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Faculty of Community and Health Sciences

The effects of poor menstrual hygiene management on sexual and reproductive health and education outcomes among adolescent schoolgirls in rural Tanzania

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A thesis submitted in partial fulfillment of the requirements for the degree of
Doctor of Public Health, School of Public Health,
University of the Western Cape, South Africa

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Key words:

Menstrual Hygiene Management, Sexual Reproductive Health and Rights**,** Water and Sanitation Hygiene. Education outcomes, Adolescent schoolgirls, Rural, Tanzania

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Declaration of originality

I declare that ***The effects of poor menstrual hygiene management on sexual and reproductive health and education outcomes among adolescent schoolgirls in rural Tanzania*** is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Full name: David Paul Ngilangwa

Date: 16th March 2023

Signed: ……

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Abstract

Background: In Tanzania, 11 million children are enrolled in primary schools, half of them being girls. As the majority of girls start their menstruation while in primary school, their retention in schools is likely to be hampered by inadequate and poor menstruation hygiene management facilities. It is important to conduct research to understand the association between poor menstruation hygiene management and school absenteeism, psychological well-being, and reproductive tract infections to inform interventions and policies that may enhance the full realization of girls pursuing education successfully. Much research conducted previously has focused on the knowledge and practices of menstruation hygiene management among girls in secondary schools. There is limited evidence of the associations between menstrual hygiene management and particularly sexual and reproductive health and education outcomes, among adolescent schoolgirls in rural Tanzania.

Aim and objectives: This study aimed to assess the extent to which poor menstrual hygiene management affected the school attendance, sexual and reproductive health and rights, and the psycho-social well-being of schoolgirls in the Kilindi district in rural Tanzania.

Methodology: The study used a sequential mixed-methods study design that was divided into three phases: 1. a rapid scoping review; 2. a quantitative cross-sectional study; 3. a qualitative descriptive study. The rapid scoping review documented the prevalence and patterns of reproductive tract infections associated with poor menstruation hygiene management among adolescent schoolgirls aged between 12-19 years old in Low-and-middle-income-countries This included publications from Low-and-middle-income-countries published from 2010 to 2021 from different databases. The quantitative cross-sectional study demonstrated the burden and associated factors related to the effect of poor menstruation hygiene management on reproductive tract infections, school absenteeism, and psychological well-being among adolescent schoolgirls in Kilindi district in Tanzania. The study randomly selected in-school adolescent girls aged between 12-15 years in grades 5-7 from 10 selected primary schools. Trained research assistants collected data from schoolgirls using piloted structured questionnaires. The qualitative descriptive study explored how schoolboys and parents can best contribute to a positive school environment for girls' menstruation hygiene management in relation to needs among adolescent

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schoolgirls in the Kilindi district in Tanzania. In addition, four focus group discussions each with 12 people were conducted with schoolboy, schoolgirl, and parent participants. In total 48 individuals who were purposively selected participated in this qualitative study.

Results: The rapid scoping review identified and included 28 eligible publications. The prevalence of reproductive tract infections among schoolgirls ranged between 7.5% and 28.7% for those with laboratory-confirmed tests. This contrasted with self-reporting, in which the prevalence was 88%. The review demonstrated an association between reproductive tract infections and poor menstruation hygiene management. Few reviews which studied the health-seeking behavior among schoolgirls reported infections. In the quantitative study, four hundred and ninety adolescent schoolgirls participated; their mean age was 13.7 (SD =0.8). Nearly two-thirds of the schoolgirls reported practicing poor menstruation hygiene management. The latter two-thirds were significantly associated with media as the source of information [AOR = 0.5, 95 % CI: 0.2– 0. 9] and living in semi-urban areas [AOR = 2.1, 95 % CI: 1.2–3.4]. Thirteen percent reported missing school for at least one day during their last menses. Twenty-four percent reported having been embarrassed during their periods; and 6% reported having at least one symptom suggestive of reproductive tract infections. The study found significant associations between poor menstruation hygiene management and school absenteeism, reproductive tract infections, and embarrassment. In the qualitative research, the support provided to girls to manage their menses while in school was organized into four main themes; counselling and guidance; provision of menstrual materials; provision of space and privacy; and support for experiences of teasing during menses. Mothers were reported to provide daughters' counselling and guidance and menstrual materials, while fathers reported providing money to their daughters for buying sanitary pads. The majority of the boys reported refraining from teasing girls and instead allowing girls to privately manage their menses.

Conclusion: Findings from this study show a high prevalence of poor menstruation hygiene management practices among schoolgirls, linked with school absenteeism, negative psychological impacts, and reproductive tract infections. These are findings contributing to new knowledge. This suggests the importance of designing and implementing policies and interventions that will ensure access to adequate

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menstruation hygiene management facilities, education, and support in schools, to reduce stigma and infections, and retain girls in school.

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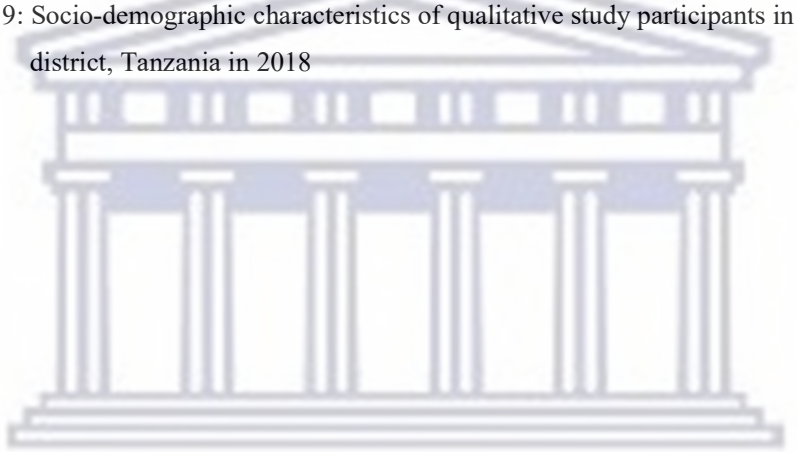

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Dedication

I dedicate this work to my daughters

Hellen Mwitumba Ngilangwa and **Meghan Lunyamadzo Ngilangwa** (deceased),

and **all adolescent schoolgirls in Africa**.

Equally

To my parents, the late Mzee **Paul Lamboni Ngilangwa** and Mama **Helena Mkwave SeChusi**, you have been so loving, supportive; and above all keeping me in your prayers for success.

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Abbreviations

AOR	Adjusted Odds Ratio
ARP	Alternative Rites of Passage
BV	Bacterial Vaginosis
CI	Confidence Interval
CSE	Comprehensive Sexuality Education
CSOs	Civil Society Organizations
CSW	The Commission on the Status of Women
FGD	Focus Group Discussion
HPV	Human papillomavirus
HSSREC	Humanities and Social Sciences Research Ethics Committee
HSV-2	Herpes Simplex Virus-2
KII	Key Informant Interview
LMICs	Low-And Middle-Income Countries
MHM	Menstrual Hygiene Management
MoEVT	Ministry of Education and Vocational Training
MoH	Ministry of Health
MP	Menstrual Period
NGOs	Non-Governmental Organizations
OR	Odds Ratio
PHC	Primary Health Care
PORALG	President's Office - Regional Administration and Local Government
RA	Research Assistant
RTIs	Reproductive Tract Infections
SDGs	Sustainable Development Goals
SEM	Social-Ecological Model
SPSS	Statistical Product and Service Solutions
SRH	Sexual And Reproductive Health
SRHR	Sexual And Reproductive Health and Rights
SSA	Sub-Saharan Africa
STIs	Sexually Transmitted Infections
SWASH	School Water Sanitation and Hygiene
TDV	Tanzania Development Vision
TV	Trichomonas Vaginalis
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNICEF	United Nations International Children's Emergency Fund
URT	United Republic of Tanzania
UWC	University of the Western Cape
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

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Definition of key terms

Adolescents are defined as those people aged between 10 to 19 years, who are in the process of transitioning from childhood to adulthood (UNICEF, 2018b, WHO, 2021). In this period, adolescents undergo intellectual, physical, health, psychological and social developmental changes. These changes sometimes increase their knowledge, skills and independence. On the other hand, stresses and vulnerability related sexual and reproductive health including poor MHM (UNICEF, 2018b, WHO, 2021).

Schoolgirl is defined as a young female person attending primary school.

Menstruation is defined as the natural and health process among girls and women of reproductive age when the blood and tissue lining the uterus flow out through the vagina, lasting between 2 to 5 days in a cycle of on average 28 days (Tellier and Hyttel, 2018). The color of the menstrual blood ranges from red to black and sometimes has an unpleasant odor. The term menstruation is used interchangeably with menses, menstrual period and cycle (Tellier and Hyttel, 2018).

Menarche is defined as the onset of menstruation in a female adolescent, the process characterized by being painless and without prior warning signs. It marks the important milestone towards the girl's transition from childhood to adolescence i.e., the girl can conceive. On average the age at menarche is mostly documented to be between 12 and 14 years (Tellier and Hyttel, 2018, UNICEF, 2019).

Menstrual Hygiene Management is defined as women and adolescent girls using a clean menstrual management material to absorb or collect blood that can be changed in privacy as often as necessary for the duration of the menstruation period, using soap and water for washing the body as required, and having access to facilities to dispose of used menstrual management material (Sommer and Sahin, 2013, UNICEF, 2019).

Poor Menstrual Hygiene Management refers to any situation which fails to comply with the definition of MHM. Therefore, lack or inadequacy of any of the following: MHM knowledge and information; access to menstrual materials and their effective disposal; MHM-friendly WASH facilities including toilets and water; and social support is regarded as poor MHM (Davis et al., 2018, Tellier and Hyttel, 2018).

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WASH facilities include water supply, latrines, handwashing facilities, incinerators, refuse pits, and other waste collection and disposal facilities (UNICEF, 2019).

Menstrual hygiene materials are defined as the products used to catch menstrual flow, such as pads, cloths, tampons or cups (UNICEF, 2019).

Menstrual facilities are defined as those facilities most associated with a safe and dignified menstruation, such as toilets and water infrastructure (UNICEF, 2019).

School absenteeism is defined as a temporarily missing or early withdrawal from school without completing the required school-time in that particular month or year for different reasons including inability to handle MHM or structural related factors such as poor MHM facilities and support at school (Benshaul-Tolonen et al., 2020b, Davis et al., 2018, Tamiru et al., 2014, UNICEF, 2015).

Psycho-social stress refers to fear, shame and embarrassment related to teasing that adolescent schoolgirl experience during their periods while in school (Hennegan et al., 2016a).

Reproductive tract infections are defined as any infections that occur in the reproductive system caused by organisms normally present in the reproductive tract, introduced from the outside during medical procedures or menstrual hygiene; and sexually transmitted infections (STIs) (WHO, 2005). It is important to note that some RTIs are asymptomatic while others are not. The most frequently presented symptoms of RTIs among girls include: the presence of genital ulcers/sores, burning sensations while urinating, abnormal vaginal discharge, genital itching, pains during sexual intercourse, abnormal vaginal discharge, pains in the lower abdomen and changes in menstrual flow (WHO, 2005). The most common RTIs are *Chlamydia, Gonorrhoea, Hepatitis B, HIV, Human papillomavirus (HPV), Bacterial vaginosis (BV), Candida, Vulvovaginal candidiasis (VVC), Herpes simplex virus (HSV1 or HSV2) and Syphilis* (WHO, 2005).

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CHAPTER ONE: INTRODUCTION

1.0 Chapter overview

This chapter provides an overview of menstrual hygiene management (MHM) in schools and how it affects the education and health of school-going girls. My study underscores the importance of education for adolescent girls and enrollment and retention challenges for girls in primary schools. The status of MHM facilities globally, in sub-Saharan Africa and the study area in relation to its effects on girls' education, health and psycho-social wellbeing. A more detailed review of the literature on MHM and its effects is covered in Chapter 2. Chapter 1 also provides information on the gaps in poor MHM research which are addressed by this study and the contribution of this study's novel findings to existing knowledge. Lastly, this chapter highlights the scope of the problem and describes the study's research questions, aims and objectives and significance. It concludes with descriptions of subsequent chapters of this thesis. In addition, abbreviations and definitions of key terms used throughout the study are on from page 17-20.

1.1 Background

1.1.1 *Importance of investing in girls' education*

The provision of education to adolescent girls has been documented to have short and long-term impacts on health, economic and social wellbeing outcomes for the individual, community and the nation (Sperling and Winthrop, 2015, Marquez-Ramos and Mourelle, 2019, Mutton and Ciriello, 2021, Raghupathi and Raghupathi, 2020, Raj et al., 2019). Evidence suggests that girls with higher levels of education are less likely to marry early, have high fertility, to contract HIV/AIDS, experience gender-based violence, and have high maternal and child morbidity and mortality (Victora et al., 2015, Akram et al., 2020, Liu and Raftery, 2020, Mee et al., 2018, Mensch et al., 2019, Mensch et al., 2020, Raj et al., 2019). In addition, girls with higher educational levels are likely to increase their own and their family's income and be able to invest in their children's health and education. This in turn may improve the national economy (Miller et al., 2017, Riaz, 2017).

In recognition of these benefits for girls, governments across the world, including the Government of the United Republic of Tanzania, are committed to provide free

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compulsory basic education for all children from pre-primary to secondary schooling. This aligns itself with the UN Sustainable Development Goal 4 (UNESCO, 2020a, UNESCO, 2020b, URT, 2018, URT, 2019, URT, 2020a, URT, 2020b). This goal calls for nations to achieve inclusive and universal education for all by 2030 (UNESCO, 2020a, UNESCO, 2020b). In low and middle-income countries (LMICs) including Tanzania, numerous policies and programs including the abolition of school fees, school construction, school feeding schemes and cash transfer programs have increased the enrollment of pupils (UNESCO, 2020a, UNESCO, 2020b, URT, 2018, URT, 2019, URT, 2020b, URT, 2020a). Consequently, the number of children attending primary schools globally has increased more than ever before (UNESCO, 2020b, UNESCO, 2020a).

