reproductive cycle. Conversely, 12% of the respondents held a contrary view. The respondents who expressed confidence in discussing menstrual hygiene management practices believed that open communication can lead to better understanding and support. On the other hand, the 12% who were not confident may benefit from more education and awareness on the topic. Similarly, in Nakivale Refugee Settlement, Uganda adolescent girls

reported to be comfortable discussing menstruation topics with their older friends (Kemigisha *et al.*, 2020). These findings conflict with a study by Boosey *et al.* (2014) conducted in Uganda. According to that survey, the majority of girls thought that menstruation and MHM were humiliating and shameful experiences; hence, they were reluctant to talk about them when asked. As a result, they knew very little or nothing about MHM practices. This disparity in attitudes towards menstrual hygiene management highlights the importance of cultural context and education in shaping perceptions. It suggests tailoring interventions to address specific beliefs and taboos surrounding menstruation in different communities.

#### 4.6.2 Visiting the health facility for menstrual hygiene management

The researcher requested the respondents to indicate their frequency of visits to the health facility for menstrual hygiene management-related advice. The data collected will be used to assess the effectiveness of current menstrual hygiene management programs and identify areas for improvement. This information will aid in tailoring future interventions to better meet the community's needs.

**Table 4. 13**

*Seeking advice at health facilities*

<b>Seeking advice at health facilities</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	0	0
No	387	100
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

All (100%) of the respondents indicated that the visit to the health facility occurs during an irregular cycle, which poses a threat to a female's reproductive health. This highlights the importance of access to timely and accurate information on menstrual hygiene management. It also underscores the need for ongoing support and education for women in the community to address these critical health issues. The findings align with a 2020

study by Hennegan *et al*, which recommends visiting a health facility for females experiencing menstrual cycle issues. This is important because it helps to address any risks that may lead to complications.

#### 4.6.3 Improvement of menstrual hygiene management practices

**Table 4. 14**

*Improvement on menstrual hygiene management practices*

<b>Improvement on Menstrual hygiene management practices</b>	<b>Frequency</b>	<b>Percentage</b>
Training on good user practice	15	4
Provision of free sanitary pads	372	<b>96</b>
<b>Total</b>	<b>387</b>	<b>100</b>

*Source: Researcher, (2024)*

Some respondents (4%) emphasized the importance of providing education on menstrual hygiene to both girls and boys to reduce stigma and promote understanding. Others suggested implementing regular workshops or training sessions for teachers and parents to ensure ongoing support for adolescent girls. 96% of the respondents suggested offering free sanitary pads in schools to ensure every girl feels comfortable and confident, and to prevent shame when sanitary pads are unavailable. According to Korir *et al.* (2018), the WASH, public health, and education sectors have not given this issue adequate attention. They emphasized the importance of collaboration between these sectors to address the menstrual hygiene needs of adolescent girls effectively.

Additionally, they recommended incorporating menstrual hygiene management into school curricula to normalize discussions and practices surrounding menstruation. This can help break the stigma and ensure that girls have access to the necessary resources. By educating both boys and girls about menstrual hygiene, we can create a more inclusive and supportive environment for all students. A study among girls from pastoralist communities in Kenya documented poor MHM practices. The school provided sanitary towels to the girls in this case, but reports indicated that the supplies

were inconsistent. Nonetheless, these girls delayed changing their absorbents for more than 6 hours, and those using reusable absorbents stored them in unclean, hidden places.

## **CHAPTER FIVE: CONCLUSION, RECOMMENDATIONS AND PUBLICATION**

### **5.1 Introduction**

This chapter presented a summary, conclusion, and recommendations on menstrual hygiene management practices among girls aged 9 to 17 years in Mathioya Sub-County, Muranga County.

### **5.2 Summary of Findings**

This section presents a summary of findings with regard to the study objectives. The findings reveal significant correlations between variables, largely meeting the study objectives. Additionally, key insights were gained that contributed to the existing body of knowledge on the topic.

#### **5.2.1 Personal hygiene practices among girls**

The study aimed to identify personal hygiene practices among girls aged 9-17 in Mathioya Sub-County. The results showed that girls maintain hygiene by bathing regularly, changing sanitary pads frequently, and disposing of menstrual waste properly. Adolescent girls emphasized the importance of washing hands regularly, using soap and water when changing menstrual management materials. They also cleaned their genitalia using soap and water, along with clean clothing and water. The study found that girls have a high level of knowledge and adherence to proper hygiene practices, using soap as the most effective remedy without side effects. Poor hygiene practices during menstruation could lead to health risks, such as irritation and urinary tract infections. Therefore, education on proper hygiene practices is crucial to prevent discomfort and infections.

### **5.2.2 Types of menstrual management materials used**

The study consisted of investigating the menstrual management materials used by girls aged 9-17 in Mathioya Sub-County. It revealed that sanitary pads were the most common, primarily acquired through donations from low-income households and local shops. The study also highlighted the challenges faced by girls in accessing menstrual hygiene products due to financial constraints. Despite the potential for serious side effects, respondents were comfortable with using these materials. They received information on menstrual management options through various channels, such as television and radio. However, they never shared their materials due to potential health risks, particularly from infectious diseases affecting the genital parts.

### **5.2.3 Types of disposal mechanisms practiced among girls**

The third objective was to determine the specific trash disposal methods employed by females aged 9 to 17 in Mathioya Sub-County. The survey indicated they had access to waste bins and pit latrines to enable the appropriate disposal of menstrual hygiene management materials. Furthermore, some girls revealed that they employed incinerators or interred their menstrual hygiene products in secluded areas. The examined girls predominantly utilized a range of disposal methods, incorporating both school-provided options and individual strategies. The study revealed that the most effective technique for disposing of menstrual hygiene management materials is to deposit them in a pit latrine, ensuring thorough disposal and reducing potential environmental impact. The survey indicated that users were unaware of the potential environmental repercussions of inappropriate disposal of menstruation control products. The school also offered guidelines for the appropriate disposal of period hygiene products.

### **5.3 Conclusion of the Study**

#### **5.3.1 Personal hygiene practices among girls**

The study emphasized the importance of hand washing before and after changing menstrual management materials, typically using soap and water. It also highlighted the importance of cleaning genitalia during menstruation using soap and water, along with clean clothing. Poor personal hygiene practices during menstruation could lead to health risks such as irritation, frequent itching, and urinary tract infections due to discharge during the cycle.

#### **5.3.2 Type of menstrual management materials used**

The study found that most respondents used sanitary pads as their primary menstrual management material, primarily obtained through donations. However, accessing these materials is challenging, with many facing insufficient funds to purchase pads, suggesting that there must be improved access to these essential resources.

#### **5.3.3 Types of disposal mechanisms practiced among girls**

The study found that adolescent girls had access to waste bins and pit latrines for disposing of menstrual hygiene management materials, with pit latrines being the best for safe disposal without environmental impact. It recommended proper waste management practices and education on proper disposal methods for a clean and healthy environment. The study also found that students were unaware of the environmental impact of improper disposal and that the school provided lessons on proper disposal methods.

### **5.4 Recommendations of the Study**

The research's findings have led to the following recommendations:

According to the first objective on personal hygiene practices among girls, the State Department of Basic Education in the MOE, through their mandate in education policy,

should incorporate general menstrual hygiene management into the National School Health Policy.

Regarding the second objective of managing materials used by girls, the study recommends that the Murang'a county government and school administration should provide support for sanitary materials and pants for adolescent girls, as well as any affiliated NGOs, CBOs, and other sponsors.

With regard to the third objective on types of disposal mechanisms practiced among girls, the study recommends that the schools, through the ministry of education, should provide materials for menstrual material disposal as well as alternatives to minimize waste.

For comparison purposes, a study on menstrual hygiene management among school-going adolescent girls in Kenyan counties is recommended, aiming to identify necessary policy measures and develop tailored MHM policies for adolescents.