1.1.2 *Status of enrolment of adolescent girls in primary schools*

The most recent statistics show that, globally about 90% of all primary school-age children have been enrolled in schools (UNESCO, 2020a, UNESCO, 2020b). For example, in 2018, it was estimated that a total of 649 million girls and boys were enrolled in primary schools globally. Of these 38% reside in sub-Saharan Africa (SSA). This represents an increase of 180 million pupils from the 469 million recorded in 1995 (UNESCO, 2020b, UNICEF, 2021). Generally, study data show that there was equality in numbers of girls and boys enrolled in primary education in 2018 compared to previous time periods (UNESCO, 2020b, UNICEF, 2021). In Tanzania, 11 million children aged between 7-15 years were recorded as enrolled in a total of 18,152 primary schools countrywide, half of them being girls. The majority of primary school students were enrolled in government-owned schools (UNESCO, 2020b, UNICEF, 2021, URT, 2020b, URT&UNICEF, 2020). In the Kilindi district in which this PhD study was conducted, approximately 37% of pupils were in grades 5-7. Out of a total of 68,115 pupils, girls constituted 51% of those enrolled in schooling in 117 schools (URT, 2020b).

1.1.3 *Retention of adolescent girls in primary schools*

Despite the progress made in increasing enrollment, low rates of school attendance exist, hence dropouts remain a critical issue for consideration in most countries (URT, 2020b, URT&UNICEF, 2020). The most recent research globally shows that the

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completion rate of primary school education stands at 85%. However, in SSA, for every 100 children enrolled in primary school, 35 of them are unlikely to reach the last grade of schooling (UNESCO, 2020b, UNICEF, 2021). In Tanzania, like most of sub-Saharan Africa countries, at least 16% of children enrolled in primary school are likely to drop out before reaching the last grade of schooling (URT, 2019). For instance, in 2019, more than 70,000 girls dropped out from primary school, of whom 1,154 were from Kilindi district (URT, 2020b). In addition, 23% of all the primary school girls who finished their primary education countrywide in 2019 did not progress to secondary school education in 2020 (URT, 2020b). Among the reasons for school absenteeism and attrition rates reported were absence or presence of unfriendly water, hygiene and sanitation (WASH) facilities in school. This hinders girls' ability and freedom to manage their menstruation privately and hygienically while in school (Chandra-Mouli and Patel, 2020). This was mainly the result of the over-enrollment of children in relation to access to the available facilities like toilets and water, particularly in rural areas (Kessy and Mahali, 2016, URT, 2019). According to UNESCO, after reaching menarche, girls are less likely to regularly attend school, where toilet and hygiene facilities are inadequate or non-existent (UNESCO, 2014). This hinders the full realization of the girls' achieving gender parity, especially later in secondary and tertiary education, as significant attrition happens in primary schools (UNESCO, 2020b, Sommer et al., 2016, UNESCO, 2014).

1.1.4 *Menstrual hygiene management in schools*

In managing menstruation blood properly, hygienically and with dignity, schoolgirls need MHM information and knowledge; access to menstrual materials and appropriate means of disposal, gender-sensitive bathrooms with water and social and environmental support (House et al., 2013, UNICEF, 2019). Despite the fact that menstruation is a natural healthy process, its management has mainly been influenced by culture, religion, personal choices, education, economic status, knowledge and availability of WASH facilities in a particular area (Kaur et al., 2018). The overwhelming majority of schools in LMICs, particularly in rural areas, do not provide WASH facilities that address the unique needs of adolescent schoolgirls (UNICEF, 2015). For instance, a limited number of schools provide menstrual

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education programs and free or subsidized sanitary pads (Wall et al., 2018). Furthermore, there is a lack of safe and appropriate disposal facilities such as incinerators and waste bins for used menstrual materials (Kaur et al., 2018, Mohammed and Larsen-Reindorf, 2020), as well as a lack of privacy in toilets for changing pads (Sivakami et al., 2019), and a lack of water and soaps in the toilets (UNICEF, 2018a). Poor social support from parents, as well as schoolboy teasing and mocking are further factors that limit MHM and therefore attendance in schools (Chinyama et al., 2019, Mason et al., 2017, Benshaul-Tolonen et al., 2020a). In 2016, UNICEF estimated that globally, 335 million girls were not accessing basic MHM facilities in their schools (Steele, 2018, UNICEF&WHO, 2018). Poor MHM means that schoolgirls face a dilemma in how to cope with limited choices to manage their monthly menses hygienically while in school (House et al., 2013, Phillips-Howard et al., 2016a).

1.1.5 *The effects of poor MHM on education, health and well-being*

Poor MHM in schools is increasingly described as having effects on education, particularly on school attendance and concentration during menses days, leading to the possibility of poor education outcomes (Benshaul-Tolonen et al., 2019). Moreover, it impacts negatively on girls' sexual and reproductive health, including potentially leading to reproductive or urinary tract infections (Nabwera et al., 2021). Lastly, experiences associated with embarrassment and fear during menstruation affects the psychological well-being of the schoolgirls and thus limits their learning and participation in their studies (Benshaul-Tolonen et al., 2020a).

Globally, poor MHM in schools increasingly contributes to school absenteeism among girls in LMICs (Sommer et al., 2016, Sommer and Sahin, 2013). Schoolgirls experience numerous challenges in efforts related to managing their periods en route to and within the school environment (Chinyama et al., 2019). It is estimated that the majority of girls in LMICs miss attending school for up to four days every 28 days due to menstruation (UNESCO, 2014).

In addition, poor MHM poses the risk of sexual and reproductive health infections, particularly Reproductive Tract Infections (RTIs) (Das et al., 2021, Torondel et al.,

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2018, Ademas et al., 2020, Almeida-Velasco and Sivakami, 2019). Despite the fact that some RTIs are transmitted sexually, there are endogenous and iatrogenic infections that are caused mainly by the growth of organisms in the woman or girl's vagina or introduced to the reproductive tract through poor practices related to the management of menstrual blood (WHO, 2005).

Furthermore, psycho-social stress is defined as impact on the girls' psyches that affects their ability to socialize and continue their day-to-day lives during menstrual periods (UNICEF, 2015). Lack of social support compounded by stigma, taboos, misconceptions and cultural restrictions on menses have been documented to have repercussions on the psycho-social wellbeing of schoolgirls (Cohen, 2020, Benshaul-Tolonen et al., 2020a, Amor et al., 2020, Gottlieb, 2020). Psycho-social stress among schoolgirls lowers self-esteem and confidence in them. This can lead to poor participation in learning activities, subsequent school absenteeism (Korir et al., 2018, Miiro et al., 2018, Ndlovu and Bhala, 2016), and later mental health problems (Cardoso et al., 2021).

1.2 Problem statement

The problem that this study sought to address was that of menstruating girls' experiences of shame and fear in managing menses in school environments, with their inadequate education about menses, compounded by structural barriers such as lack of safe and gender friendly bathrooms and WASH facilities (Atari et al., 2021, Benshaul-Tolonen et al., 2020a, Davis et al., 2018, Korir et al., 2018, Sivakami et al., 2019, van Eijk et al., 2018, Sivakami and Rai, 2019). The growing body of evidence from South Asia, sub-Saharan Africa, and other LMICs indicates that many girls reach menarche with little or no guidance about menstruation, nor of effective methods to hygienically manage menses (Chandra-Mouli and Patel, 2020, Coast et al., 2019, Wall et al., 2018). In many areas of the world, including in Tanzania, menstruation remains a taboo subject. As a result, girls remain uninformed about the biological impact of menstruation and proper hygienic practices to adopt. This can further be exacerbated by the practical challenges of MHM, contributing to gender inequity and exclusion in the education system. This is the case particularly in primary schools as well as later in secondary education (Chinyama et al., 2019, Blake et al., 2018, Beksinska et al.,

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2015). However, there is insufficient research on the magnitude of the problem, including the embarrassment girls experience from boys and male teachers when menstruating, and the effects of poor privacy, safety and hygiene in schools. Better understanding thereof assists in addressing the problem of poor MHM among schoolgirls.

In addition, school environments that have poor or inadequate MHM facilities impact on the sexual and reproductive health and rights (SRH&R) of menstruating girls by increasing the probability of getting reproductive tract infections (RTIs) that may lead to school absenteeism (Oruko et al., 2015, Nabwera et al., 2021). Evidence from Kenya suggests that girls from poorer families are more likely to engage in transactional sex to obtain money for buying sanitary products. This may increase the girls' odds of getting STIs, having unintended pregnancies and eventually dropping out of school (Oruko et al., 2015, Phillips-Howard et al., 2015). Despite available evidence of an association between poor menstrual hygiene practices and a higher prevalence of RTIs (Torondel et al., 2018), there is dearth of evidence, particularly among primary school girls in rural Tanzania, on the prevalence and risk factors or the reported occurrence of RTIs related to poor MHM (Kerubo et al., 2016, Phillips-Howard et al., 2015). Efforts to improve MHM among adolescent girls would not only positively impact on the lives of school-going adolescent girls in Tanzania but could also improve the economic growth and prosperity of the country, by decreasing absenteeism and drop out of schooling among girls.

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1.3 Study rationale

Adolescence, particularly in primary school girls, represents a critical period for preventative health interventions, as health-related behaviors developed during adolescence are major determinants of lifelong health and well-being (Naughton et al., 2017, UNICEF, 2021, UNICEF, 2015). Most girls start their first menses around the age of 12 years, during which time they are in primary school and are mostly unprepared and uninformed about menstruation and managing it (Chandra-Mouli and Patel, 2020). As a result, girls tend to practice poor MHM due to limited knowledge and facilities at school. Improving MHM among schoolgirls is essential to continuing Tanzania's progress in achieving the Sustainable Development Goals that include

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ensuring an inclusive and equitable education for all and gender equality and empowerment for all women and girls (Naughton et al., 2017). Improving young adolescents' SRH is key to improving the future economic and social well-being of Tanzania (Naughton et al., 2017, UNICEF, 2019, UNICEF, 2015, UNICEF, 2021).

There is dearth of rigorous research evidence on how poor MHM affects the SRH, school attendance and the psychological wellbeing of primary school girls, particularly those residing in the rural areas of Tanzania. Anecdotal and available evidence tends to focus on girls in secondary schools or those in tertiary education institutions located in urban or peri-urban areas. A literature search yielded very limited rigorous studies on poor MHM among primary school girls in rural Tanzania. This study contributes new knowledge and provides a deeper understanding of the effects of poor MHM facilities and practices in primary schools in relation to SRH and educational participation outcomes of primary school girls residing in a typical rural area in Tanzania. Findings from this study provide an overall picture of access, utilization, needs, limitations and available opportunities to improve MHM facilities in Tanzania. Findings also highlight the MHM experiences of schoolgirl areas like the Kilindi district with its limited resources.

1.4 Purpose

The purpose of this study was to describe and measure the extent of the burden of the poor MHM in schools in rural areas and the contextual factors that put adolescent girls at risk of school absenteeism, reported reproductive tract infections and psycho-social stress related to fear and embarrassment while in school during their monthly periods. This information contributes to developing appropriate recommendations that will inform policy and future programs for the improvement of MHM facilities and coping strategies of menstruating girls in rural schools.

1.5 Significance of the study

Understanding the magnitude and patterns of the effects of poor MHM in schools and its associated risks is critical for planning interventions that prevent or manage these problems. Therefore, the results of this study produce new knowledge that will contribute to informing policy formulations aimed at improving the well-being of

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adolescent schoolgirls, particularly younger adolescent girls in rural areas, with limited resources such as water. It aimed to promote the well-being of vulnerable populations. Furthermore, the study results shed more light on future programs of government and non-governmental organizations like Amref Health Africa programs involved in developing responsive interventions to improve the situation of MHM facilities and behaviors in rural areas. Additionally, this informs the need for resource allocation at the district level and promotes further research for improvement of MHM services in Tanzania. Importantly, the findings from this study also contribute to understanding Tanzania's progress in meeting the Sustainable Development Goals (SDGs), particularly for goals number 3, 4, 5 and 6.

1.6 Research questions

The study intended to answer the following questions with respect to the Kilindi district in Tanzania:

1. What is the self-reported occurrence of RTIs/STIs associated with poor MHM among schoolgirls aged between 12-19 years old in LMICs?
2. What is the level of adolescent schoolgirls' knowledge, attitudes, practices and needs of MHM in school?
3. How does poor MHM in school influence school absenteeism and concentration on their studies among adolescent schoolgirls?
4. What kind of psycho-social stress related to fear and embarrassment are experienced by girls while accessing MHM facilities in schools?
5. What are the associations between self-reported RTIs risks and poor MHM; and SRH care-seeking behavior among school-going adolescent girls aged 12-19 years in rural Tanzania?
6. What are the attitudes of parents and schoolboys towards menstruating girls and how can they positively contribute to the well-being of schoolgirls' MHM needs?

1.7 Study aims and objectives

The overall aim of this study was to assess the extent to which poor menstrual hygiene management (MHM) affects schoolgirls' school attendance, SRHR and psycho-social

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well-being, in the Kilindi district of rural Tanzania. The specific objectives of this study were as follows:

1. To document the prevalence and patterns of self-freported RTIs/STIs associated with poor MHM, health-seeking behavior and the challenges associated with the utilization of the healthcare services among the adolescent schoolgirls aged between 12-19 years old in LMICs.
2. To examine the knowledge, attitudes, and practices of MHM among adolescent schoolgirls in Kilindi district in Tanzania.
3. To determine the self-reported occurrence of school absenteeism during menstruation and its associated factors among adolescent schoolgirls in Kilindi district in Tanzania.
4. To investigate the extent and range of reported psycho-social stress related to fear and embarrassment experienced by schoolgirls while accessing MHM facilities in schools in Kilindi district in Tanzania.
5. To assess the self-reported prevalence of RTIs, associated risks with poor MHM and the SRH care-seeking behavior for reported RTIs among adolescent schoolgirls in Kilindi district in Tanzania.
6. To explore schoolboys' and parents' attitudes to menstruating girls and how they can best contribute to a positive school environment for girls' MHM in relation to needs among adolescent schoolgirls in Kilindi district in Tanzania.

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1.8 How the thesis is organized

This thesis is written as a monograph, which is organized into six chapters.