### **5.5 Publication**

Nyarenchi, J., Amatu, M., & Mutembei, J. (2025). Menstrual hygiene management practices among girls aged 9 to 17 years in Mathioya Sub-County, Murang'a County: A descriptive study on personal hygiene practices, menstrual management materials, and disposal methods. *African Journal of Science, Technology and Social Sciences*, 4(2), PAS 65–73. <https://doi.org/10.58506/ajstss.v4i2.264>

## REFERENCES

- Achuthan, K., Muthupalani, S., Kolili, V. K. & Sreedevi, A. (2021). A novel banana fiber pad for menstrual hygiene in India: a feasibility and acceptability study. *BMC Women's Health*, 21(1):1-14.
- Adane, Y., Ambelu, A., Azage Yenesew, M., & Mekonnen, Y. (2024). Menstrual hygiene management practices among schoolgirls in resource-limited settings of Bahir Dar City administration, Northwestern Ethiopia. *Women's health (London, England)*, 20, 17455057241308343. <https://doi.org/10.1177/17455057241308343>
- Ademas, A., Adane, M., Sisay, T., Kloos, H., Eneyew, B., Keleb, A., Lingerew, M., Derso, A., & Alemu, K. (2020). Does menstrual hygiene management and water, sanitation, and hygiene predict reproductive tract infections among reproductive women in urban areas in Ethiopia? *PloS One*, 15(8), e0237696. <https://doi.org/10.1371/journal.pone.0237696>
- Afiaz, A., & Biswas, R. K. (2021). Awareness on menstrual hygiene management in Bangladesh and the possibilities of media interventions: using a nationwide cross-sectional survey. *BMJ open*, 11(4), e042134. <https://doi.org/10.1136/bmjopen-2020-042134>
- Ahmed Shallo, S., Willi, W., & Abubeker, A. (2020). Factors Affecting Menstrual Hygiene Management Practice Among School Adolescents in Ambo, Western Ethiopia, 2018: A Cross-Sectional Mixed-Method Study. *Risk management and healthcare policy*, 13, 1579–1587. <https://doi.org/10.2147/RMHP.S267534>
- Aidara, R., & Gassama Mbaye, M. (2020). Practice Note: Menstrual Hygiene Management— Breaking Taboos and Supporting Policy Change in West

- and Central Africa. In C. Bobel (Eds.) et. al., *The Palgrave Handbook of Critical Menstruation Studies*. (pp. 529–537). Palgrave Macmillan.
- Ajzen, I. (2018). *Constructing a theory of planned behavior*.
- Akoth, C., Wambiya, E. O. A., Kibe, P. M., Mbutia, G. W., Otieno, P. O., & Oguta, J. O. (2023). Prevalence and factors associated with unmet need for menstrual hygiene management in six countries in Sub-Saharan Africa: a multilevel analysis, 18 September 2023, PREPRINT (Version 1). <https://doi.org/10.21203/rs.3.rs-3280589/v1>
- Alam, M. U., Sultana, F., Hunter, E. C., Winch, P. J., Unicomb, L., Sarker, S., Mahfuz, M. T., Al-Masud, A., Rahman, M., & Luby, S. P. (2022). Evaluation of a menstrual hygiene intervention in urban and rural schools in Bangladesh: a pilot study. *BMC public health*, 22(1), 1100. <https://doi.org/10.1186/s12889-022-13478-1>
- Alda-Vidal, C., & Browne, A. L. (2022). Absorbents, practices, and infrastructures: Changing socio-material landscapes of menstrual waste in Lilongwe, Malawi. *Social & Cultural Geography*, 23(8), 1057-1077. doi: 10.1080/14649365.2021.1901974
- Ali, T. S., & Rizvi, S. N. (2010). Menstrual knowledge and practices of female adolescents in urban Karachi, Pakistan. *Journal of adolescence*, 33(4), 531–541. <https://doi.org/10.1016/j.adolescence.2009.05.013>
- Amatya, P., Ghimire, S., Callahan, K. E., Baral, B. K., & Poudel, K. C. (2018). Practice and lived experience of menstrual exiles (Chhaupadi) among adolescent girls in far-western Nepal. *PloS one*, 13(12), e0208260. <https://doi.org/10.1371/journal.pone.0208260>

- Anaba, E. A., Udofia, E. A., Manu, A., Daniels, A. A., & Aryeetey, R. (2022). Use of reusable menstrual management materials and associated factors among women of reproductive age in Ghana: analysis of the 2017/18 Multiple Indicator Cluster Survey. *BMC women's health*, 22(1), 92. <https://doi.org/10.1186/s12905-022-01670-9>
- Anand, U., Vithanage, M., Rajapaksha, A. U., Dey, A., Varjani, S., & Bontempi, E. (2022). Inapt management of menstrual hygiene waste (MHW): An urgent global environmental and public health challenge in developed and developing countries. *Heliyon*, 8(7), e09859. <https://doi.org/10.1016/j.heliyon.2022.e09859>
- Angrainy, R., Fitri, L., & Utari, A. (2021). Hubungan pengetahuan dengan perilaku Personal saat menstruasi dengan remaja. *Jurnal Proteksi Kesehatan*, 10(1), 49-54.
- Aparnavi, P., Ramanathan, R., Shanmugam, J., Narayanan, S., Kumar, M., Ramya, V., Rathinamoorthy, R., & Vignesh, S. (2024). Suitability, acceptability, feasibility of modern menstrual methods: a qualitative study in Coimbatore district, Tamil Nadu, India. *Frontiers in global women's health*, 5, 1497686. <https://doi.org/10.3389/fgwh.2024.1497686>
- Arshad Ali, S., Baloch, M., Riaz, L., Iqbal, A., Riaz, R., Perveen, B., Siddiqui, M., & Arshad Ali, A. (2020). Perceptions, Practices, and Challenges Regarding Menstrual Hygiene Among Women in Karachi, Pakistan: A Comparison Between General Population and Healthcare Workers. *Cureus*, 12(8), e9894. <https://doi.org/10.7759/cureus.9894>
- Asumah, M. N., Abubakari, A., & Aninanya, G. A. (2022). Determinants of menstrual hygiene management *practices* among schoolgirls: a cross-sectional study in the Savannah Region of Ghana. *Infectious Diseases in Obstetrics and Gynecology*, 2022.

- Averbach, S., Sahin-Hodoglugil, N., Musara, P., Chipato, T., & van der Straten, A. (2009). Duet for menstrual protection: a feasibility study in Zimbabwe. *Contraception*, 79(6), 463–468. <https://doi.org/10.1016/j.contraception.2008.12.002>
- Baird, S., Hamory, J., Gezahegne, K., Pincock, K., Woldehanna, T., Yadete, W., & Jones, N. (2022). Improving Menstrual Health Literacy Through Life-Skills Programming in Rural Ethiopia. *Frontiers in global women's health*, 3, 838961. <https://doi.org/10.3389/fgwh.2022.838961>
- Baker, K. K., Padhi, B., Torondel, B., Das, P., Dutta, A., Sahoo, K. C. & Panigrahi, P. (2017). From menarche to menopause: A population-based assessment of water, sanitation, and hygiene risk factors for reproductive tract infection symptoms over life stages in rural girls and women in India. *PloS one*, 12(12), e0188234.
- 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.
- Betsu, B. D., Medhanyie, A. A., Gebrehiwet, T. G., & Wall, L. L. (2024). Menstrual hygiene management interventions and their effects on schoolgirls' menstrual hygiene experiences in low and middle countries: A systematic review. *PloS one*, 19(8), e0302523. <https://doi.org/10.1371/journal.pone.0302523>
- Bhagwat, A., & Jijina, P. (2020). A Psychosocial Lens on an Indigenous Initiative to Address Menstrual Health and Hygiene in Indian Villages. *Social work in public health*, 35(3), 73–89. <https://doi.org/10.1080/19371918.2020.1738972>
- Bloomfield, S. F., Exner, M., Signorelli, C., Nath, K. J., & Scott, E. A. (2011, April). The infection risks associated with clothing and household linens in home and

everyday life settings, and the role of laundry. In *International Scientific Forum on Home Hygiene*.

Boosey, R., Prestwich, G., & Deave, T. (2014). Menstrual hygiene management amongst schoolgirls in the Rukungiri district of Uganda and the impact on their education: a cross-sectional study. *The Pan African medical journal*, *19*, 253. <https://doi.org/10.11604/pamj.2014.19.253.5313>

Braun, V., & Clarke, V. (2022). Toward good practice in thematic analysis: Avoiding common problems and becoming a knowing researcher. *International journal of transgender health*, *24*(1), 1–6. <https://doi.org/10.1080/26895269.2022.2129597>

Borjigen, A., Huang, C., Liu, M., Lu, J., Peng, H., Sapkota, C., & Sheng, J. (2019). Status and Factors of Menstrual Knowledge, Attitudes, Behaviors and Their Correlation with Psychological Stress in Adolescent Girls. *Journal of pediatric and adolescent gynecology*, *32*(6), 584–589. <https://doi.org/10.1016/j.jpag.2019.08.007>

Calderón-Villarreal, A., Schweitzer, R., & Kayser, G. (2022). Social and geographic inequalities in water, sanitation and hygiene access in 21 refugee camps and settlements in Bangladesh, Kenya, Uganda, South Sudan, and Zimbabwe. *International journal for equity in health*, *21*(1), 27. <https://doi.org/10.1186/s12939-022-01626-3>

Chandra-Mouli, V., & Patel, S. V. (2017). Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low- and middle-income countries. *Reproductive health*, *14*(1), 30. <https://doi.org/10.1186/s12978-017-0293-6>