Chapter One introduces the thesis by providing a brief, broad overview of MHM and its status in schools. Moreover, it provides a study statement, the rationale for conducting this study in a rural area of Tanzania, the study research questions, aims and objectives.

Chapter Two reviews the relevant literature related to effects of poor MHM in schools. The chapter introduces the topic by defining the important terms related to MHM used in the study. It also explores empirical evidence on the status of MHM in schools and the known associations with poor MHM including effects on schooling, reproductive tract infections, psycho-social well-being and the role of boys and

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parents in supporting MHM in school. Furthermore, different SWASH policies are highlighted.

Chapter Three describes the study setting and explains the methodology used, particularly the study design data collection procedures, and the data analysis.

Chapter Four presents the study results from objective one i.e., phase 1: the rapid literature scoping review.

Chapter Five presents the results from objectives 2, 3, 4 and 5 i.e., phase 2: the quantitative study.

Chapter Six presents the results from objective 6 i.e., phase 3: the qualitative study.

Chapter Seven presents the discussion and interpretation of the study results.

Chapter Eight presents the conclusions arising from the key results and makes recommendations for further research and for program implementers and policymakers. All the references cited in this study are presented at the end of the thesis, together with study appendices.

Appendices for this study include the questionnaire, focus group discussion guides and key informant interview guides, consent forms, institutional ethics approvals and data use permission for the PhD thesis.

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CHAPTER TWO: OVERALL LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.0 Chapter overview

Chapter One focused on key concepts of the study and gaps in the body of evidence that I intended to contribute to through the study. Chapter Two presents the overall literature that I reviewed on the current challenges related to MHM among adolescent schoolgirls. The reviewed literature consists mainly of peer-reviewed articles accessed from journals and electronic databases, which are related to the study outcomes of interest, namely, knowledge, and practices of MHM, self-reported RTIs, school absenteeism, experiences of embarrassment while menstruating and the need for the MHM in schools. The chapter seeks to gain a deeper understanding of the issues around poor MHM globally, and then to narrow the focus to sub-Saharan Africa (SSA) and Tanzania in particular.

I present the following themes: the theoretical framework of the study, the policy framework supporting MHM in schools both globally and in Tanzania specifically; and interventions to improve MHM among school adolescents. I then describe the empirical evidence on knowledge, attitude and practices related to MHM in schools, followed by a description of the effects of poor MHM in three areas including: empirical evidence on school absenteeism; RTIs and psycho-social well-being; and the potential role of boys and parents in supporting girls in relation to the poor MHM. My review focuses on the global context and particularly LMICs, especially from Africa and Asia, SSA and Tanzania. In the section on Reproductive Tract Infections (RTIs), I review the available literature on the epidemiology or burden of reported RTIs among unmarried adolescent girls; reported RTIs' associations with poor MHM; and health-seeking behavior among infected girls and women. Furthermore, the chapter highlights the knowledge gaps in the literature. Finally, I conclude with a summary of the chapter. The in-depth examination and critique of the literature review appears in Chapter Four of this thesis.

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2.1 Theoretical framework for understanding poor MHM

2.1.1 *Socio-ecological model (SEM)*

This study draws on findings that would inform practices and policies in preventing and mitigating poor MHM in schools, particularly in rural areas. Thus, I felt it would be important to understand the factors that influence poor MHM and its effects on adolescent schoolgirls. To understand the complexity of relationships between poor MHM and the influence of other factors, this study situates itself within the socio-ecological model (SEM) adopting Bronfenbrenner's ecological systems theory (Glanz et al., 2015, Trickett, 2009, Bronfenbrenner, 1977, Kilanowski, 2017). This model was chosen because of its comprehensiveness in describing the multiple external and internal factors that lead to poor MHM in schools, which this study aims to understand through its research questions and objectives (Glanz et al., 2015, Trickett, 2009, Soderlund, 2017). The SEM suggests that individual schoolgirls' practice of poor or good MHM depends not only on their behavior or knowledge but also on the environment in which they live (Bronfenbrenner, 1977, McLeroy et al., 1988). Thus, the SEM guided the design and analysis of this study including the selection of the type of information needed and the participants to be included in the study.

Bronfenbrenner (1977) suggests a conceptual model for understanding human development that focuses on the interactions and relationships with the individual's immediate surroundings (Bronfenbrenner, 1977). The model gained popularity and was used in the 1980s and later formalized. Substantial revisions and changes to the theory were made which led to the emergence of other models based on the socio-ecological model (Bronfenbrenner, 1977, Early, 2016). Among them is Kenneth McLeroy who introduced five different interrelated levels that make significant contributions to influencing the individual's health and behaviors. These levels are the intrapersonal level, interpersonal level, institutional level, community level and public policy level (McLeroy et al., 1988, McLaren and Hawe, 2005). In addition, the SEM describes the linkages between the five levels (Golden and Earp, 2012). The SEM has been used by different researchers across LMICs to understand poor MHM and its effects (McCammon et al., 2020, Long et al., 2013).

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The socio-ecological model is illustrated in Figure 1. Below are descriptions of how the five levels are hierarchically ranked; and how they have helped in framing this research on MHM in schools. This is based on the assumption that adequate MHM may result in desirable school attendance, SRH and psychological well-being. This model was used to guide an understanding of the interaction between various levels in relation to the causes and effects of poor MHM in schools, as well as the analysis in this study. In addition, the model was used to suggest how different levels of the social system could act together to address the effects of poor MHM on girls' education and SRH (Krug et al., 2002).

Figure 1. The socio-ecological model adapted from Bronfenbrenner's *Toward an experimental ecology of human development,* 1977

At the first level, the intrapersonal level concentrates on individual characteristics or attributes such as knowledge, attitudes, behavior, beliefs, skills, and practices (McLeroy et al., 1988). These are important parameters in shaping a schoolgirl's perceptions and practices towards MHM. This approach proposes that for a schoolgirl to effectively practice good MHM while at school, her knowledge and skills obtained pre-menarche on how to manage menses independently, and how to use and dispose of menstrual products is important. Likewise, schoolgirls' higher socio-economic status and higher current grade have been found to be associated with good MHM practices (Hussein et al., 2022, Long et al., 2013, McCammon et al., 2020).

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At the second level, the interpersonal focuses on relationships with others such as family, friends, social networks, teachers, and other social support systems that can influence the individual's behavior or health. This level is considered to be the important level at which an individual can receive information and emotional support which has an impact on the individual's traits, behavior and responses toward the phenomena under study (McLeroy et al., 1988). It is suggested that school attendance for girls during their menses will depend on the kind of support they receive from their counterparts such as boys, male teachers, and parents. Such support can be emotional, or in the form of menstrual materials and MHM facilities. The majority of girls tend to experience teasing and mockery by boys and other girls, as well as male teachers, particularly during their menses. In many schools, boys and male teachers have limited knowledge on menstruation and thus cannot support girls (Chinyama et al., 2019, Mason et al., 2017, Hennegan et al., 2016a, Benshaul-Tolonen et al., 2020a).

The third level focuses on the influence of organizations or institutions on individual behavior and health, through their structures and processes. These factors are argued to have an impact on the advancement or worsening of an individual's health (McLeroy et al., 1988). It is suggested that schools with adequate MHM facilities have, for example, separated toilets for boys and girls, access to water and sanitation facilities including menstrual materials disposal mechanisms or facilities for used sanitary pads, appropriate menstrual materials including emergency sanitary pads, and provide menstrual education to both boys and girls (House et al., 2013). However, most schools lack toilets with lockable doors and MHM facilities; thus girls' lack of access to adequate and private WASH facilities at school are among the barriers to good MHM at the environmental level (House et al., 2013).

The fourth level is community. This level focuses on an understanding of the influence of the social norms and values of the community to which an individual belongs, and how this affects his/her behaviors and health. Social groups such as families, personal friendship networks and neighborhoods are important agents in ensuring that social norms are being spread and absorbed by an individual member (McLeroy et al., 1988). It is suggested that schools with an enabling environment such as: facilities to manage menses effectively and privately; providing menstrual education for pre-menarche;

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education and proper use of facilities; and beliefs surrounding menstruation at the community level, are likely to encourage schoolgirls to practice good MHM privately and freely (Al Omari et al., 2016).

The fifth level is a public policy or enabling environment with the main focus on the formulation, implementation and coordination of policies and/or initiatives that support MHM services and facilities in schools (McLeroy et al., 1988). It is argued that strong policies and initiatives that support MHM in schools include gender policies, school curriculum, teacher training, as well as MHM budget allocation and standards guides. Such initiatives would ensure that WASH facilities and MHM supplies are always available at schools. Consequently, these will assist in breaking the cultural beliefs that prohibit discussions around menstruation and allow girls to freely access services without fear of being stigmatized (Chinyama et al., 2019, SNV, 2014b, SNV, 2014a, Coast et al., 2019, Crichton et al., 2012).

The use of this socio-ecological model (SEM) helped me as a researcher to design the quantitative and qualitative questions for examining different levels of influence of poor MHM and subsequent effects on study outcomes of interest (McLaren and Hawe, 2005). In my study, I focused on the personal, school settings, support from the parents and schoolboys and the local government responsible for the provision of WASH facilities in schools. This enabled me to examine their associations with RTIs, absenteeism and psychological well-being outcomes.

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2.2 Policy framework supporting MHM interventions in schools

Globally, MHM has received vast support from multilateral organizations at international and regional levels, as well as from international collaborators. MHM is considered to be an important aspect of girls' reproductive health and realization of their education potential (Sommer et al., 2016), as poor MHM may lead to school absenteeism, RTIs, and psychological stress among adolescent schoolgirls (Baker et al., 2017, Davis et al., 2018, Benshaul-Tolonen et al., 2020a). Thus, a number of recommendations have been proposed to guide the implementation of MHM programs and projects, including the Sustainable Development Goals (SDGs) to be achieved by 2030, the UN Human Rights Council, Commission on Status of Women

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and regional and International Policy Frameworks such as Africa Water Agenda 2063 (UN, 2015, UN, 2022, CSW, 2020).

The United Nations (UN), through the Sustainable Development Goals (SDGs) in 2015, developed 17 goals to address poverty and improve lives by 2030 (UN, 2015). Despite the fact that MHM has not been featured in the SDGs (Loughnan et al., 2020), goals number 3, 4, 5 and 6 have been indirectly described as providing better menstrual hygiene facilities through ensuring access to basic water and sanitation services for all (Goal 6) (UN, 2015). This will decrease the ailments and diseases linked to the use of unsafe menstrual products and management, leading to good health and wellbeing (Goal 3) (UN, 2015). Another aspect where policy could impact the SDGs is by integrating MHM and an understanding of puberty into school curricula leading to improved and sustained quality education (Goal 4) (UN, 2015). This in turn will assist in retaining girls in school and eliminating gender disparities in education (Goal 5). This will increase the chances and opportunities for the female population to attain decent chances of work and enhance individual and national economic growth (Goal 8) (UN, 2015).

In addition, the UN Human Rights Council in its resolutions in 2018 on the human right to water and sanitation explicitly mentioned MHM. The resolution viewed poor MHM as an infringement on girls' and women's human rights, and urged all nations to tackle issues around menstruation stigma and shame by ensuring universal access to necessary MHM facilities (UN, 2022).

Similarly, the UN Commission on the Status of Women (CSW) in its 64th session of 2020 adopted a political declaration which called on all member states, the private sector and civil society organizations to join their efforts in breaking the barriers that hinder schoolgirls' access to MHM facilities as one of the human rights components (CSW, 2020). To date, evidence suggests that a number of countries in Africa have either reduced or no longer tax sanitary pads (Rossouw and Ross, 2020, Crankshaw et al., 2020). In addition, some governments in East and Southern Africa are providing free menstrual products to schoolgirls, in collaboration with the private sector, non-governmental organizations and communities (Crankshaw et al., 2020).

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In Tanzania, the WASH policy, which features MHM, has been integrated into education, health and water policies and guidelines. WASH is a cross-sectoral strategy, with its implementation guided by multiple documents. MHM interventions feature indirectly in a number of key Tanzanian high-level documents including: Tanzania Development Vision (TDV) 2025; the National Five-Year Development Plan 2021/22–2025/26; the National Long Term Perspective Plan (NLTPP 2011/12-2025/26); and the Water Sector Development Programme (WSDP 2006-2025) (URT, 1999, URT, 2006, URT, 2012, URT, 2021). These documents contain the government's vision to ensure universal access to WASH facilities by the year 2025, directly supporting adequate MHM in schools (URT, 1999, URT, 2006, URT, 2012, URT, 2021). In addition, each sector, particularly the water, education and health sectors, have policies that support the realization of the government's stated goals with respect to MHM such as the National Water Policy 2002, Education and Training Policy 2014 and National Health Policy 2017 (URT, 2002, URT, 2014a, URT, 2016, URT, 2017).

The National Water Policy of 2002 provides a comprehensive legal and policy framework for sustainable development and management of water resources within the country. The policy is supported by other key documents such as the Five-Year Medium Term Strategic Plan 2019/20-2023/24 and National Rural Water Supply and Sanitation Program (NRWSSP) 2006-2025 (URT, 2006, URT, 2020a).

The major Tanzanian policy documents of interest to the study are: Water Sector Development Program Phase II (2014/2015 – 2018/2019); National Health Policy 2017; and the National Guideline for Water and Sanitation and Hygiene for Tanzania School of 2016 (URT, 2014b, URT, 2016, URT, 2017). Among the objectives included in the Water Sector Development Program Phase II (2014/2015 – 2018/2019) is to provide access to improved sanitation and hygiene facilities to 75% of the population in rural and urban settings. These facilities include the rehabilitation of latrines in 3, 500 primary schools that encompass handwashing facilities, menstrual hygiene facilities and the formation of sanitation clubs (URT, 2014b).

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One of the objectives of the National Health Policy 2017 is to provide sustainable water safety, sanitation, hygiene and food safety. The policy commits to enforcing laws and regulations related to safe water, food, sanitation and hygiene, including ensuring efficient MHM (URT, 2017). The 2016 National Guideline for Water and Sanitation and Hygiene for Tanzania Schools provides guidance on aspects of WASH services in primary and secondary schools. It aims to improve WASH conditions, contributing to a positive learning environment, quality education and health for schoolchildren (URT, 2016). The guideline also covers the support related to menstruation, education and MHM. The document is being implemented collaboratively by the Ministry of Education and Vocational Training (MoEVT); the Ministry of Water, the Ministry of Health (MoH); and the President's Office for Regional Administration and Local Government (PORALG) (URT, 2016).

Despite the available and well-articulated policies which lay the foundation for the implementation of the MHM-related interventions in Tanzania, the rapid increase in enrollment of primary school pupils due to the abolition of school fees has been highlighted as one factor that jeopardizes the attainment of the MHM goals in schools' policies (Kessy and Mahali, 2016, URT, 2020b). Institutions are struggling to meet the need for MHM with the annual growth of pupil numbers (URT, 2020b).

2.3 Global situation of MHM in schools

The MHM as part of WASH is increasingly getting attention and focus in recent years, from academia and the development sector due to its impact on the health, education attainment and psycho-social wellbeing of schoolgirls in LMICs (Sommer et al., 2015a, Sommer et al., 2016, Sommer et al., 2021, Sommer et al., 2015b). This attention is heightened by the fact that menstruation is managed differently across the globe, depending on culture, religion, personal choices, education, economic status, knowledge and availability of WASH facilities in particular schools (Kaur et al., 2018). The body of available evidence on the subject documents the challenges of MHM for schoolgirls in LMICs (Van Eijk et al., 2016). For example, in 2016, WHO estimated that 335 million girls attended school without water and soap for handwashing after changing sanitary pads or clothes (UNICEF&WHO, 2018). Only 12% of the schools with basic hygiene facilities were reported to be in the Tanga

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region in Northeastern Tanzania where this study took place (URT&UNICEF, 2020). Therefore, lack of one or more of the above important components of adequate MHM has led to poor MHM practices (Davis et al., 2018).

2.3.1 The magnitude of poor MHM practices

Studies conducted in LMICs showed that approximately 70% of the schoolgirls practice poor MHM while in school (Boakye-Yiadom et al., 2018). A systematic review of 22 studies from Ethiopia on menstrual hygiene reported that 47% of schoolgirls practice poor MHM while in school (Sahiledengle et al., 2022). Yadav et al in their study among schoolgirls in Nepal found that 60% engaged in good menstrual hygiene practices (Yadav et al., 2017). A survey conducted among the primary school girls in pastoralist communities showed that 29% of them were practicing poor MHM (Korir et al., 2018). Davis et al (2018) in their study among 1,159 adolescent schoolgirls in rural and urban Indonesia found that 64% reported poor MHM practices (Davis et al., 2018). Boakye-Yiadom et al (2018) in their study in northern Ghana found that 69% of schoolgirls were practicing poor MHM (Boakye-Yiadom et al., 2018). Similarly, another study from Ethiopia recorded the prevalence of poor MHM at a rate of 49% (Shallo et al., 2020). A study among adolescent schoolgirls in southern Ethiopia found that 60% of girls engaged in poor menstrual hygiene practices (Belayneh and Mekuriaw, 2019). Research conducted among secondary schoolgirls in Eastern Ethiopia demonstrated that 42% of the schoolgirls practiced poor MHM (Mohammed Gena, 2020). Another study by Bulto in Ethiopia found that 65% practiced poor MHM (Bulto, 2021). In rural Bangladesh, the prevalence of poor MHM was found to be 28% (Ahmed et al., 2021). In Ghana, a rate of 49% poor MHM was reported (Mohammed et al., 2020). In Lao PDR among in-and-out of school girls, 66% of them reported practicing poor MHM (Sychareun et al., 2020).

2.3.2 Factors associated with poor MHM practices

Several studies in LMICs have documented the factors influencing the odds of poor MHM practices among schoolgirls. Those factors have been divided into four factors namely: socio-demographic characteristics, biological factors, social structure and beliefs (Korir et al., 2018, Davis et al., 2018). As highlighted earlier, studies in

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Ethiopia, Indonesia, Ghana and Kenya found that adolescent girls of age less than 15 years, reported that religion, non-discussion of menses, lack of sanitary pads, girls who did not receive a regular allowance for menstrual care products, living in a rural residence, being in the lower school grades and having low knowledge of menstruation increased the odds of poor MHM among the schoolgirls (Korir et al., 2018, Belayneh and Mekuriaw, 2019, Davis et al., 2018, Shallo et al., 2020, Mohammed and Larsen-Reindorf, 2020). In addition, a lack of latrine privacy and a lack of water within the latrines for handwashing and washing after changing pads at school increased the odds of poor MHM practices (Shallo et al., 2020, Korir et al., 2018). Moreover, fear of being teased and actual teasing from the boys also increased the risks of practicing poor MHM among schoolgirls (Korir et al., 2018).

2.4 Contributing factors to poor MHM in schools

2.4.1 Lack of MHM facilities and services in schools

The unavailability of functional and private school toilets is a widespread problem across the globe, particularly in LMICs (UNICEF&WHO, 2020). In 2019, a global study reported that a total of 698 million schoolchildren were denied access to basic sanitation services. In addition, it is estimated that 331 million schools had no usable toilets but not separate for boys and girls, while another 367 million had no sanitation service facilities at all. This refers to a lack of single-sex toilets with lockable doors, located in safe locations, which are clean, with water, and a bin with a lid inside cubicles (UNICEF&WHO, 2020). Among children who had no basic sanitation service, 213 million of them lived in SSA, where most of their toilets were inaccessible or of an unacceptable level of quality and cleanliness. For example, only 44%, and 22% of schools in rural areas had basic sanitation and no sanitation facilities respectively (UNICEF&WHO, 2020).

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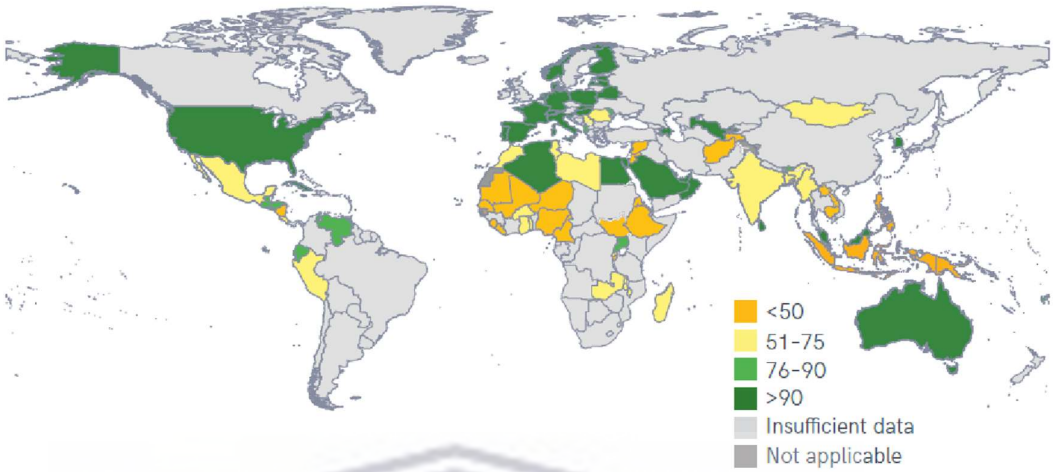

Figure 2: Proportion of schools with basic sanitation services in 2019

(UNICEF&WHO, 2020)

In Tanzania, eight out of ten schools reported having done away with single-sex sanitation facilities However, of these, only three out of 10 toilets were in usable condition. Furthermore, changing rooms/special rooms for adolescent girls with or without basic amenities were observed in 17% and 7% of schools respectively (URT&UNICEF, 2020). With respect to the availability of MHM facilities in schools and their location, study data showed poorest coverage in rural, primary, government-owned, and day schools (URT&UNICEF, 2020).

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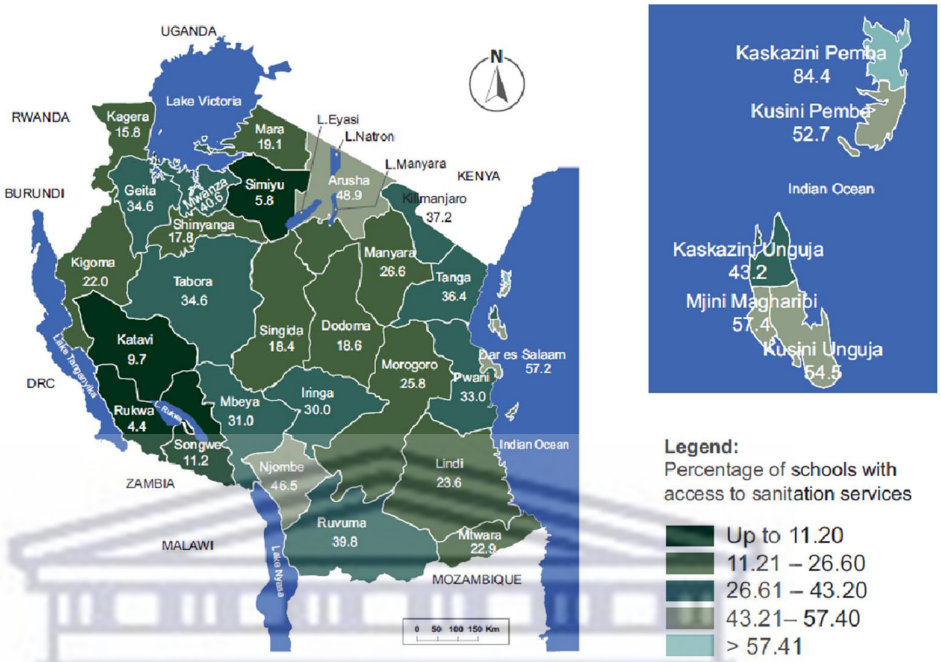

Figure 3: Proportion of schools with basic sanitation services, Tanzania, 2018

(URT&UNICEF, 2020)

On the other hand, the availability of handwashing stations with water and soap within toilet conveniences or outside the toilets is one of the integral components of MHM. These facilities could be mobile or fixed, allowing pupils to wash their hands using running water, particularly before and after schoolgirls have changed their menstrual materials (UNICEF&WHO, 2020). In 2019, 462 million in-school children globally had no access to handwashing facilities. A quarter of the schools had neither handwashing facilities nor any water at all. Of those who are denied their right to these services, over half i.e., 295 million children, were from SSA (UNICEF&WHO, 2020). Cronk et al (2021) in their study in rural schools in 14 LMICs found that only 12% of schools had at least basic handwashing facilities (Cronk et al., 2021). In addition, schools with health clubs, funds budgeted for WASH infrastructure, supplies or repairs, or MHM materials were more likely to have basic handwashing facilities. In Tanzania, a national SWASH representative survey revealed that only just over half of schools had handwashing facilities. Only 32% of schools had water and soap at handwashing facilities. It was also noted that only 19% of schools with handwashing facilities were located near the toilet room (URT&UNICEF, 2020).

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2.4.2 Inadequate access to menstrual materials and their effective disposal

Access to menstrual products and their effective disposal is one of the important conditions for girls to manage their menstruation hygienically while in school (House et al., 2013, UNICEF, 2019). Therefore, girls need safe, clean, comfortable, appropriate, and affordable menstrual materials that protect the flow of blood (House et al., 2013, Kandjimi and Aku-Akai, 2018, Mohammed et al., 2020), and proper disposal facilities after using them (House et al., 2013). House et al (2013) show that schoolgirls who lacked access to disposable sanitary pads reported resorting to using unhygienic methods. Research findings show that most schools are reportedly not providing menstrual products free or with a minimal charge, particularly during a menstrual emergency ie, when a girl starts her monthly period unexpectedly while at school (Tamiru et al., 2014, Tamiru et al., 2015, Wall et al., 2018).

Results from studies conducted in rural areas of LMICs among primary and secondary school girls reported that over 80% of girls preferred disposable sanitary pads for managing the flow of menstrual blood (Belayneh and Mekuriaw, 2019, Bhusal, 2020, Bulto, 2021, Cherenack et al., 2020, Katsuno et al., 2019, Korir et al., 2018, Mohammed and Larsen-Reindorf, 2020, Nabwera et al., 2021, Shallo et al., 2020, Upashe et al., 2015, Mohammed Gena, 2020). Schoolgirls who lacked access to disposable sanitary pads resorted to using crude and unhygienic methods such as old pieces of cloth to control the flow of menstrual blood (Chinyama et al., 2019, Kaur et al., 2018). There were few schools that were reported to have provided menstrual products either free or with a minimal charge, particularly during an emergency (Wall et al, 2018). A qualitative study in Zambia revealed that there were few schools that provided toilet paper to absorb menstrual blood (Chinyama et al., 2019). Similarly, the most recent study conducted in rural schools in 14 LMICs found that only 26% had MHM materials (Cronk et al., 2021). It was reported that factors associated with access to MHM materials for schoolgirls included being a secondary school, having at least basic sanitation facilities, having MHM in the school curriculum, having a designated MHM focal person or having school funds budgeted for WASH (Cronk et al., 2021). In addition, available evidence shows that while numerous non-governmental organizations and philanthropists provide sanitary towels to schoolgirls, their supply remains irregular (Mohammed et al., 2020).

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On the other hand, most schools in LMICs lack disposal facilities such as incinerators for sanitary pads (Kaur et al., 2018). The poor location of incinerators in few schools with facilities hampers their use as girls feel shy or afraid of being seen by others, especially boys, when using or carrying a bundle of used sanitary pads; therefore most of the girls opt out of using them (Kaur et al., 2018). It is reported that schoolgirls therefore opt to dispose of their used menstrual absorbents in pit latrines, dustbins located in the toilet, or carry them back home; there they dispose of them in regular waste, throw them in the bush or on the roadside or on a farm or over the fence, bury them in fields or burn them with other household waste (Belayneh and Mekuriaw, 2019, Bulto, 2021, Garba et al., 2018, Hennegan and Montgomery, 2016, Hennegan and Sol, 2020, Kapoor and Kumar, 2017, Mohammed and Larsen-Reindorf, 2020, Nabwera et al., 2021, Shallo et al., 2020, Upashe et al., 2015).