- 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.<https://doi.org/10.1186/s12978-017-0293-6>
- Chen, T., Kerubo, E., Van Eijik, A., Pace, C., Obor, D., Juma, J., Oyaro, B., Niessen, L., Bigogo, G., Ngere, I., Henry, C., Majiwa, M., Onyango, C. O., Phillips-Howard, P. A. (2019). Menstrual cups and cash transfer to reduce sexual and reproductive harm and school dropout in adolescent schoolgirls: study protocol of a cluster-randomised controlled trial in western Kenya. *BMC Public Health*, 19(1), 1317. <https://doi.org/10.1186/s12889-019-7594-3>
- Chinyama, J., Chipungu, J., Rudd, C., Mwale, M., Verstraete, L., Sikamo, C., Mutale, W., Chilengi, R., & 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), 16. <https://doi.org/10.1186/s12889-018-6360-2>
- Choi, H., Lim, N. K., Jung, H., Kim, O., & Park, H. Y. (2021). Use of menstrual sanitary products in women of reproductive age: Korea Nurses' Health Study. *Osong Public Health and Research Perspectives*, 12(1), 20.
- Coast, E., Lattof, S. R., & Strong, J. (2019). Puberty and menstruation knowledge among young adolescents in low-and middle-income countries: a scoping review. *International journal of public health*, 64, 293-304. <https://doi.org/10.1007/s00038-019-01209-0>
- Coast, E., Lattof, S. R., & Strong, J. (2019). Puberty and menstrual knowledge among young COVID-19 preventive behaviors: The mediating role of risk and efficacy

- perceptions. *Journal of Health Psychology*, 27(8), 1861-1874.  
<https://doi.org/10.1177/13591053211003125>
- Critchley, H. O. D., Maybin, J. A., Armstrong, G. M., & Williams, A. R. W. (2020). *Physiology of the Endometrium and Regulation of Menstruation. Physiological reviews*, 100(3), 1149–1179.  
<https://doi.org/10.1152/physrev.00031.2019>
- Cronk, R., Guo, A., Fleming, L., & Bartram, J. (2021). Factors associated with water quality, sanitation, and hygiene in rural schools in 14 low-and middle-income countries. *Science of the Total Environment*, 761, 144226.  
<https://doi.org/10.1016/j.scitotenv.2020.144226>
- Daniel, N., Kejela, G., Fantahun, F., Desalegn, M., & Guteta, F. (2023). Menstrual hygiene management practice and its associated factors among in-school adolescent girls in Western Ethiopia. *Contraception and reproductive medicine*, 8(1), 1. <https://doi.org/10.1186/s40834-022-00196-7>
- Deriba, B. S., Garedew, G., Gemed, D., Geleta, T. A., Jemal, K., Bala, E. T., Mekuria, M., Edraki, F. (2017, November 4). *Tampons, pads, cups: Which period product is best for the environment?* Tampons, pads, menstrual cups, period underwear: What's best for the environment? ABC News.  
<https://www.abc.net.au/news/2017-10-27/which-period-product-is-best-for-the-environment/9090658>
- Deriba, B. S., Garedew, G., Gemed, D., Geleta, T. A., Jemal, K., Bala, E. T., Mekuria, M., Nigussie, T., Dirirsa, D. E., & Legesse, E. (2022). Safe menstrual hygiene management practice and associated factors among female adolescent students at high schools in central Ethiopia: A mixed-method study. *Frontiers in public health*, 10, 913262. <https://doi.org/10.3389/fpubh.2022.913262>

- Elledge, M. F., Muralidharan, A., Parker, A., Ravndal, K. T., Siddiqui, M., Toolaram, A. P., & Woodward, K. P. (2018). Menstrual hygiene management and waste disposal in low and middle income countries—a review of the literature. *International journal of environmental research and public health*, *15*(11), 2562.
- Etsy. (n.d.). *Cloth menstrual pads*. [https://www.etsy.com/market/cloth\\_menstrual\\_pads](https://www.etsy.com/market/cloth_menstrual_pads)
- Fehintola, F. O., Fehintola, A. O., Aremu, A. O., Idowu, A., Ogunlaja, O. A., & Ogunlaja, I. P. (2017). Assessment of knowledge, attitude and practice about menstruation and menstrual hygiene among secondary high school girls in Ogbomoso, Oyo state, Nigeria. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, *6*(5), 1726-1732.
- Foster, J., & Montgomery, P. (2021). A Study of Environmentally Friendly Menstrual Absorbents in the Context of Social Change for Adolescent Girls in Low- and Middle-Income Countries. *International journal of environmental research and public health*, *18*(18), 9766. <https://doi.org/10.3390/ijerph18189766>
- Gharacheh, M., Ranjbar, F., Hajinasab, N., & Haghani, S. (2021). Acceptability and safety of the menstrual cups among Iranian women: a cross-sectional study. *BMC Women's Health*, *21*(1), 1-8. <https://doi.org/10.1186/s12905-021-01259-8>
- Girod, C., Ellis, A., Andes, K. L., Freeman, M. C., & Caruso, B. A. (2017). Physical, social, and political inequities constraining girls' menstrual management at schools in informal settlements of Nairobi, Kenya. *Journal of Urban Health*, *94*, 835-846. <https://doi.org/10.1007/s11524-017-0189-3>
- Gruer, C., Hopper, K., Smith, R. C., Kelly, E., Maroko, A., & Sommer, M. (2021). Seeking menstrual products: a qualitative exploration of the unmet menstrual needs

- of individuals experiencing homelessness in New York City. *Reproductive Health*, 18(1), 1-11. <https://doi.org/10.1186/s12978-021-01133-8>
- Gultie, T., Hailu, D., & Workineh, Y. (2014). Age of menarche and knowledge about menstrual hygiene management among adolescent school girls in Amhara province, Ethiopia: implication to health care workers & school teachers. *PloS one*, 9(9), e108644. <https://doi.org/10.1371/journal.pone.0108644>
- Habtegiorgis, Y., Sisay, T., Kloos, H., Malede, A., Yalew, M., Arefaynie, M. & Adane, M. (2021). Menstrual hygiene practices among high school girls in urban areas in Northeastern Ethiopia: A neglected issue in water, sanitation, and hygiene research. *PloS one*, 16(6), e0248825. <https://doi.org/10.1371/journal.pone.0248825>
- Ha, M. A. T., & Alam, M. 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, M. S. A., Sreedharan, S. P., Sivapragasam, P., Chakraborty, S., Devarajulu, C., & Sivagami, K. (2024). Resource recovery from soiled sanitary napkin waste-a state-of-the-art review. *Environmental science and pollution research international*, 31(21), 30336–30352. <https://doi.org/10.1007/s11356-024-33218-9>
- Hameed, M. S. A., Sreedharan, S. P., Sivapragasam, P., Chakraborty, S., Devarajulu, C., & Sivagami, K. (2024). Resource recovery from soiled sanitary napkin waste-a state-of-the-art review. *Environmental science and pollution research international*, 10.1007/s11356-024-33218-9. Advance online publication. <https://doi.org/10.1007/s11356-024-33218-9>

- Hamoonga, T. E., Olowski, P., & Musonda, P. (2019). Vaginal douching in Zambia: risk or benefit to women in the fight against cervical cancer: a retrospective cohort study. *BMC women's health*, *19*(1), 135. <https://doi.org/10.1186/s12905-019-0834-y>
- Hartmann, M. A., Krishnan, S., Rowe, B. R., Hossain, A., & Elledge, M. F. (2015). Gender-responsive sanitation solutions in urban India.
- Hema Priya, S., Nandi, P., Seetharaman, N., Ramya, M. R., Nishanthini, N., & Lokeshmaran, A. (2017). A study of menstrual hygiene and related personal hygiene practices among adolescent girls in rural Puducherry. *International Journal of Community Medicine and Public Health*, *4*(7), 2348-55.
- Hennegan, J., Dolan, C., Wu, M., Scott, L., & Montgomery, P. (2016). Measuring the prevalence and impact of poor menstrual hygiene management: a quantitative survey of schoolgirls in rural Uganda. *BMJ open*, *6*(12), e012596. <https://doi.org/10.1136/bmjopen-2016-012596>
- Hennegan, J., Dolan, C., Steinfield, L., & Montgomery, P. (2017). A qualitative understanding of the effects of reusable sanitary pads and puberty education: implications for future research and practice. *Reproductive health*, *14*(1), 78. <https://doi.org/10.1186/s12978-017-0339-9>
- Hennegan, J., Kibira, S. P. S., Exum, N. G., Schwab, K. J., Makumbi, F. E., & Bukenya, J. (2020). 'I do what a woman should do': a grounded theory study of women's menstrual experiences at work in Mukono District, Uganda. *BMJ global health*, *5*(11), e003433. <https://doi.org/10.1136/bmjgh-2020-003433>
- Hennegan, J., & Montgomery, P. (2016). Do Menstrual Hygiene Management Interventions Improve Education and Psychosocial Outcomes for Women and

- Girls in Low and Middle Income Countries? A Systematic Review. *PloSone*, 11(2), e0146985. <https://doi.org/10.1371/journal.pone.0146985>
- Hennegan, J., Swe, Z. Y., Than, K. K., Smith, C., Sol, L., Alberda, H., Bukenya, J. N., Kibira, S. P. S., Makumbi, F. E., Schwab, K. J., & Azzopardi, P. S. (2022). Monitoring Menstrual Health Knowledge: Awareness of Menstruation at Menarche as an Indicator. *Frontiers in global women's health*, 3, 832549. <https://doi.org/10.3389/fgwh.2022.832549>
- Hennegan, J., Zimmerman, L., Shannon, A. K., Exum, N. G., OlaOlorun, F., Omoluabi, E., & Schwab, K. J. (2018). The Relationship between Household Sanitation and Women's Experience of Menstrual Hygiene: Findings from a Cross-Sectional Survey in Kaduna State, Nigeria. *International journal of environmental research and public health*, 15(5), 905. <https://doi.org/10.3390/ijerph15050905>
- Hennegan, J., Shannon, A. K., Rubli, J., Schwab, K. J., & Melendez-Torres, G. J. (2019). Women's and girls' experiences of menstruation in low-and middle-income countries: A systematic review and qualitative metasynthesis. *PLoS medicine*, 16(5), e1002803. <https://doi.org/10.1371/journal.pmed.1002803>
- Holmes, K., Curry, C., Sherry, Ferfolja, T., Parry, K., Smith, C., Hyman, M., & Armour, M. (2021). Adolescent Menstrual Health Literacy in Low, Middle and High-Income Countries: A Narrative Review. *International journal of environmental research and public health*, 18(5), 2260. <https://doi.org/10.3390/ijerph18052260>
- Hussein, J., Gobena, T., & Gashaw, T. (2022). The practice of menstrual hygiene management and associated factors among secondary school girls in eastern Ethiopia: The need for water, sanitation, and hygiene support. *Women's Health*, 18, 17455057221087871. <https://doi.org/10.1177/17455057221087871>

- Jahan, F., Nuruzzaman, M., Sultana, F., Mahfuz, M. T., Rahman, M., Akhand, F. & Winch, P. J. (2020). Piloting an acceptable and feasible menstrual hygiene products disposal system in urban and rural schools in Bangladesh. *BMC Public Health*, 20(1), 1-14. <https://doi.org/10.1186/s12889-020-09413-x>
- Janoowalla, H., Keppler, H., Asanti, D., Xie, X., Negassa, A., Benfield, N., Rulisa, S., & Nathan, L. M. (2020). The impact of menstrual hygiene management on adolescent health: The effect of Go! pads on rate of urinary tract infection in adolescent females in Kibogora, Rwanda. *International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics*, 148(1), 87–95. <https://doi.org/10.1002/ijgo.12983>
- Johnston, R., & Hancioglu, A. (2017). Optimizing household survey methods to monitor the Sustainable Development Goals targets 6.1 and 6.2 on drinking water, sanitation and hygiene: A mixed-methods field-test in Belize. *PloS one*, 12(12), e0189089. <https://doi.org/10.1371/journal.pone.0189089>
- Juma, J., Nyothach, E., Laserson, K. F., Oduor, C., Arita, L., Ouma, C., Oruko, K., Omoto, J., Mason, L., Alexander, K. T., Fields, B., Onyango, C., & Phillips-Howard, P. A. (2017). Examining the safety of menstrual cups among rural primary school girls in western Kenya: observational studies nested in a randomised controlled feasibility study. *BMJ open*, 7(4), e015429. <https://doi.org/10.1136/bmjopen-2016-015429>
- Kambala, C., Chinangwa, A., Chipeta, E., Torondel, B., & Morse, T. (2020). Acceptability of menstrual products interventions for menstrual hygiene management among women and girls in Malawi. *Reproductive health*, 17(1), 185. <https://doi.org/10.1186/s12978-020-01045-z>

- Kansiime, C., Hytti, L., Nalugya, R., Nakuya, K., Namirembe, P., Nakalema, S., Neema, S., Tanton, C., Alezuyo, C., Namuli Musoke, S., Torondel, B., Francis, S. C., Ross, D. A., Bonell, C., Seeley, J., & Weiss, H. A. (2020). Menstrual health intervention and school attendance in Uganda (MENISCUS-2): a pilot intervention study. *BMJ open*, 10(2), e031182. <https://doi.org/10.1136/bmjopen-2019-031182-fccc>
- Karthikayini, S., & Arun, S. (2021). Challenges Faced by Primary Caretakers of Adolescent Girls with Intellectual Disability during their Menstrual Cycle in Puducherry: A Mixed Method Study. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine*, 46(3), 416–420. [https://doi.org/10.4103/ijcm.IJCM\\_433\\_20](https://doi.org/10.4103/ijcm.IJCM_433_20)
- Kashyap, V., & Choudhari, S. G. (2023). Menstrual Hygiene Problems and Challenges Faced by Adolescent Females in Rural Areas: A Narrative Review. *Cureus*, 15(6), e40438. <https://doi.org/10.7759/cureus.40438>
- Kaur, N., & Byard, R. W. (2021). Menstrual health management: practices, challenges and human rights violations. *Medico-Legal Journal*, 89(4), 241-246. <https://doi.org/10.1177/00258172211052111>
- Kaur, R., Kaur, K., & Kaur, R. (2018). Menstrual hygiene, management, and waste disposal: practices and challenges faced by girls/women of developing countries. *Journal of environmental and public health*, 2018. <https://doi.org/10.1155/2018/1730964>
- Kawata, R., Endo, M., & Ohashi, K. (2022). Traditional menstruation practices among Nepalese women living in Japan. *BMC women's health*, 22(1), 201. <https://doi.org/10.1186/s12905-022-01789-9>

- Kemigisha, E., Rai, M., Mlahagwa, W., Nyakato, V. N., & Ivanova, O. (2020). A Qualitative Study Exploring Menstruation Experiences and Practices among Adolescent Girls Living in the Nakivale Refugee Settlement, Uganda. *International journal of environmental research and public health*, 17(18), 6613. <https://doi.org/10.3390/ijerph17186613>
- Kenya Population and Housing Census Volume III. (2019). Distribution of Population by Age, Sex and Administrative Units. <https://www.knbs.or.ke>
- Khan, S. M., Bain, R. E. S., Lunze, K., Unalan, T., Beshanski-Pedersen, B., Slaymaker, T., Kim, H. J., & Choi, S. Y. (2018, September 20). *Status of use of menstrual hygiene products and genital organ hygiene management in unmarried women*. Korean Journal of Women Health Nursing. <https://synapse.koreamed.org/articles/1101252>
- Kim, H. J., & Choi, S. Y. (2018). Status of Use of Menstrual Hygiene Products and Genital Organ Hygiene Management in Unmarried Women. *Korean journal of women health nursing*, 24(3), 265–275. <https://doi.org/10.4069/kjwhn.2018.24.3.265>
- Kim, H., Jung, J., Song, Y. K., Chang, T., Park, S., Park, J., & Kim, K. (2022). Women's attitudes toward certification logos, labels, and advertisements for organic disposable sanitary pads: results from a multi-city cross-sectional survey. *BMC women's health*, 22(1), 237. <https://doi.org/10.1186/s12905-022-01723-z>
- Kim Y. (2023). "My body is the evidence, assess my health": Women's disposable sanitary pads social health movement in Korea. *Health care for women international*, 44(5), 566–582. <https://doi.org/10.1080/07399332.2021.1900189>
- 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. *Pan African Medical Journal*, 31(1).<https://doi.org/10.11604/pamj.2018.31.222.13521>
- 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. *Pan African Medical Journal*, 31(1).
- Krusz, E., Hall, N., Barrington, D. J., Creamer, S., Anders, W., King, M., Martin, H., & Hennegan, J. (2019). Menstrual health and hygiene among Indigenous Australian girls and women: barriers and opportunities. *BMC women's health*, 19(1), 146. <https://doi.org/10.1186/s12905-019-0846-7>
- Kuhlmann, A. S., Bergquist, E. P., Danjoint, D., & Wall, L. L. (2019). Unmet menstrual hygiene needs among low-income women. *Obstetrics & Gynecology*, 133(2), 238-244. <https://doi.org/10.1097/AOG.0000000000003060>
- Kuhlmann, A. S., Henry, K., & Wall, L. L. (2017). Menstrual Hygiene Management in Resource-Poor Countries. *Obstetrical & gynecological survey*, 72(6), 356–376. <https://doi.org/10.1097/OGX.0000000000000443>
- Kumari, S., Sood, S., Davis, S., & Chaudhury, S. (2021). Knowledge and practices related to menstruation among tribal adolescent girls. *Industrial psychiatry journal*, 30(Suppl 1), S160–S165. <https://doi.org/10.4103/0972-6748.328808>
- Kumbeni, M. T., Otupiri, E., & Ziba, F. A. (2020). Menstrual hygiene among adolescent girls in junior high schools in rural northern Ghana. *The Pan African medical journal*, 37, 190. <https://doi.org/10.11604/pamj.2020.37.190.19015>
- Kwak, J. I., Nam, S. H., Kim, D., & An, Y. J. (2019). Comparative study of feminine hygiene product regulations in Korea, the European Union, and the United States. *Regulatory toxicology and pharmacology : RTP*, 107, 104397. <https://doi.org/10.1016/j.yrtph.2019.05.022>