Inappropriate and unsafe and disposal of used menstrual materials poses risks for blood-borne infections and negative environmental impacts such as the blockage of sanitation systems (Kaur et al., 2018, Sornapudi et al., 2018). Furthermore, it causes embarrassment to the girls, particularly when their menstrual blood is seen by other people from improperly disposed of pads (House et al., 2013, Scorgie et al., 2016).

The preference for use of certain methods of disposal may be in part influenced by taboos and myths. For example, a qualitative study in Zambia revealed that girls preferred to dispose of the used menstrual products in pit latrines than in waste bins as they believed that disposing of them in the latter may expose them to witchcraft (Chinyama et al., 2019). In Tanzania, most schools conduct the disposal of menstrual materials on a daily and weekly basis (URT&UNICEF, 2020).

2.4.3 Lack of MHM education and information

Schools remain an integral point in the provision of MHM education to increase knowledge and awareness of safe MHM among schoolchildren and teachers. However, a limited number of schools in LMICs were reported to provide MHM education components in their curriculum or programs (UNICEF, 2019). In India, only 64% of schools provided menstrual hygiene education (UNICEF&WHO, 2018). A survey conducted in 10 regions in Zambia found that only 46% of the schools

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provided MHM education (Agol et al., 2018). Sivakami, et al (2019) in their study in three states of India found that 19% of the schools were providing MHM education (Sivakami et al., 2019). A study among schoolgirls in Bangladesh shows that only 9% of schools provide MHM education to grade 8 girls (Alam et al., 2017). A Nepalese study found that only 45% of schoolchildren reported having received MHM education while in class (Yadav et al., 2017). Similarly, a qualitative study among schoolgirls in Ghana found that only two out of 33 participants of focus group discussions (FGDs) reported receiving MHM education from school programs (Rheinländer et al., 2019). A study conducted in Nepal reported that practices and beliefs related to MHM were influenced by the girls' families rather than knowledge being gained at school (Singh et al., 2019). In addition, most MHM education or training in a school was provided by the NGOs working in that school catchment area (Yadav et al., 2017). Less than half of schools in Tanzania provide comprehensive sexuality education (CSE) (URT, 2018).

2.4.4 Lack of MHM social support

Social support is a critical component of adequate MHM in schools, to ensure privacy and respect for schoolgirls when they are menstruating (House et al., 2013, UNICEF, 2019). Despite the fact that menstruation is a natural process for girls and women of reproductive age, it is regarded as taboo for some religions and communities (Gottlieb, 2020). Hence, girls and women are regarded as impure during their periods, and their rights to access and use water and other sanitation facilities are denied (House et al., 2013, Rastogi et al., 2019, Tamiru et al., 2015, Vashisht et al., 2018).

Evidence from the literature reveals that schoolgirls lack social support from their boy classmates, male teachers and parents, in order for them to manage menstruation while in school (Haver et al., 2018). Furthermore, lack of access to MHM facilities leads to schoolgirls experiencing shame, fear, stress and embarrassment related to leakage and staining of their uniform during their periods. Schoolgirls are also reported to often fail to wash or to hygienically use menstrual absorbents. This makes schoolgirls feel unclean, uncomfortable and makes them prone to teasing from boy classmates (Mason et al., 2019).

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Studies from SSA and Asia describe that most schoolgirls reported that they had at some stage experienced or witnessed other girls being teased by boy classmates while menstruating (Miiro et al., 2018, Shah et al., 2019, Vashisht et al., 2018). This situation mainly happened when a girl unexpectedly menstruated or soiled her clothes with menstrual stains (Kuhlmann et al., 2017, Wall et al., 2018). In addition, some boys were reported to have been able to identify a menstruating schoolgirl by either their menstrual smell or by observing behaviors such as isolating from the group (Chinyama et al., 2019). When they encountered such challenges, schoolgirls were less likely to seek support from the predominantly male teachers, who may have had a negative attitude towards menstruation. This meant that attention was not paid to the challenges that schoolgirls experience (Mahon et al., 2015).

In reports from rural Kenya, schoolgirls expressed concerns related to seeking information or supplies related to menstruation from male teachers (McMahon et al., 2011). Male teachers reported lacking formal training on menstruation and demonstrated inadequate knowledge and felt uncomfortable supporting girls on this subject (Jewitt and Ryley, 2014, Kuhlmann et al., 2017, Mason et al., 2017, Shah et al., 2019). Mason et al (2017) in their qualitative study in India observed that female teachers were generally reported to be supportive compared to male teachers (Mason et al., 2017). Another qualitative study from Mali showed that schoolgirls' peers provided information and menstrual materials when approached by those who had none (Trinies et al., 2015). A qualitative study from Zambia indicated that some parents supported their daughters by educating them on how to manage menses hygienically while in school (Chinyama et al., 2019). However, findings from a qualitative study in Gambia, showed that mothers thought that teachers should be responsible for supporting girls when they are having their periods while in school (Shah et al., 2019). A cross-sectional study in rural Bangladesh showed that school supportive arrangements, such as approval to use the toilet when needed and free discussions with peers on menstruation issues, increased the confidence of girls in managing menses while in school (Hennegan and Sol, 2020). Findings from the studies in India, Gambia and Mali showed that lack of parental and school support is mainly rooted in poor knowledge and restrictions on males learning and openly discussing menstruation (Mahon et al., 2015, Shah et al., 2019, Trinies et al., 2015).

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The same taboos have resulted in boys, male parents and male teachers viewing MHM as an issue exclusively for girls to take care of, and feeling that there was nothing they could do to support girls if they were bullied and teased (Shah et al., 2019).

Tanzania is among the countries where girls experience teasing and embarrassment during their menses while in school (Benshaul-Tolonen et al., 2020a, Brama, 2018, Guya et al., 2014, SNV, 2014a, Sommer et al., 2015a). Findings from a study conducted in northern Tanzania showed that 13% of schoolgirls reported an experience of teasing from their boy classmates while in school. It reported that 80% were afraid of being teased if they soiled their uniforms (Benshaul-Tolonen et al., 2020a). Boy classmates were reported to go to the extent of searching schoolgirls' bags to find sanitary pads and when they found them started to tease schoolgirls (SNV, 2014a). Thus, schoolgirls opted not to carry additional sanitary pads during menses and ended up using a single sanitary pad for the whole day, without changing them (Sommer, 2010). As found elsewhere, the lack of support from boy classmates as well as school matrons, teachers, parents and school committees were attributable to inadequate knowledge, shyness, and taboos (Mason et al., 2017, Chinyama et al., 2019). MHM issues were rarely integrated into school plans (SNV, 2014a). Another exploratory study from northern Tanzania found that other girls were providing emotional and material support to those girls who did not have in exchange for other favors in future including washing clothes or asking to bring something she needs (Brama, 2018). The Netherlands Development Organization (SNV) noted in their study that some male teachers purchased sanitary towels for schoolgirls in exchange for sex, particularly when girls soiled their clothes while at school and came from poor families (SNV, 2014a). Embarrassment and lack of respect during their periods in school were reported to be amongst the main causes of girls' school absenteeism (Guya et al., 2014, Sommer et al., 2015a).

2.5 Empirical evidence on knowledge, attitude and practices

2.5.1 Knowledge of menstruation

Despite the fact that awareness of menstruation is almost universal among schoolgirls in LMICs, comprehensive knowledge of menstruation remains limited (Boakye-Yiadom et al., 2018, Boosey et al., 2014, Chikulo, 2015). Few girls reported having

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accurate information on which to base effective management of their menstrual hygiene at school (Boosey et al., 2014). This was mainly because of myths, taboos, and socio-cultural restrictions around menstruation, which not only limit girls access to accurate information but also their ability to practice hygienic menstruation while in school (Boosey et al., 2014, Chandra-Mouli and Patel, 2020).

There is evidence that the majority of the adolescent girls in LMICs transition to adolescence without much preparation in terms of information about what will occur in their bodies during puberty, particularly during menstruation (Chandra-Mouli and Patel, 2020, Coast et al., 2019, Wall et al., 2018). A study in Bangladesh among schoolgirls reported that 64% of them had no knowledge of menstruation before reaching menarche (Alam et al., 2017). Similarly, a study among adolescent girls in Nigeria found that half of the students received no information on menstruation prior to menarche (Salami et al., 2019). In their study in Myanmar and Bangladesh, Hennegan et al (2022) found that lack of awareness related to menarche across the two countries was 84% and 34% respectively (Hennegan et al., 2022).

Evidence from the literature shows that between 28% and 54% of schoolgirls have poor knowledge of menstruation (Belayneh and Mekuriaw, 2019, Bulto, 2021, Korir et al., 2018, Vashisht et al., 2018, Yadav et al., 2017, Mohammed and Larsen-Reindorf, 2020). For example, findings from a study in Ghana showed that about 90% of girls believed that the vagina was the source of menstrual blood. In 2014, 2015, studies showed that in Tanzania, 82% of adolescent girls lacked sufficient knowledge about body changes and how to take care of themselves during menstruation (SNV, 2014a, Tamiru et al., 2014, Tamiru et al., 2015). Despite strong qualitative evidence of negative experiences of girls attempting to manage their menses in school, less than half of schools in Tanzania provide Comprehensive Sexuality Education (CSE) (URT, 2018).

Regarding the source of information on menstruation, studies in Mali, Ghana, Gambia and South Africa reported that mothers were the most common sources as well as grandmothers, aunties, older sisters, friends, the media and female teachers (Boakye-Yiadom et al., 2018, Chikulo, 2015, Ramathuba, 2015, Shah et al., 2019). However,

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despite this role, mothers reported experiencing difficulties in discussing menstruation with their daughters because of their own limited knowledge, and would sometimes prefer this responsibility to be given to the teachers (Shah et al., 2019). A study from Tanzania noted that when girls were asked who else they may seek MHM information from besides friends and mothers, girls studying in private schools reported that they would consult with female teachers. However, girls in public schools reported that they did not consult with female teachers (Guya et al., 2014). From the literature, it is evident that the high prevalence of stigma surrounding menstruation contributes to inadequate knowledge about MHM among adolescents, particularly those living in rural areas (House et al., 2013).

In addition, due to cultural taboos about the subject, male teachers are reported to lack knowledge and to be uncomfortable in discussing issues related to menstruation. Hence, they tended not to focus on reproductive health topics with pupils, particularly not menstruation (Boosey et al., 2014, Chikulo, 2015). Studies from Zambia and South Africa reported them to be ill-equipped to provide behavioral and communication materials on menstruation, which would enable schoolgirls to be better informed (Chikulo, 2015, Chinyama et al., 2019). Moreover, schools were reported to lack adequate teaching structures to include information and discussion of MHM. Schoolgirls were therefore found to have missed age-specific and accurate information on menstruation (Chikulo, 2015).

Studies from Ethiopia and Ghana highlight factors such as schoolgirls living in rural areas attending public schools, living with mothers only, having mothers who were illiterate; and girls being above 15 years of age were found to be associated with girls' poor menstrual knowledge (Bhusal, 2020, Boakye-Yiadom et al., 2018, Fisseha et al., 2017, Mohammed and Larsen-Reindorf, 2020). Other factors associated with poor menstrual knowledge were not having television or a radio at home (Mohammed and Larsen-Reindorf, 2020).

2.5.2 Attitudes towards menstruation

Perceptions of menstruation among different cultures and religious beliefs may cause stigma, shame and fear among girls. For example, results from a survey in Nigeria

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showed that almost 70% of the schoolgirls reported the existence of beliefs and myths regarding menses in their localities (Okafor-Terver and Chuemchit, 2017).

These beliefs or myths hamper public discussion on the subject among the girls themselves and with parents or teachers. Salami et al (2019) in their study in Nigeria found that 41% of schoolgirls believed that menses issues should not be discussed openly (Salami et al., 2019). Similarly, a study in India reported that 57% of the girls said it is shameful to discuss menses (Singh et al., 2019). Among the reasons for not discussing this publicly were shame and embarrassment. In the aforementioned study in the Gambia, findings showed that schoolgirls reported experiencing difficulties, embarrassment and shame when discussing menstruation (Shah et al., 2019). However, in the aforementioned studies in Ethiopia and in Lao PDR, there were a number of schoolgirls who reported discussing menstruation issues, but this was mostly with their parents (Bulto, 2021, Sychareun et al., 2020). A report among adolescent schoolgirls in Lao PDR suggested that 90% have ever discussed menstruation with their mothers and 8% with their fathers (Sychareun et al., 2020). Another study on the same topic from Ethiopia suggested that 56% reported discussing their menses with their parents (Bulto, 2021). In the Gambia, mothers reported experiencing challenges in having discussions with their daughters (Shah et al, 2019). Among the reasons given by the studies from Kenya and Ethiopia were shamefulness and the secrecy of menstruation issues (Bulto, 2021, Fennie et al., 2022, Korir et al., 2018). All the schoolgirls who participated in a survey in India reported not having not discussed any menses' issue with their teacher due to discomfort on the subject (Singh et al., 2019).

Despite the fact that political, socioeconomic, and cultural factors have been reported as influencing adolescent girls' different attitudes towards menstruation, there is increasing development in understanding such factors (Atari et al., 2021). Numerous studies across the LMICs documented varying prevalence of the attitudes of the schoolgirls towards menstruation, particularly MHM. A survey among schoolgirls in India showed that half of them had a positive attitude towards MHM (Yadav et al., 2017). A study in Indonesia showed that 78% of girls had a favorable attitude toward menstruation (Balqis et al., 2016). A pilot intervention study in Uganda showed an

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increase in the percentage of schoolgirls who correctly answered questions related to myths from 17% to 41% from the baseline prior to the intervention and the end-line, post-intervention, respectively (Kansiime et al., 2020). Austrian et al (2021) in their cluster randomized controlled trial among schoolgirls in western Kenya detected an improvement in menstruation attitudes among girls who received interventions comprising reproductive health education and provision of sanitary pads (Austrian et al., 2021). However, a study in Ghana reported that only 13.6% of adolescent schoolgirls had a positive attitude towards MHM (Boakye-Yiadom et al., 2018), while a study in India showed that only 14% of girls had a positive attitude toward menstruation (Singh et al., 2019). Another study suggests that factors such as the higher the age of girls, the higher the class they were in, and parents with higher levels of education have an increased likelihood of positively affecting the attitude of adolescents on menses (Aluko et al., 2020).

2.5.3 Practices related to menstruation

Evidence suggests that the majority of school-going girls in LMICs prefer to use commercially made disposable sanitary pads and reusable pads to absorb their menstrual blood. Van Eijk et al (2016) in their systematic review of 138 studies on MHM in India found that commercial pad use was predominant among adolescent girls in urban areas, 67% as compared to 32% in rural areas (Van Eijk et al., 2016). Studies in Bangladesh, Ethiopia, Nigeria, Ghana, Uganda and Indonesia reported that between 42% and 98% of the schoolgirls reported to have used commercial disposable sanitary pads during their most recent menstrual period (Van Eijk et al., 2016, Ahmed et al., 2021, Mohammed Gena, 2020, Boakye-Yiadom et al., 2018, Miiro et al., 2018, Belayneh and Mekuriaw, 2019, Sahiledengle et al., 2022, Okafor-Terver and Chuemchit, 2017, Biruk et al., 2018, Shallo et al., 2020, Bulto, 2021, Davis et al., 2018). A systematic review of 22 studies among girls conducted in Ethiopia showed a slightly greater prevalence in the use of commercial menstrual absorbents compared with homemade cloth pads, being 65% and 53%, respectively (Sahiledengle et al., 2022). A very recent study in Northeast Ethiopia showed that 55% of schoolgirls use commercially made disposable sanitary pads, while 19% reported using reusable sanitary pads, and the remainder reported using disposable pieces of rag (Shumie and

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Mengie, 2022). In this study, 31% of the respondents reported disposing of their used menstrual pads in a bin (Shumie and Mengie, 2022).

As previously mentioned, poor hygiene conditions and lack of privacy in toilets inhibit girls either in changing sanitary pads or washing their hands and genitals during menstruation (Katsuno et al., 2019, Korir et al., 2018, Kumbeni et al., 2021, Kapoor and Kumar, 2017). Van Eijk et al (2016) in their systematic review of 138 studies on MHM in India found that only 37% of school-going girls were able to change their absorbent menstrual materials in school facilities (Van Eijk et al., 2016). Studies in Ethiopia, Nepal, Philippines and Gambia reported low consistency of changing sanitary pads at least three times a day while in school (Katsuno et al., 2019, Belayneh and Mekuriaw, 2019, Bhusal, 2020, Nabwera et al., 2021).

A study in Ethiopia among schoolgirls showed that only 4% changed their used sanitary pads three times a day (Shumie and Mengie, 2022). Another survey in Indonesia reported that 57% of the schoolgirls reported changing absorbents at least every 4-8 hours (Davis et al., 2018). Moreover, the delay in changing used menstrual materials for up to eight hours was reported to be common among school-going girls in Tanzania, the Philippines and Kenya (Katsuno et al., 2019, Korir et al., 2018, Cherenack et al., 2020). In Tanzania, a report showed that about 40% of the sampled schoolgirls changed their sanitary pads after six hours or more (Guya et al., 2014). Another report showed that only half of the girls dried pads and reusable cloths in sunlight (Belayneh and Mekuriaw, 2019). Cherenack et al (2020) noted that about half the girls reported reuse of a not fully dry product and use of an already used product by someone else.

On the other hand, the rate of hand washing before changing pads, and cleaning external genitalia during menstruation was low (Mohammed Gena, 2020, Mohammed and Larsen-Reindorf, 2020). Furthermore, up to 40% of the girls did not clean their external genitalia with water and soap during menstruation (Belayneh and Mekuriaw, 2019, Bulto, 2021). A study in Ethiopia among schoolgirls showed that only 39% of girls used water alone to clean their genitalia. In addition, about 60% reported not to take baths at all during their menses (Shumie and Mengie, 2022).

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2.6 Empirical evidence on school absenteeism related to poor MHM

2.6.1 School absenteeism as proxy of poor MHM in school

Despite the increased enrollment of girls in primary and secondary schools in LMICs, school absenteeism related to menstruation remains an issue of concern in relation to girls' realization of education attainments (Davis et al., 2018, Ahmed et al., 2021, Alam et al., 2017, Van Eijk et al., 2016, Hennegan et al., 2020). School absenteeism in the context of schoolgirls menses may reflect the existence of poor MHM facilities such as water in school, poor health status and lack of support related to menses (Chinyama et al., 2019, Vashisht et al., 2018). A schoolgirl who experiences suspected STIs/RTIs and the accompanying embarrassment may opt to remain home during menses rather than encounter these challenges while remaining in school (Vashisht et al., 2018, Davis et al., 2018). In addition, the existence of stigma and taboos around menses among teachers and pupils causes shame and fear in schoolgirls (Phillips-Howard et al., 2016a) as does fear of being teased after staining or the smell of menstrual blood on their clothes (Miiro et al., 2018, Shah et al., 2019). A systematic review from India reported restrictions imposed on girls during menstruation as another reason for the absenteeism (Van Eijk et al., 2016).

2.6.2 Prevalence of school absenteeism related to menstruation

Numerous quantitative and qualitative studies have been conducted among schoolgirls to understand and measure the prevalence rate of school absenteeism in relation to menstruation. Studies conducted in India, Malawi, Ethiopia, Tanzania, Bangladesh, Kenya, Ghana, Indonesia and South Africa revealed that 10-79% of schoolgirls have missed school for at least one day during their last period (Davis et al., 2018, Enzler and Gass, 2018, Sahiledengle et al., 2022, Benshaul-Tolonen et al., 2020b, Benshaul-Tolonen et al., 2020a, Benshaul-Tolonen et al., 2019). The most recent data from Performance Monitoring for Action surveys conducted in West Africa show that 23% of girls in Nigeria, 17% in Burkina Faso and 15% in Niger missed school due to menstruation in the last 12 months (Hennegan et al., 2021), while 20% of girls in Uganda reported missing studies for at least one day in their most recent menses (Miiro et al., 2018). In addition, qualitative studies reported absenteeism and described the experiences of schoolgirls in missing the school days during their menses (Hennegan et al., 2017, Chinyama et al., 2019).

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2.6.3 The average number of days missed in a month

Studies across the LMICs showed that girls miss an average of between 1.6 to 2.8 days every month (Wilson et al., 2014, Alam et al., 2017). The average number of days varies across countries due to study designs, sample size and study population (Van Eijk et al., 2016). For example, in a study in Malawi, 1.8 days were missed per menstrual cycle (Enzler and Gass, 2018), in Nepal 2.6 days (Shrestha et al., 2022), in Bangladesh 2.8 days (Alam et al., 2017), and in South Africa an average of 1.8 days of school (Macleod et al., 2020). In a trial in Western Province, Kenya, the mean number of days girls reported missing school specifically due to menstruation was 1.6 (Wilson et al., 2014) and in Ghana 2.8 days (Kumbeni et al., 2021).

2.6.4 The association between poor MHM and girls' absenteeism

The available evidence suggests the presence of a link between poor MHM and school absenteeism among adolescent girls (Davis et al., 2018). Among the reasons for absenteeism are lack of absorbent material, lack of WASH facilities and lack of social support in schools during menses (Atari et al., 2021, Baku et al., 2020, Blake et al., 2018, Mohammed and Larsen-Reindorf, 2020, Mohammed et al., 2020, Enzler and Gass, 2018). Other risk factors for school absenteeism include: being above 15 years old; absence of MHM education or programs in school (Sivakami et al., 2019), living in rural areas; being in a higher school grade; believing menstruation should be kept secret; having an illiterate mother or father; and coming from single families (Hasan et al., 2021). A study in Ghana reported that schoolgirls use different reasons to get excused from school by teachers including sickness when they miss classes due to menses (Rheinländer et al., 2019).

Van Eijk et al (2016) found in their systematic review in India that commercial pad use was associated with a decrease in school absenteeism and vice versa for re-usable cloth use. Similarly, a qualitative study from Uganda reported that the absence of reliable absorbents keeps girls away from school (Van Eijk et al., 2016, Hennegan et al., 2016b, Hennegan et al., 2017). In addition, schoolgirls reported knowing other schoolgirls who were absent for the same reasons (Hennegan et al., 2017). On the other hand, Sivakami et al (2019) in their study in India reported that the use of reusable and disposable pads was associated with decreased absenteeism during

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menstruation (Sivakami et al., 2019), while the unavailability of sanitary pads and disposal facilities for used menstrual materials at school was associated with increased absenteeism (Shrestha et al., 2022, Vashisht et al., 2018, Hasan et al., 2021, Alam et al., 2017). Another school-based cross-sectional study in Ghana showed that the use of sanitary pads was significantly associated with increased school attendance among schoolgirls (Kumbeni et al., 2021). A study from South Africa reported that disposing of used absorbent materials through burning or throwing on farmland increased the risk of school absenteeism (Khamisa et al., 2022).

On the other hand, inadequate WASH facilities such as water, soap and separate toilets for girls with space to manage menses and change pads in privacy are among the reasons for school absenteeism during menses (Sivakami et al., 2019, Van Eijk et al., 2016, Atari et al., 2021, Davis et al., 2018, Stoilova et al., 2022). A study from Bhutan reported that one out of four girls; and one out of five missed school due to unavailable facilities to wash and change sanitary pads and places to dispose of the used sanitary pads respectively (UNICEF, 2018a). Sivakami et al (2019) in their study in India found that adequate toilets in school and access to use during breaks were associated with decreased absenteeism during menses (Sivakami et al., 2019). In addition, the recent systematic review of 50 MHM intervention studies in LMICs showed that the introduced WASH facilities interventions decreased school absenteeism (Canon, 2021).

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2.6.5 Short and long-term effects

It was recently estimated that 65% of countries have reached gender parity in primary education (UNESCO, 2020a, UNESCO, 2020b): however, school absenteeism has an impacted the academic performance and early school dropout, hence the importance of increasing gender parity in education for girls is being jeopardized (Soto Mendez, 2020). For instance, a study in India reported that 65% of girls missed their exams and other important class activities as they coincided with their periods and a fear of leakage or staining of uniforms (Vashisht et al., 2018). Despite this problem being known in Tanzania, there is limited rigorous research evidence on the subject, particularly among primary school girls in rural areas like the Kilindi district in Tanga region.

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2.7 Empirical evidence of RTIs related to poor MHM

2.7.1 Burden of RTIs

RTIs continue to be one of the public health concerns among populations in LMICs due to their disproportionate burden and their causing increased susceptibility to HIV infection and infertility if not treated (WHO, 2005). In 2020, the World Health Organization estimated that 374 million cases of chlamydia, gonorrhea, syphilis and trichomoniasis infections occurred i.e., more than one million infections occurred daily. Trichomoniasis took the lead, presenting with 156 million cases, followed by Chlamydia-129 million cases, gonorrhea - 82 million cases and syphilis – 7.1 million cases (WHO, 2022).

Despite the fact that STIs/RTIs are widespread globally, there are disparities in transmission and prevalence across population groups (WHO, 2018). The key factors for such disparities are age, socioeconomic, biological and behavioral. Low-and-middle-income countries bear a huge burden totaling 92% of all RTIs (Rowley et al., 2019). Sub-Saharan Africa accounts for 86 million cases (Rowley et al, 2019). In addition, RTIs and non-sexually transmitted RTIs among women are usually even more common (WHO, 2005).

Furthermore, adolescents, particularly girls, bear the highest burden of infections due to limited correct information, poverty, poor health-seeking behavior and stigma (Mehta et al., 2021). Results from the studies that assessed the reported or confirmed RTIs among schoolgirls aged between 10-19 years in LMICs showed a prevalence of between 0% and 88.4% (Mathiyalagen et al., 2017, Gupta, 2019). The majority of these schoolgirls were asymptomatic (Kerubo et al., 2016). However, the most common symptoms experienced by girls and women included: abdominal pain, genital ulcers, vulvar itching, inguinal swelling, abnormal vaginal discharge, burning sensation, and dyspareunia, among others (Kerubo et al., 2016).

2.7.2 Association between RTIs and poor MHM

A number of studies have documented the association between unhygienic practices in managing menses and RTIs among women and girls in low and middle-income countries (Anand et al., 2015, Baker et al., 2017, Janoowalla et al., 2020, Torondel et

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al., 2018). Torondel et al (2018) in their hospital-based survey among women found that poor MHM was associated with RTIs, particularly with the use of unsanitary absorbent material. The most recent data from Ethiopia, Gambia and India depict that poor MHM practices such as using unclean latrines, not washing hands with soap before touching the genital area, changing absorbent materials only once per day, washing the genital area only once per day during menstruation, use of reusable absorbents, drying absorbents inside the house and storing absorbents in the latrine area are all significantly associated with RTIs (Ademas et al., 2020, Das et al., 2021, Nabwera et al., 2021). In addition, studies documented numbers of schoolgirls who reported to have never engaged in penetrative sex but had RTIs, which suggests further investigation into MHM practices (Mehta et al., 2021, Houlihan et al., 2014).

There are high-risk sexual behaviors of engaging in transactional sex to obtain money for buying sanitary pads as reported among adolescent girls in Kenya. These expose them to a high risk of HIV and other RTIs (Phillips-Howard et al., 2015).

2.7.3 Risks of untreated RTIs

RTIs have serious consequences in the short and long-term of adverse maternal and perinatal morbidity and mortality (WHO, 2005). Untreated RTIs have serious complications for pregnancy outcomes including preterm labor, miscarriage, stillbirth, congenital infections, and death. RTIs increase the risk of acquiring HIV/AIDS, HPV increases and developing cervical cancer (Puthuchira Ravi and Athimulam Kulasekaran, 2014, WHO, 2022).

However, limited studies have been conducted in Tanzania to understand RTIs' prevalence and associated factors, particularly poor MHM among primary school girls. In addition, there is scarcity of published and grey literature scoping reviews to understand the STI/RTIs prevalence, associated factors and health-seeking behavior to learn the magnitude of the problem among adolescent schoolgirls, particularly in LMICs.