- Lee H. S. (2021). Why should we be concerned about early menarche?. *Clinical and experimental pediatrics*, 64(1), 26–27. <https://doi.org/10.3345/cep.2020.00521>
- Levy, J. K., Darmstadt, G. L., Ashby, C., Quandt, M., Halsey, E., Nagar, A., & Greene, M. E. (2020). Characteristics of successful programmes targeting gender inequality and restrictive gender norms for the health and wellbeing of children, adolescents, and young adults: The Lancet. *Global health*, 8(2), e225-e236. [https://doi.org/10.1016/S2214-109X\(19\)30495-4](https://doi.org/10.1016/S2214-109X(19)30495-4)
- MacRae, E. R., Clasen, T., Dasmohapatra, M., & Caruso, B. A. (2019). 'It's like a burden on the head': Redefining adequate menstrual hygiene management throughout women's varied life stages in Odisha, India. *PloS one*, 14(8), e0220114. <https://doi.org/10.1371/journal.pone.0220114>
- 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), 148. <https://doi.org/10.1186/s12978-022-01453-3>
- Marcelis, Q., Gatzios, A., Deconinck, E., Rogiers, V., Desmedt, B., & Vanhaecke, T. (2022). Quantitative risk assessment of allergens leaching from menstrual hygiene products. *Regulatory toxicology and pharmacology: RTP*, 135, 105260.
- Mason, L., Alexander, K. T., Fields, B., Onyango, C., & Phillips-Howard, P. A. (2017). Examining the safety of menstrual cups among rural primary school girls in western Kenya: observational studies nested in a randomised controlled feasibility study. *BMJ open*, 7(4), e015429. <https://doi.org/10.1136/bmjopen-2016-015429>
- Mason, L., Nyothach, E., Van Eijk, A. M., Obor, D., Alexander, K. T., Ngere, I., ... & Phillips-Howard, P. (2019). Comparing use and acceptability of menstrual cups

- and sanitary pads by schoolgirls in rural Western Kenya. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 8(8), 2974.
- Mathenge, M. W. & Midigo, R. (2020). Still grappling with menstrual hygiene: explaining uptake by socio-cultural factors among school going girls in Kenya. *Journal of Obstetrics and Gynecological Surgery*, 1(1):1-6.
- Mathiyalagen, P., Peramasamy, B., Vasudevan, K., Basu, M., Cherian, J., & Sundar, B. (2017). A descriptive cross-sectional study on menstrual hygiene and perceived reproductive morbidity among adolescent girls in a union territory, India. *Journal of family medicine and primary care*, 6(2), 360–365. <https://doi.org/10.4103/2249-4863.220031>
- Mattsson, J., Hedström, A., Ashley, R. M., & Viklander, M. (2015). Impacts and managerial implications for sewer systems due to recent changes to inputs in domestic wastewater - A review. *Journal of environmental management*, 161, 188–197. <https://doi.org/10.1016/j.jenvman.2015.06.043>
- Mehta, S., Grover, A., Mittal, N., Nanda, P., Khatuja, R., & Naseem, A. (2022). Reusable sanitary napkins-time to revisit. *Journal of public health (Oxford, England)*, 44(2), 356–362. <https://doi.org/10.1093/pubmed/fdaa192>
- Mehta, S. D., Zulaika, G., Otieno, F. O., Nyothach, E., Agingu, W., Bhaumik, R., Green, S. J., van Eijk, A. M., Kwaro, D., & Phillips-Howard, P. A. (2021). High Prevalence of *Lactobacillus crispatus* Dominated Vaginal Microbiome Among Kenyan Secondary School Girls: Negative Effects of Poor Quality Menstrual Hygiene Management and Sexual Activity. *Frontiers in cellular and infection microbiology*, 11, 716537. <https://doi.org/10.3389/fcimb.2021.716537>
- Method, A., Hassan, J., Assenga, O., Kamugisha, P., Kawishe, T., Luchagura, F., Msaka, P., Singu, M., & Bintabara, D. (2024). Challenges faced by adolescent girls on

- menstrual hygiene management: School-based study, Siha, Kilimanjaro, Tanzania. *PLOS global public health*, 4(6), e0002842.  
<https://doi.org/10.1371/journal.pgph.0002842>
- Miuro, G., Rutakumwa, R., Nakiyingi-Miuro, J., Nakuya, K., Musoke, S., Namakula, J. & Weiss, H. A. (2018). Menstrual health and school absenteeism among adolescent girls in Uganda (MENISCUS): a feasibility study. *BMC women's health*, 18, 1-13.  
<https://doi.org/10.1186/s12905-017-0502-z>
- 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.
- Mokaya, J. N., Muiruri, M., & Ongecha, F. (2022). Management of Menstrual Hygiene among School-Going Adolescent Girls in an Informal Settlement in Nairobi, Kenya, Amidst COVID-19 Pandemic. *International Journal of Health Sciences and Research*, 12(2). <https://doi.org/10.52403/ijhsr.20220235>
- Nabiryo, M., Ondia, M., & Izudi, J. (2023). Behaviors and practices of incarcerated women towards menstrual hygiene in a large urban prison in Uganda: a phenomenological qualitative study. *BMC women's health*, 23(1), 339.  
<https://doi.org/10.1186/s12905-023-02462-5>
- Nabwera, H. M., Shah, V., Neville, R., Sosseh, F., Saïdykhan, M., Faal, F., Sonko, B., Keita, O., Schmidt, W. P., & Torondel, B. (2021). Menstrual hygiene management practices and associated health outcomes among school-going adolescents in rural Gambia. *PloS one*, 16(2), e0247554.  
<https://doi.org/10.1371/journal.pone.0247554>

- Nalugya, R., Tanton, C., Hytti, L., Kansiime, C., Nakuya, K., Namirembe, P., Nakalema, S., Neema, S., Alezuyo, C., Namuli Musoke, S., Torondel, B., Francis, S. C., Ross, D. A., Bonell, C., Seeley, J., & Weiss, H. A. (2020). Assessing the effectiveness of a comprehensive menstrual health intervention program in Ugandan schools (MENISCUS): process evaluation of a pilot intervention study. *Pilot and feasibility studies*, 6, 51. <https://doi.org/10.1186/s40814-020-00585-2>
- Namuwonge, F., Kizito, S., Ssentumbwe, V., Namatovu, P., Namuli, F., Tutlam, N. T., Nabunya, P., & Ssewamala, F. M. (2025). Culture, self-esteem and menstrual hygiene management among adolescent girls in Uganda: the impact of economic and family strengthening. *BMC women's health*, 25(1), 230. <https://doi.org/10.1186/s12905-025-03778-0>
- Nigussie, T., Dirirsa, D. E., & Legesse, E. (2022). Safe menstrual hygiene management practice and associated factors among female adolescent students at high schools in central Ethiopia: A mixed-method study. *Frontiers in Public Health*, 10, 913262. <https://doi.org/10.3389/fpubh.2022.913262>
- 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.
- Nonfoux, L., Chiaruzzi, M., Badiou, C., Baude, J., Tristan, A., Thioulouse, J., ... & Lina, G. (2018). Impact of currently marketed tampons and menstrual cups on *Staphylococcus aureus* growth and toxic shock syndrome toxin 1 production in vitro. *Applied and Environmental Microbiology*, 84(12), e00351-18.
- Nsemo, A. D., Ojong, I. N., Agambire, R., Adu, R. & Dankwah, M. (2020). Menstrual hygiene practices among adolescent girls in junior high schools in selected

- communities of Ashanti Region, Ghana. *Global Journal of Health Science*, 12(8):38-51.
- Oliveira, V. C., Pena, É. D., Andrade, G. N., & Felisbino-Mendes, M. S. (2023). Menstrual hygiene access and practices in Latin America: scoping review. Acceso y prácticas de higiene menstrual en América Latina: revisión de alcance. *Revista latino-americana de enfermagem*, 31, e4028. <https://doi.org/10.1590/1518-8345.6736.4028>
- Oppenheim, M. (2018). Kenyan girls forced into sex in exchange for sanitary products. *The Independent*.
- Pachauri, A., Shah, P., Almroth, B. C., Sevilla, N. P. M., & Narasimhan, M. (2019). Safe and sustainable waste management of self care products. *BMJ (Clinical research ed.)*, 365, 11298. <https://doi.org/10.1136/bmj.11298>
- Pandit, K., Hasan, M. J., Islam, T., & Rakib, T. M. (2022). Constraints and current practices of menstrual hygiene among Rohingya adolescent girls. *Heliyon*, 8(5), e09465. <https://doi.org/10.1016/j.heliyon.2022.e09465>
- Peterson, M. Y., & Warshaw, E. (2023). Going Green and Adhesive-Free: Snap-in Reusable Menstrual Pads for Tampon and Pad Intolerance. *Dermatitis : contact, atopic, occupational, drug*, 34(1), 60–61. <https://doi.org/10.1089/DERM.0000000000000898>
- Phillips, A. K., & Wilson, C. (2021). Menstrual Practices in Operational Military Women. *Military medicine*, 186(Suppl 1), 767–774. <https://doi.org/10.1093/milmed/usaa345>
- Phillips-Howard, P. A., Caruso, B., Torondel, B., Zulaika, G., Sahin, M., & Sommer, M. (2016). Menstrual hygiene management among adolescent schoolgirls in low-and

- middle-income countries: research priorities. *Global health action*, 9(1), 33032. <https://doi.org/103402/gha.v9.33032>
- Plesons, M., & Mahon, T. (2021). Menstrual health: a definition for policy, practice, and research. *Sexual and Reproductive Health Matters*, 29(1), 1911618. <https://doi.org/10.1080/26410397.2021.1911618>
- Pokhrel, D., Bhattarai, S., Emgård, M., Von Schickfus, M., Forsberg, B. C., & Biermann, O. (2021). Acceptability and feasibility of using vaginal menstrual cups among schoolgirls in rural Nepal: a qualitative pilot study. *Reproductive health*, 18(1), 1-10.
- Polansky, R. (2019, February 6). *Do you know what's in your tampon?* Women's Voices for the Earth. <https://womensvoices.org/2019/02/06/do-you-know-whats-in-your-tampon/>
- Prigent-Combaret, C., & Lina, G. (2018). Impact of Currently Marketed Tampons and Menstrual Cups on *Staphylococcus aureus* Growth and Toxic Shock Syndrome Toxin 1 Production In Vitro. *Applied and Environmental Microbiology*, 84(12), e00351-18. <https://doi.org/10.1128/AEM.00351-18>
- Rakić, R., Puškaš, V., & Pavlica, T. (2020). Menarche in adolescents from Vojvodina (the Republic of Serbia) in the period 2001–2019. *Anthropologischer Anzeiger*, 77(4). <https://doi.org/10.1127/anthranz/2020/1140>
- Ram, U., Pradhan, M. R., Patel, S., & Ram, F. (2020). Factors associated with disposable menstrual absorbent use among young women in India. *International Perspectives on Sexual and Reproductive Health*, 46, 223-234. <https://doi.org/10.1363/46e0320>
- Rawat, M., Shields, A. N., Venetis, M. K., & Seth, J. (2023). Women's Agentic Role in Enabling and Dismantling Menstrual Health Taboos in Northern India: A

- Culture-Centered Approach. *Health communication*, 38(4), 695–704.  
<https://doi.org/10.1080/10410236.2021.1970296>
- Ren, W., Zhu, X., & Hu, Y. (2022). Differential effects of traditional and social media use on 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.  
<https://doi.org/10.1371/journal.pone.0241106>
- Robinson, H. J., & Barrington, D. J. (2021). Drivers of menstrual material disposal and washing practices: A systematic review. *PloS one*, 16(12), e0260472.  
<https://doi.org/10.1371/journal.pone.0260472>
- Rossouw, L., & Ross, H. (2021). Understanding Period Poverty: Socio-Economic Inequalities in Menstrual Hygiene Management in Eight Low- and Middle-Income Countries. *International journal of environmental research and public health*, 18(5), 2571. <https://doi.org/10.3390/ijerph18052571>
- Roxburgh, H., Hampshire, K., Kaliwo, T., Tilley, E. A., Oliver, D. M. & Quilliam, R. S. (2020). Power, danger and secrecy-a socio-cultural examination of menstrual waste management in urban Malawi. *Plos One*, 15(6):e0235339.
- Ruby Cup. (n.d.). *How to clean a menstrual cup (it's easier than you'd think)*.  
<https://rubycup.com/blogs/articles/how-to-clean-menstrual-cup>
- Rupe, E. R., Rodean, J., Hurley, E. A., Miller, M. K., Boncoeur, M. D., & Masonbrink, A. R. (2022). Menstrual health among adolescents and young adults in rural Haiti. *Reproductive Health*, 19(1), 227.
- Sahiledengle, B., Atlaw, D., Kumie, A., Beressa, G., Tekalegn, Y., Zenbaba, D., Woldeyohannes, D., Desta, F., Assefa, T., Bogale, D., Nugusu, F., & Agho, K. E. (2022). Earning pocket money and girls' menstrual hygiene management in

- Ethiopia: a systematic review and meta-analysis. *BMC women's health*, 22(1), 271. <https://doi.org/10.1186/s12905-022-01855-2>
- Salami, K. K., Mettu, J. C., & Azeez, A. (2019). Onset of Menarche and Adolescent Menstrual Hygiene Practices in Semi-Urban Ibadan Community, Nigeria. *Women's Reproductive Health*, 6(2), 102-117. <https://doi.org/10.1080/23293691.2019.1601903>
- Schmitt, M. L., Clatworthy, D., Ratnayake, R., Klaesener-Metzner, N., Roesch, E., Wheeler, E., & Sommer, M. (2017). Understanding the menstrual hygiene management challenges facing displaced girls and women: findings from qualitative assessments in Myanmar and Lebanon. *Conflict and health*, 11(1), 1-11. <https://doi.org/10.1186/s13031-017-0121-1>
- Schmitt, M. L., Wood, O. R., Clatworthy, D., Rashid, S. F., & Sommer, M. (2021). Innovative strategies for providing menstruation-supportive water, sanitation and hygiene (WASH) facilities: learning from refugee camps in Cox's bazar, Bangladesh. *Conflict and health*, 15(1), 10. <https://doi.org/10.1186/s13031-021-00346-9>
- Schwab, K. J. (2018). The Relationship between Household Sanitation and Women's Experience of Menstrual Hygiene: Findings from a Cross-Sectional Survey in Kaduna State, Nigeria. *International Journal of Environmental Research and Public Health*, 15(5), 905. <https://doi.org/10.3390/ijerph15050905>
- Scorgie, F., Foster, J., Stadler, J., Phiri, T., Hoppenjans, L., Rees, H., & Muller, N. (2016). "Bitten By Shyness": Menstrual Hygiene Management, Sanitation, and the Quest for Privacy in South Africa. *Medical Anthropology*, 35(2), 161–176. <https://doi.org/10.1080/01459740.2015.1094067>

- Sebert Kuhlmann, A., Key, R., Billingsley, C., Shato, T., Scroggins, S., & Teni, M. T. (2020). Students' Menstruation an Urban St. Louis, Missouri, District. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine*, 67(3), 444–446. <https://doi.org/10.1016/j.jadohealth.2020.05.040>
- Shah, V., Nabwera, H., Sonko, B., Bajo, F., Faal, F., Saidykhan, M., Jallow, Y., Keita, O., Schmidt, W. P., & Torondel, B. (2022). Effects of Menstrual Health and Hygiene on School Absenteeism and Drop-Out among Adolescent Girls in Rural Gambia. *International journal of environmental research and public health*, 19(6), 3337. <https://doi.org/10.3390/ijerph19063337>
- Shah, V., Nabwera, H. M., Sosseh, F., Jallow, Y., Comma, E., Keita, O., & Torondel, B. (2019). A rite of passage: a mixed methodology study about knowledge, perceptions and practices of menstrual hygiene management in rural Gambia. *BMC public health*, 19(1), 1-15.
- Sharma, S., Mehra, D., Brusselaers, N., & Mehra, S. (2020). Menstrual Hygiene Preparedness Among Schools in India: A Systematic Review and Meta-Analysis of System-and Policy-Level Actions. *International journal of environmental research and public health*, 17(2), 647. <https://doi.org/10.3390/ijerph17020647>
- Sharma, S., Mehra, D., Kohli, C., Singh, M. M., Shantanu, S., & Mehra, D. (2017). Menstrual hygiene practices among adolescent girls in a resettlement colony of Delhi: a cross-sectional study. *Int J Reprod Contracept Obstet Gynecol*, 6(5), 1945-51.
- Shearston, J. A., Upson, K., Gordon, M., Do, V., Balac, O., Nguyen, K., Yan, B., Kioumourtzoglou, M. A., & Schilling, K. (2024). Tampons as a source of exposure to metal(loid)s. *Environment international*, 190, 108849. <https://doi.org/10.1016/j.envint.2024.108849>

- Shenkman, J. L., Neubauer, L. C., Mason, L., Oruko, K., Alexander, K., Phillips-Howard, P. A., & Nyothach, E. (2023). Building menstrual health and hygiene-supportive environments: exploring teachers' experience in rural Western Kenya. *Frontiers in public health, 11*, 1206069. <https://doi.org/10.3389/fpubh.2023.1206069>
- Shibeshi, B. Y., Emiru, A. A., & Asresie, M. B. (2021). Disparities in menstrual hygiene management between urban and rural schoolgirls in Northeast, Ethiopia. *PloS one, 16*(9), e0257853. <https://doi.org/10.1371/journal.pone.0257853>
- 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. <https://doi.org/10.1371/journal.pone.0271275>
- Soeiro, R. E., Rocha, L., Surita, F. G., Bahamondes, L., & Costa, M. L. (2021). Period poverty: menstrual health hygiene issues among adolescent and young Venezuelan migrant women at the northwestern border of Brazil. *Reproductive Health, 18*(1)238.
- Ssewanyana, D., & Bitanhirwe, B. K. Y. (2019). Menstrual hygiene management among adolescent girls in sub-Saharan Africa. *Global health promotion, 26*(1), 105-108. <https://doi.org/10.1177/1757975917694597>
- Swe, Z. Y., Mon, N. O., Than, K. K., Azzopardi, P. S., Kennedy, E. C., Davis, J., Burns, L. J., & Hennegan, J. (2022). Adolescent girls' experiences of menstruation and schooling in monastic schools in Magway Region, Myanmar: A mixed-methods exploration. *Frontiers in reproductive health, 4*, 893266. <https://doi.org/10.3389/frph.2022.893266>
- Tanton, C., Alezuyo, C., Namuli Musoke, S., Torondel, B., Francis, S. C., Ross, D. A., Bonell, C., Seeley, J., & Weiss, H. A. (2020). Menstrual health intervention and