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2.8 Empirical evidence of the impact of poor MHM on psycho-social wellbeing

2.8.1 The magnitude of fear and embarrassment

As already mentioned, available evidence from Asia and sub-Saharan Africa shows that schoolgirls experiencing fear and embarrassment related to poor MHM are associated with inadequate resources and practices while in school (Kuhlmann et al., 2017). A quantitative study among schoolgirls in Uganda found that 46% of the girls reported having experienced embarrassment during their last menses (Hennegan et al., 2016a). Benshaul-Tolonen et al (2020a) in their study among secondary schoolgirls in Tanzania found that 13% of girls reported ever having experienced teasing related to menstruation while in school. In addition, a study in Kenya among schoolgirls reported that 13% of girls had been laughed at or teased by boys when they stained their clothes, leaving them embarrassed and humiliated (Korir et al., 2018). In a study from Bangladesh, 30% of girls reported feelings of embarrassment while 2.5% had feelings of shame (Davis et al., 2018).

As previously documented, schoolboys and male teachers were reported to be the main perpetrators of causing fear, shame, embarrassment and discomfort (Benshaul-Tolonen et al., 2020a). A study in northern Tanzania reported that 18% and 29% have ever personally teased or seen other boys teasing girls about their periods respectively (Benshaul-Tolonen et al., 2020a). In addition, schoolboys in a qualitative study in Zambia acknowledged being able to identify a girl in menses by the smell and their behavior (Chinyama et al., 2019).

Studies from Tanzania, Uganda, Ghana and Nigeria found that between 58% and 80% of schoolgirls fear being teased because of soiling their garments due to menstruation while in school (Tanton et al., 2021, Benshaul-Tolonen et al., 2020a, Hennegan et al., 2017, Edet et al., 2022, Mohammed et al., 2020). The same study found that 87% of schoolgirls fear being teased because of menstrual odor (Benshaul-Tolonen et al., 2020a). In South Africa, 22% of girls feared teasing from boys as they make efforts to privately clean themselves during their periods (Crankshaw et al., 2020).

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2.8.2 Short- and long-term effects of psycho-social stress on isolation and fear

Psycho-social stress arising from teasing negatively affects girls' ability to succeed academically, thus impacting their long term SRH outcomes and limiting their self-esteem, self-agency, and economic potential (Blake et al., 2018, Phillips-Howard et al., 2016b, Sommer et al., 2016). Stress can lead to poor concentration and participation in studying and extracurricular activities, early school leaving, staying home during menstruation and later school drop-out (Chinyama et al., 2019, Kuhlmann et al., 2017, Tellier and Hyttel, 2018, Vashisht et al., 2018, Benshaul-Tolonen et al., 2020a).

2.8.3 Participation in standing/participation in class activities

Poor MHM has been associated with the disengagement of girls in the learning process due to fear of either being teased or soiling their clothes with menstrual blood (Girod et al., 2017). Reports from Uganda and South Africa showed that over half of the schoolgirls were finding themselves uncomfortable standing and answering questions in class during their periods (Crankshaw et al., 2020, Hennegan et al., 2016a). Moreover, schoolgirls who have ever stained their clothes before while in class are reported to have feelings of being ashamed and embarrassed by an unanticipated flow of menstrual blood (Girod et al., 2017, Yaliwal et al., 2020). Furthermore, about 70% of schoolgirls reported having been ashamed, insecure and uncomfortable at school during their last menstrual period (Hennegan et al., 2016a, Alam et al., 2017). Moreover, reports show that schoolgirls were either isolating themselves or being isolated from their female friends or boys after noticing that they were in menses (Alam et al., 2017, Benshaul-Tolonen et al., 2020a, Girod et al., 2017, Korir et al., 2018). Evidence suggests that cultural and religious restrictions were used to isolate and exclude girls during their periods from participation in different functions and routine activities such as cooking or taking particular food stuffs (Girod et al., 2017, Korir et al., 2018, Mohammed and Larsen-Reindorf, 2020). On some occasions, girls who were on menses tended to avoid intermingling with others to keep their menstruation a secret due to fear of giving out an unpleasant smell, staining their clothes or accidentally dropping sanitary material out of their pants (Girod et al., 2017, Alam et al., 2017).

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2.8.4 Effects on concentration, school absenteeism and dropout

In addition, between 33%-48% of schoolgirls reported having experienced loss of concentration while in class due to fear of staining their uniforms and poor MHM facilities and practices (Benshaul-Tolonen et al., 2020a). Almost one in every ten girls reported being afraid to stand up and participate in learning activities because of fear (Benshaul-Tolonen et al., 2020a). Furthermore, it was reported that about 4% who dropped out of school had ever experienced period teasing (Benshaul-Tolonen et al., 2020a). However, there is a scarcity of evidence in Tanzania, particularly in the studies conducted among primary school girls residing in rural areas.

2.9 Empirical evidence of the parents' and schoolboys' support for MHM

As highlighted above, schoolgirls lack social support from their boy classmates, male teachers and parents, in order for them to manage menstruation while in school (Haver et al., 2018). This leads to them to experience shame, fear, stress and embarrassment related to leakage and staining of their uniforms during their periods, as they are unable to access the MHM facilities to manage menses (Miiro et al., 2018). Accordingly, such schoolgirls become prone to teasing from boy classmates, teachers and other staff (Mason et al., 2019).

Evidence suggests that engagement of parents and schoolboys in providing support to enhance a conducive environment for schoolgirls to properly manage menses in school hygienically and comfortably without stress remains critical (Kaba and Adugna, 2020, Giles-Hansen et al., 2019, Mahon et al., 2015, SNV, 2014b, SNV, 2014a, Tamiru et al., 2014, Tamiru et al., 2015). Studies from SSA and Asia have highlighted different types of support ranging from education and information to materials and psychological support from schoolboys and parents to enable schoolgirls to attend and participate in their studies with dignity (SNV, 2014b, SNV, 2014a, Tamiru et al., 2014, Tamiru et al., 2015).

2.9.1 MHM education and counselling

The majority of the adolescent schoolgirls in LMICs start their menarche with limited information and support from their parents and the school environment to manage their periods while in school (Al Omari et al., 2016). Mothers are reported to be the

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most reliable and dependable source of support in this aspect (Trinies et al., 2015, Kansiime et al., 2020, Crichton et al., 2012, Tamiru et al., 2014, Tamiru et al., 2015). In available qualitative evidence from Kenya, Malawi, Mali, and Uganda, mothers admitted to providing education and counselling to their daughters on how to take care of themselves during menstruation (such as keeping clean and behavior around others during menstruation while in school) (Chinyama et al., 2019, Trinies et al., 2015, Kansiime et al., 2020, Crichton et al., 2012, Hennegan et al., 2017). In addition, due to limited knowledge and discomfort discussions around the subject, mothers continue to emphasize the importance to schoolgirls of complying with social norms such as abstinence to avoid early pregnancies and STIs (Miiro et al., 2018, Crichton et al., 2012, Hennegan et al., 2017, Trinies et al., 2015, Sommer et al., 2015a, Chinyama et al., 2019, Boosey et al., 2014).

On the other hand, the support of the fathers is needed and has been regarded as important in MHM. Findings from Gambia show girls' narratives on the importance of involving their fathers as important stakeholders and potential supporters in MHM (Shah et al., 2019). However, for cultural reasons, fathers tend to have negative reactions towards menstruation. For example, findings from Ethiopia show girls describing their fear of being punished by their fathers after noticing the menarche, as the flow of the blood to the fathers is associated with sexual debut and misbehaving (Sommer et al., 2015a). This discouraged schoolgirls from looking for support from fathers during menses (Wall et al., 2018, Sommer et al., 2015a). Again, there are beliefs that if a girl seeks advice or discusses menstruation with her father, there are possibilities that the girl will die (Tamiru et al., 2015). Consequently, a limited number of the girls reported seeking support or discussing the menses with their fathers (Miiro et al., 2018, Sychareun et al., 2020).

2.9.2 Provision of MHM materials

More than three-quarters of parents reported being cognizant of the challenges that their daughters are facing while menstruating in school including unavailability of sanitary pad materials and other MHM facilities (Chinyama et al., 2019, Tamiru et al., 2014, Tamiru et al., 2015). Mothers are reported to be consistently told about the materials needed for MHM by their daughters (Smiles et al., 2017, Hennegan et al.,

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2016b). Studies in Ghana, Zambia and Uganda showed that mothers were providing daughters with money, sewing materials including fabric and other materials for making their own pads, or directly buying them sanitary pads to enable them to manage menses in school to avoid smell and stain (Hennegan et al., 2017, Baku et al., 2020, Chinyama et al., 2019). However, this did not happen consistently as there were times when mothers were unable to afford to do so. In such cases, rather than letting their children miss class, mothers would buy a few pads for the girls to use at school and switch to rags when they got back home (Mason et al., 2013, Hennegan et al., 2017, Tamiru et al., 2014, Tamiru et al., 2015). However, a study from India reported that 4% of schoolgirls were barred from attending school during the menses by their mothers (Vashisht et al., 2018).

On the other hand, there are reports of fathers who directly support their daughters by providing them sanitary pads to manage their periods while in school (Hennegan et al., 2017, Mahon et al., 2015, Atari et al., 2021).

Furthermore, schoolboys were reported to be supportive in the provision of sanitary towels. A qualitative study from Ethiopia described that schoolboys decided to contribute money from their own pockets to buy sanitary pads for needy girls (Kaba and Adugna, 2020). In addition, another study in India that examined the effectiveness of men and boys' involvement in supporting menstruation found a reduction of shame and embarrassment among girls when men and boys bought pads for them (Mahon et al., 2015).

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2.9.3 Reduction of teasing of menstruating girls

Stopping the teasing and mockery of schoolgirls perpetuated by schoolboys during their menses is another area that needs to be supported. Evidence from India and Uganda shows that such deeds have been reduced significantly among the schoolboys (Kansiime et al., 2020, Mason et al., 2017). The majority of interviewed schoolboys in India and Ethiopia described being knowledgeable in detecting schoolgirls who are menstruating but denied continuing to tease or mock schoolgirls (Mason et al., 2017, Kaba and Adugna, 2020). In addition, boys expressed their regret for teasing schoolgirls who are in their menses (Mason et al., 2017). Schoolboys were

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sympathetic to the situation that girls were going through during their menses and showed their readiness to give support, as long as the girls were willing to open up to the boys if they were menstruating; this, however, was criticized by another study from Tanzania (Mason et al., 2017, Kansiime et al., 2020, Benshaul-Tolonen et al., 2020a). An assessment of MHM intervention in Uganda showed the increased number of schoolboys who started to care about schoolgirls during menses while in school (Kansiime et al., 2020). In addition, schoolboys were concerned that girls were not getting adequate support during menses while in school, particularly from the teachers, most of whom were male. For this reason, they thought the schools should hire female teachers to guide and counsel the girls (Mason et al., 2017). On the contrary, some schoolboys strongly disapproved of and despised girls who were in their menses for religious and cultural reasons.

Lack of parental and school support is mainly rooted in poor knowledge and restrictions on males to learn and openly discuss menstruation (Allen et al., 2011, Mahon et al., 2015, Shah et al., 2019, Trinies et al., 2015). Studies from around the globe have increasingly demonstrated that schoolgirls need adequate social support, particularly from schoolboys and parents, for them to manage their periods while in school (Coast et al., 2019, SNV, 2014b, SNV, 2014a).

However, limited studies have been conducted to understand the roles that parents and schoolboys play in supporting girls in managing their menses at school, particularly among primary schoolgirls in rural Tanzania. Even those few MHM studies that included schoolboys and parents were more interested in understanding their knowledge and attitudes regarding menstruation than exploring the issues of support amongst schoolgirls during their menses.

2.9.4 Summary

This chapter has provided a review of literature on MHM and gaps that need to be explored further by the current research. The following chapter will present the methodology of the current study focusing on the three phases applied i.e., a rapid scoping review conducted among the schoolgirls in LMICs; quantitative and

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qualitative approaches used in a study conducted among adolescent schoolgirls in Kilindi district in Northeastern Tanzania.

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CHAPTER THREE: METHODOLOGY

3.0 Chapter overview

The previous chapter of this thesis reviewed the overall literature related to MHM in order to understand the effects of MHM and gaps in the field. Chapter Three presents information on the research methods and study instruments used to respond to the research questions and objectives. It describes the study settings, the research design and approaches i.e., the mixed-methods used, divided into three phases as follows 1) a scoping review, 2) a qualitative component and 3) a quantitative component. It includes study participants sampling procedures, sample size calculation and sample size justification, the instruments used for data collection and the process of data collection, management and analysis. The chapter also provides an overview of the theoretical framework that guided the analysis of the data. Furthermore, it describes the issues pertaining to quality assurance and control of the study i.e., trustworthiness and credibility for the qualitative component and reliability and validity for the quantitative component. The chapter closes with a description of the study's ethical considerations.

3.1 Study settings and participants

The study was conducted in Kilindi district of Tanga region in Northeastern Tanzania, one of the eleven administrative districts of the Tanga Region established in 2002 after it was split from the neighboring district of Handeni. It is bordered by the Handeni district of the Tanga region to the east, the Simanjiro district (Manyara region) to the north, Kiteto district (Manyara region) to the west and the Mvomero and Kilosa districts (Morogoro region) in the south (KDC, 2017). It is the second largest district in the Tanga region after the Handeni district, with a total area of 6 129 km^2. This makes up 23% of the total land area of the Tanga region. The Kilindi district has 21 administrative wards and 102 villages (KDC, 2017). The figures from 2017 show that the district population was estimated to be 264 778 inhabitants. The population has slightly more than half females 132 668 (50.1%) and males accounted for 132 110 (49.9%). There was a growth rate of 2.2% in the population according to the 2002 census results. The average household size was 5.1 people and the annual growth is estimated at 2.1 annually (KDC, 2017). The average population density in the district is recorded as 23.5 persons per square kilometer (KDC, 2017). The most recent data

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on the main ethnic groups living in the district shows that they are Maasai, Nguu, Zigua, Kaguru and Kamba. Other minority groups include Iraqw, Burunge, Chagga, Pare, Meru and Shambaa (KDC, 2017, van der Kwaak et al., 2012). The Kilindi district is characterized by being rural with fertile soil suitable for agriculture. Thus, the majority of inhabitants depend largely on small-scale cultivation of crops such as maize, beans, cassava, potatoes and millet as their main means of livelihood. In addition, keeping of livestock and lumbering are among the other economic and livelihood means in the district (KDC, 2017).