- school attendance in Uganda (MENISCUS-2): a pilot intervention study. *BMJ open*, *10*(2),
- Tegegne, T. K., & Sisay, M. M. (2014). Menstrual hygiene management and school absenteeism among female adolescent students in Northeast Ethiopia. *BMC public health*, *14*, 1118. <https://doi.org/10.1186/1471-2458-14-1118e031182>.  
<https://doi.org/10.1136/bmjopen-2019-031182>
- The Lancet Planetary Health (2017). Microplastics and human health-an urgent problem. *The Lancet. Planetary health*, *1*(7), e254. [https://doi.org/10.1016/S2542-5196\(17\)30121-3](https://doi.org/10.1016/S2542-5196(17)30121-3)
- Torondel, B., Sinha, S., Mohanty, J. R., Swain, T., Sahoo, P., Panda, B., ... & Das, P. (2018). Association between unhygienic menstrual management practices and prevalence of lower reproductive tract infections: a hospital-based cross-sectional study in Odisha, India. *BMC infectious diseases*, *18*, 1-12.
- UNICEF. (2018, May 25). *Fast facts: Nine things you didn't know about menstruation*. <https://www.unicef.org/press-releases/fast-facts-nine-things-you-didnt-know-about-menstruation>
- UNICEF. (2019, March). UNICEF. <https://www.unicef.org/media/91341/file/UNICEF-Guidance-menstrual-health-hygiene-2019.pdf>.
- Method, A., Hassan, J., Assenga, O., Kamugisha, P., Kawishe, T., Luchagura, F., Msaka, P., Singu, M., & Bintabara, D. (2024). Challenges faced by adolescent girls on menstrual hygiene management: School-based study, Siha, Kilimanjaro, Tanzania. *PLOS global public health*, *4*(6), e0002842. <https://doi.org/10.1371/journal.pgph.0002842>
- Van Eijk, A. M., Jayasinghe, N., Zulaika, G., Mason, L., Sivakami, M., Unger, H. W., & Phillips-Howard, P. A. (2021). Exploring menstrual products: A systematic review

- and meta-analysis of reusable menstrual pads for public health internationally. *PloS one*, *16*(9), e0257610. <https://doi.org/10.1371/journal.pone.0257610>
- Van Eijk, A. M., Laserson, K. F., Nyothach, E., Oruko, K., Omoto, J., Mason, L., ... & Phillips-Howard, P. A. (2018). Use of menstrual cups among school girls: longitudinal observations nested in a randomised controlled feasibility study in rural western Kenya. *Reproductive Health*, *15*(1), 1-11. <https://doi.org/10.1186/s12978-018-0582-8>
- Van Eijk, A. M., Sivakami, M., Thakkar, M. B., Bauman, A., Laserson, K. F., Coates, S., & Phillips-Howard, P. A. (2016). Menstrual hygiene management among adolescent girls in India: a systematic review and meta-analysis. *BMJ open*, *6*(3), e010290. <https://doi.org/10.1136/bmjopen-2015-010290>
- Vayeda, M., Ghanghar, V., Desai, S., Shah, P., Modi, D., Dave, K., Dave, S., & Shah, S. (2021). 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. <https://doi.org/10.1080/26410397.2021.1992199>
- Waller, C. L., Griffiths, H. J., Waluda, C. M., Thorpe, S. E., Loaiza, I., Moreno, B., Pacherres, C. O., & Hughes, K. A. (2017). Microplastics in the Antarctic marine system: An emerging area of research. *The Science of the Total Environment*, *598*, 220–227. <https://doi.org/10.1016/j.scitotenv.2017.03.283>
- Winter, S. C., Sommer, M., Obara, L. M., & Nair, D. (2022). "There is no place to dispose them. What would you have me do?": A qualitative study of menstruation in the unique physical and social environment in informal

settlements in Nairobi, Kenya. *Health & place*, 78, 102932.

<https://doi.org/10.1016/j.healthplace.2022.102932>

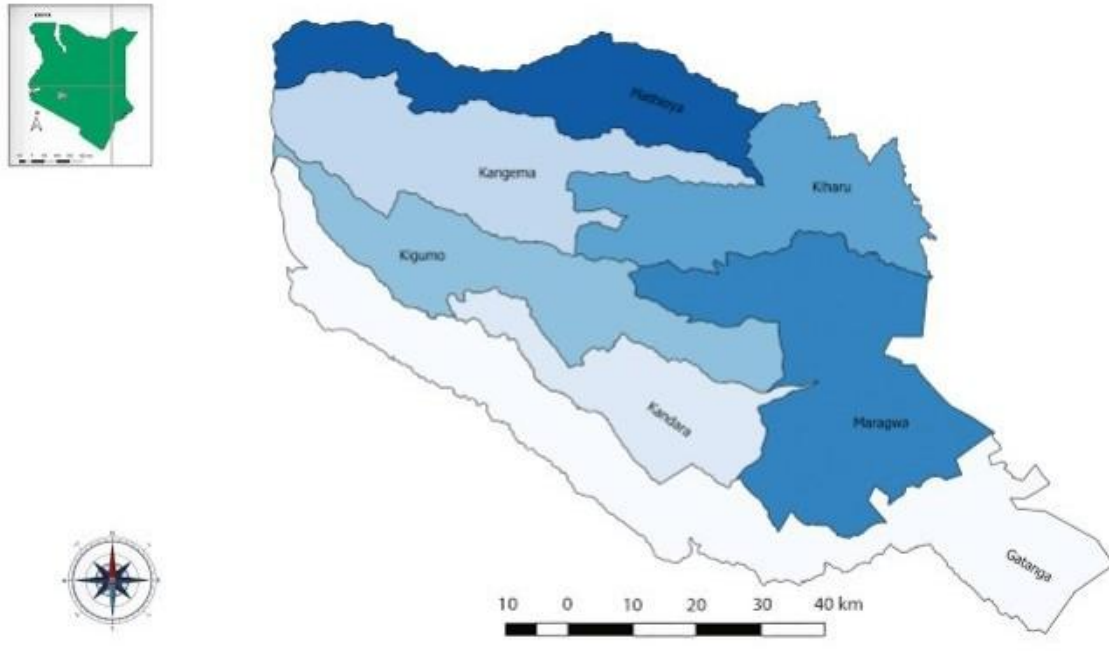
Yeasmin, F., Luby, S. P., Saxton, R. E., Nizame, F. A., Alam, M. U., Dutta, N. C., Masud, A. A., Yeasmin, D., Layden, A., Rahman, H., Abbott, R., Unicomb, L., & Winch, P. J. (2017). Piloting a low-cost hardware intervention to reduce improper disposal of solid waste in communal toilets in low-income settlements in Dhaka, Bangladesh. *BMC Public Health*, 17(1), 682.  
<https://doi.org/10.1186/s12889-017-4693-x>

Yilmaz, S. K., Bohara, A. K., & Chowdhury, S. R. (2020). Touch for health: use of Pavlovian processes with physical touch as a means to improve menstrual hygiene management initiatives, measured by willingness to pay. *Pharmacoeconomics-Open*, 4, 263-276.<https://doi.org/10.1007/s41669-019-0168-6>

Zulaika, G., Kwaro, D., Nyothach, E., Wang, D., Zielinski-Gutierrez, E., Mason, L.M. & Phillips-Howard, P. A. (2019). Menstrual cups and cash transfer to reduce sexual and reproductive harm and school dropout in adolescent schoolgirls: study protocol of a cluster-randomised controlled trial in western Kenya. *BMC Public Health*, 19, 1-14.

## APPENDICES

### Appendix A. Map of Mathioya Sub-County



*Source: IEBC, (2013)*

## **Appendix B. Consent Letter**

Dear participant,

My name is Janet Bosibori Nyarenchi a student of Meru University of Science and Technology. I am conducting a study on girls' practices on Menstrual Hygiene Management among adolescent girls aged 9 to 17 years in Mathioya Sub-County. I would like to invite you to participate in this study. The purpose of this study is to understand the menstrual hygiene management practices and experiences of adolescent girls and to identify the barriers to proper menstrual hygiene management. The study will also evaluate the effectiveness of menstrual hygiene education program to improve hygiene management practices among adolescent girls.

Your participation in this study is voluntary and you have the right to withdraw at any time. You will not be penalized in any way if you choose to withdraw. Your participation in the study will involve filling out a questionnaire and potentially participating in an interview. The information you will provide will be kept confidential and anonymous. Your name will not be used in any reports or publications. The data also collected will only be used for research purposes and will be stored securely.

Thank you for considering participating in this study.

Participant Name.....

Participant signature.....

Date.....

## Appendix C. Questionnaire

### SECTION 1: SOCIODEMOGRAPHICS

1. What is your age?
  - 9 – 11 years
  - 12 – 14 years
  - 15 – 17 years
2. What is your current education level?
  - Primary school
  - Junior secondary school
  - Secondary school
  - Other (please specify)
3. What is your current living situation?
  - Living with parents
  - Living with other family members
  - Living with friends
  - Living alone
  - Others (specify)
4. What is your religion?
  - Christianity
  - Islam
  - Hinduism
  - Other (please specify)
5. What is your current school attendance rate?
  - Regularly attend school
  - Occasionally absent from school
  - Frequently absent from school
  - Not currently attending school
6. What is your current school performance?
  - Good/Excellent
  - Average
  - Poor/Failing
  - Not sure

## SECTION 2: PERSONAL HYGIENE PRACTICES

7. How do you maintain personal hygiene during your menstrual period?
8. Do you wash your hands before and after changing Menstrual Management Materials and how do you do it?
9. How frequently do you change your Menstrual Management Materials during your menstruation period?
  - Once a day
  - Twice a day
  - Every 4-6 hours
  - Every 8-12 hours
10. How do you clean your genitalia during your menstrual period?
11. Do you use soap or any other cleaning agent during menstruation?
12. What are the health risks associated with poor personal hygiene practices during menstruation?

(Select all that apply)

- Urinary tract infections
- Yeast infections
- Bacterial infections
- Skin irritation
- Allergies
- None of the above

## SECTION 3: MENSTRUAL MANAGEMENT MATERIALS

13. What type of Menstrual Management Materials do you use during your periods?

(Tick all that apply)

- Sanitary pads
- Tampons
- Menstrual cups
- Cloth pads
- Other(please specify)

14. How do you acquire these Menstrual Management Materials?

- Pharmacy
- Supermarket

- Local shop
- Other (please specify)

15. Have you ever been unable to afford menstrual hygiene management materials?

- Yes
- No

If so, what did you do? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

16. Have you ever faced challenges in accessing Menstrual Management Materials?

If yes, what are those challenges?

17. Have you received any information or education on different menstrual management options? If yes, what was the source of that information?

18. How do you feel about the menstrual hygiene management materials you use?

\_\_\_\_\_  
\_\_\_\_\_

19. Are there any other menstrual hygiene management materials you would like to try?

- Yes
- No

If so, what are they? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

20. Have you ever shared menstrual hygiene management materials with someone?

- Yes
- No

If so, who and why? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

21. What do you think would help improve access to and use of menstrual hygiene products and facilities in your school or community?

---

---

---

---

SECTION 4: DISPOSAL OPTIONS OF MENSTRUAL WASTES

22. Do you have access to proper disposal facilities, such as waste bins or incinerators?

23. How do you dispose your menstrual hygiene management materials?

- Throw them in the trash
- Burn them
- Bury them
- Flush them down the toilet
- Pit latrines

24. Are you aware of the environmental impacts of improper disposal of Menstrual Management Materials? If yes, list them.

---

---

25. Have you received any education or guidance on proper disposal methods?

SECTION 5: GENERAL MENSTRUAL HYGIENE MANAGEMENT PRACTICES

26. Do you feel confident enough to discuss menstrual hygiene management practices with other people (family, friends, etc)?

- Yes
- No

27. What are the general menstrual hygiene management practices?

---

---

---

---

---

28. How often do you visit the health facility for menstrual hygiene management related advice?

- Never

- Regularly
- Sometimes
- Frequently
- Other (please specify) \_\_\_\_\_

29. Is there anything else you would like to add or suggest to improve Menstrual Hygiene Management practices among adolescent girls?

---

---

---

---

**THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY!**

## Appendix D. Plagiarism report



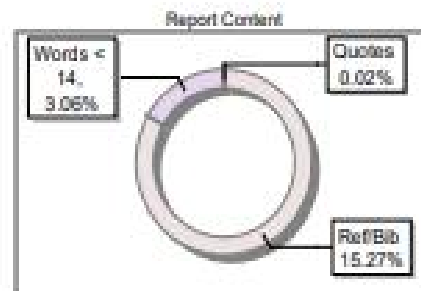
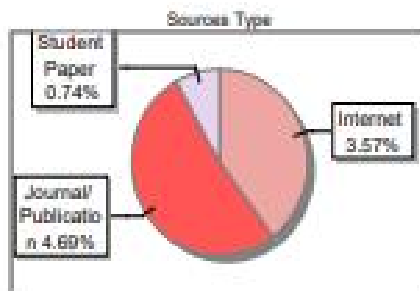
The Report is Generated by DrillBit Plagiarism Detection Software

### Submission Information

Author Name	NYARENCHI JANET BOSIBORI
Title	PRACTICES ON MENSTRUAL HYGIENE MANAGEMENT AMONG GIRLS AGED 9 TO 17 YEARS IN MATHIOYA SUBCOUNTY, MURANG'A COUNTY
Paper/Submission ID	2082766
Submitted by	mmwings@imst.ac.ke
Submission Date	2024-07-05 09:20:34
Total Pages, Total Words	109, 25785
Document type	Thesis

### Result Information

Similarity **9 %**



### Exclude Information

Quotes	Not Excluded
References/Bibliography	Excluded
Source: Excluded < 14 Words	Not Excluded
Excluded Source	<b>0 %</b>
Excluded Phrases	Not Excluded

### Database Selection

Language	English
Student Papers	Yes
Journals & publishers	Yes
Internet or Web	Yes
Institution Repository	Yes

A Group QR Code can be used to View/Download/Share PDF File



## Menstrual hygiene management practices among girls aged 9 to 17 years in Mathiyoa Sub-County, Murang'a County: A descriptive study on personal hygiene practices, menstrual management materials, and disposal methods

Janet Nyarenchi<sup>1\*</sup>, Mary Amatu<sup>2</sup>, Josephine Mutembei<sup>1</sup>

<sup>1</sup>Muru University of Science and Technology, Muru, Kenya

### ARTICLE INFO

#### Keywords

Menstrual hygiene management  
 Personal hygiene practices  
 Menstrual management materials  
 Disposal methods  
 Menstruation

### ABSTRACT

Menstrual hygiene is an essential component of women's lives, particularly in underdeveloped nations. Nevertheless, numerous women encounter obstacles and hardships within their homes, schools, and workplaces. Girls living in rural areas may have limited knowledge and readiness in relation to menstruation, which can result in challenges and obstacles. More than 50% of teenage females in developing countries demonstrate unacceptable menstrual hygiene behaviors, particularly among those living in rural areas and attending public schools. Limited data exists regarding menstrual hygiene issues among economically disadvantaged adolescent females in Mathiyoa sub-county, situated in Murang'a County. This study's objectives were to evaluate the existing personal hygiene habits, the type of menstrual management material utilized, and the disposal techniques employed to improve menstrual hygiene practices and overall well-being among adolescent girls in the region. The study adopted a descriptive cross-sectional design and utilized a stratified random sampling technique. For participation, the study recruited a cohort of 387 adolescent females aged 9 to 17 years. Findings showed that 80% of the girls continuously adhered to appropriate personal hygiene practices by showering regularly, whereas 20% held a divergent viewpoint. Almost all (94%) of the female participants in the study reported changing their menstrual products every 4–6 hours, whereas 6% changed them twice within that time frame, depending on the intensity of their menstrual flow. Majority (98%), utilized soap and water for hand washing whereas 2%, relied solely on water. Eighty-six (86%) of the female participants utilized a cloth, soap, and water to cleanse their genitalia, whereas 14% relied solely on a cloth and water. In addition, 95% of these girls used disposable sanitary pads to efficiently manage their menstrual periods. Because of their poverty, they faced numerous challenges in acquiring these items (89%). Only 92% of the female participants showed a preference for disposable sanitary pads, despite having received information about various menstrual management options. Due to the issue of period poverty, 85% of people have stated that the government and ministry of education should offer complimentary sanitary products to meet their needs. In the end, 97% of participants indicated that the most efficient approach for disposing of menstrual waste was to dispose of it in pit latrines. However, only 10% had the opportunity to use such

\*Corresponding author: Janet Nyarenchi

Email: [jjcharania@gmail.com](mailto:jjcharania@gmail.com)

<https://doi.org/10.54565/ajstss.v4i2.264>

AFRICAN JOURNAL OF SCIENCE, TECHNOLOGY AND SOCIAL SCIENCES, ISSN: 2958-0560

<https://journals.must.ac.ke> © 2024 The Author. Published by Muru University of Science and Technology

This article is published on an open access license as under the CC BY SA 4.0 license 0919