The district is characterized by poverty, with poor indicators of SRH and WASH facilities and services (Mbonile et al., 2017). For example, there are limited SRH services, knowledge about SRHR and low uptake of HIV services, particularly among the pastoralist youth (Ngadaya et al., 2021). Early marriages and female genital cutting/mutilation (FGC/M) are reported as being practiced in Kilindi district, particularly among the Maasai community (Maro, 2012, Nduba et al., 2011, van der Kwaak et al., 2012). In terms of healthcare services, the most recent information is that the district has one hospital, three health centers and 33 dispensaries (Maro, 2012, Mbonile et al., 2017, KDC, 2017).

Furthermore, by 2019 the district had a total of 113 primary schools which enrolled a total of 54,151 pupils of whom half were girls (URT, 2020b). This study was conducted in schools in eight administrative wards, namely Kwediboma, Mabalanga, Naigero, Kilindi, Kimbe, Msanja, Kwekivu and Jaila, where Amref Health Africa had implemented its intervention project known as *Integrated Alternatives Rites of Passage (ARP) and Water, Sanitation and Hygiene (WASH)* – (ARP/WASH). All 7,082 schoolgirls in public primary schools eligible for study participation were aged between 12-15 years and were in grades 5-7 in 2018 (URT, 2020b). The Kilindi district was chosen as the setting for this study due to the long-time presence of Amref Health Africa implementing SRH intervention projects that were anticipated to have a positive impact on adolescent girls' health and education.

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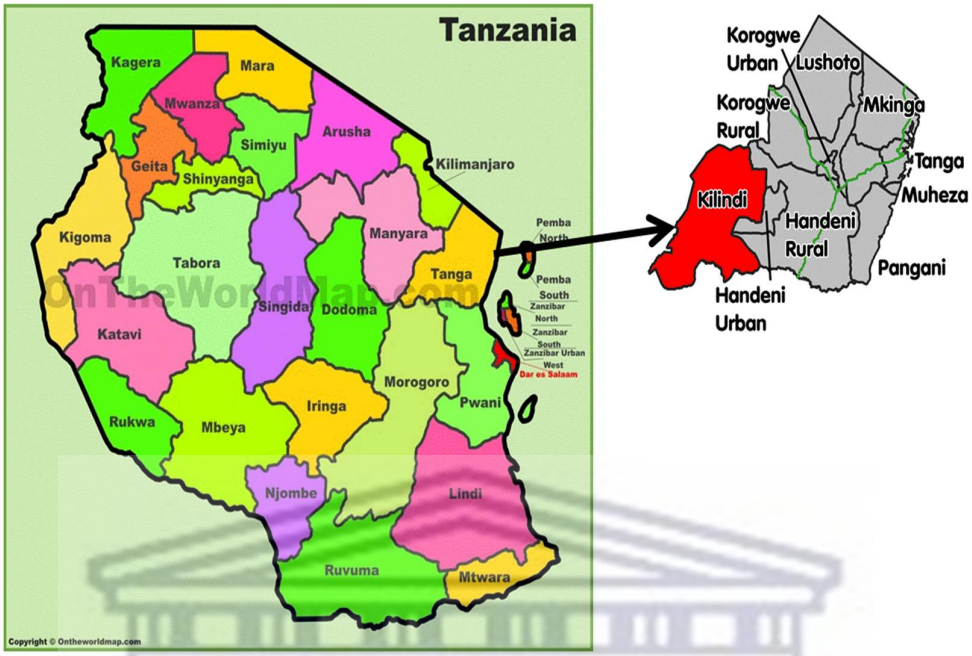

Figure 4. Map of Tanzania depicting the study district

3.2 Study design

This was a sequential mixed-methods study design that was divided into three phases. The first phase was a rapid scoping review of the relevant published and unpublished literature to document the burden of RTIs/STIs and treatment seeking-behavior among adolescent schoolgirls aged 12-19 years in LMICs. In Phase 2, I analyzed quantitative cross-sectional secondary data from a broad before-and-after impact evaluation study titled *The Impact of Integrating Sexual and Reproductive Health Rights; and Water, Hygiene and Sanitation Interventions to Improve Adolescents' Health and Education in Rural Tanzania* collected in 2018 by Amref Health Africa, a non-governmental health research organization. I was the Principal Investigator (PI) of the study. In phase 3, I analyzed the qualitative descriptive data extracted from the above study of which I was also the PI.

3.3 Phase 1: Rapid scoping review

The overall objective of Phase 1 was to conduct a rapid scoping review to explore and document the prevalence rate and patterns of RTIs/STIs associated with poor MHM and to understand the extent of health-seeking behavior and challenges associated with the utilization of the healthcare services among the adolescent schoolgirls aged

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between 12-19 years old in LMICs. This piece of work corresponds with study objective 1 of this PhD thesis. I chose to conduct a rapid scoping review due to its richness and ability to appropriately summarize different designs and methods of studies, map the evidence related to RTIs and highlight gaps and directions for future research.

3.3.1 Methods

This rapid scoping review was based on the Arksey and O'Malley methodological framework for conducting scoping reviews (Arksey and O'Malley, 2005). The framework has five steps that were adhered to as follows: (i) identifying the research question, (ii) identifying relevant studies, (iii) selection of eligible studies, (iv) charting the data, and (v) collating and summarizing the results (Arksey and O'Malley, 2005). In addition, the study complied with the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) statement (Page et al., 2021).

3.3.2 Identifying the research question

In this scoping review, the main research question was framed as follows:

What is the reported or confirmed prevalence rate of RTIs/STIs associated with poor MHM reported among schoolgirls aged between 12-19 years old in low-and middle-income countries?

The research sub-questions were:

1. What are the most prevalent patterns of reported or confirmed RTIs/STIs which affect adolescent schoolgirls aged between 12-19 years old in low-and middle-income countries?
2. What is the situation with respect to reported or confirmed RTIs/STIs' treatment-seeking behavior and factors associated with utilization of healthcare services for adolescent schoolgirls aged between 12-19 years old in low-and middle-income countries?

3.3.3 Identifying relevant studies

The study team (I, research assistant and senior researcher) used a comprehensive search strategy using key terms and concepts related to the research question. I conducted the pilot search using all the alternative terms in order to get relevant

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results, assisted by a research assistant. In order for the study to obtain both the published and unpublished or grey literature relevant for the research question and settings, four electronic databases were used: PubMed, Google scholar, JSTOR and Science Direct.

Together with a research assistant, I searched and included all the relevant literature referenced in publications. In addition, a hand search was conducted to include relevant grey literature from the websites of organizations like UNFPA, UNICEF and WHO. The study also included theses and dissertations from 30 university portals located in Africa and Asia. The search for literature was conducted between January and February 2022. Two people conducted the search, as recommended in scoping reviews, as it helps to lessen likely reviewer bias. In case of disagreement on the study/article selection, consensus was reached through discussion between me and the research assistant (Tricco et al., 2016). If consensus could still not be reached, then a third researcher who was an expert and had extensive experience on the subject was invited to make the final decision.

The following Boolean phrases were used to identify all the potential and relevant studies to be included in the review: “Reproductive tract infections" OR “genital tract infections” OR "sexually transmitted infections" OR “urinary tract infections” AND "menstrual hygiene" AND "prevalence" AND "treatment-seeking" OR “care-seeking behavior” OR “health-care utilization” AND "adolescent girls" OR "schoolgirls" OR "school-going girls" AND “low-and-middle-income countries”.

3.3.4 Selection of eligible studies

The selection of eligible studies was guided by the Population, Exposure, and Outcome (PEO) framework to screen the titles and abstracts identified during the search process (Chorwe-Sungani and Chipps, 2017, Tricco et al., 2016). The study included relevant articles found in peer-reviewed journals and unpublished literature such as theses, reports and books. In order to meet predetermined inclusion and exclusion criteria, the following studies were included:

- Original quantitative, qualitative, and mixed-method study designs.

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- Studies aimed to measure prevalence of RTIs/STIs associated with poor MHM; patterns of RTIs; health-seeking behavior; utilization of RTIs services; and its associated factors.
- Targeting adolescent schoolgirls in primary and secondary schools or other learning institutions aged between 12-19 years. However, studies with girls exceeding 19 years were included as long as the mean age of the study population was between 15-17 years, as the majority of the girls fall under this age group ie, 15-17 years.
- Published in English.
- Published between 1/1/2010 and 31/12/2021.
- Conducted in low-and-middle-income countries (LMICs) according to World Bank classifications.

The exclusion criterion included:

- Studies conducted outside LMICs.
- Not targeting schoolgirls.
- Not disaggregating the outcomes of interest by age and sex.
- Not being in school.
- Published in a language other than English.
- Systematic reviews.
- Studies with no full-text.
- Protocols.

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Unlike in a systematic literature review, the rapid scoping review did not focus on the methodological and other types of quality of the papers, as these did not form criteria for inclusion or exclusion (Khalil et al., 2016). The search was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow approach (Page et al., 2021). Even though the search was not confined by specific geographic location, the studies that focused on high-income countries were excluded during the title and abstract (TIAB) screening process.

3.3.5 Charting and extracting the data

A structured form that I developed specifically was used as a data charting form to capture relevant information such as: (1) author and date of publication, (2) study setting, (3) study design, (4) sample size and (5) age range of participants.

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Furthermore, the outcomes of the study findings relevant to the rapid scoping review objective, most relevant findings were captured: (6) Diagnostic methods used, (7) the prevalence of RTIs/STIs related to poor MHM, (8) health-seeking behavior (9) factors that undermine/promote the utilization of healthcare services and researcher's comments about the paper.

3.3.6 Collating, summarizing and reporting the results

I produced a descriptive summary of all extracted data by combining the study outcome of the interests and results of identified studies in relation to their study design, characteristics of participants, measurements of the outcome, sample size, and study settings, among others. Therefore, the results from this review have been organized and presented thematically and narratively. Besides this, I have identified gaps and areas that need further research and intervention implementation.

3.3.7 Analysis

In analyzing the rapid scoping review's outcomes i.e., the prevalence of the RTIs/STIs and health-seeking behavior, two steps were applied to reach my goal. Firstly, the broader assessment of overall prevalence or other types of reporting of RTIs/STIs was conducted among adolescent schoolgirls. Then, the evaluation was narrowed down to the specific age category and symptoms, or disease-specific items.

In addition, the review also assessed the type of RTIs/STIs diagnosis used i.e., self-reporting or laboratory-based tests to reach the prevalence estimation. For the school-based studies, mostly the self-reporting of the presence of symptoms suggestive of RTIs/STIs such as abnormal vaginal discharge, foul-smelling/fishy smell from the genital area, lower abdominal pain, painful micturition, genital ulceration, genital itching, swelling, pain during intercourse and the like were solicited. In clinic-based studies, laboratory tests were used to detect the presence of RTIs/STIs and their type in addition to the self-reported socio-demographic, MHM, sexual and behavioral information; and symptoms being described.

The same process was used for health-seeking behavior: its prevalence and the health services which the adolescent girls reported attending, and the factors that influenced them were captured. Secondly, I analyzed if the reviewed studies examined the

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association between the prevalence of the RTIs/STIs and poor MHM including knowledge and informational facilities and support. Thirdly, other exposures such as reports related to penetrative sex debut were examined.

In cases where these prevalence rates were not provided, the available rates for specific groups of adolescent schoolgirls included were recorded. For example, in intervention studies, the prevalence rates for the intervention and control participants were reported and presented in this review. Once again, in presenting the associations of the RTIs/STIs and poor MHM, the risk factors such as age, absorbent materials used, knowledge, and facilities are reported. This was regardless of whether they were found to be statistically significant in the particular studies.

3.4 Description of the parent study for phase 2 and 3 components

The overall goal of the parent study was to evaluate the impact of a project on the integration of SRHR and WASH interventions among adolescent schoolgirls in rural Tanzania. Therefore, the impact evaluation study was titled: *The impact of Integrating Sexual and Reproductive Health Rights; and Water, Sanitation and Hygiene interventions to adolescent schoolgirls health in rural Tanzania*. This was a midterm study to assess the impact of the five-year (2015-2020) Sexual and Reproductive Health and Rights (SRHR) and Water, Sanitation and Hygiene (WASH) interventional project which was implemented in Kilindi district in Tanga region in Northwestern Tanzania. This was known as *Integrated Alternatives Rites of Passage and Water, Sanitation and Hygiene interventions among adolescents' girls and women of reproductive age in the Kilindi district in Tanga region.* The study used a convergent design of mixed-methods i.e., quantitative and qualitative research approaches (Bowling, 2005b, Bowling, 2005a). The data collection was conducted between July and September 2018.

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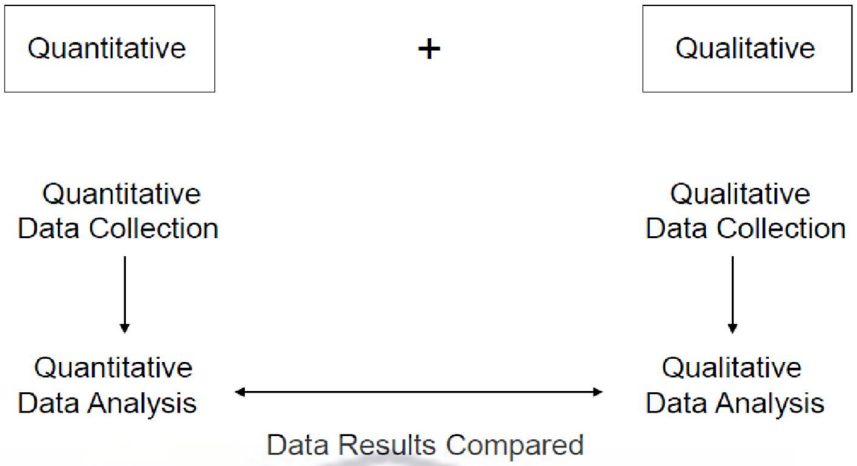

Source: Adapted from Creswell J. W (2008).

Figure 5. The structure of concurrent mixed-method study approaches used

The data from the parent study have not been published anywhere, as the study was meant to be used for informing the project implementer, the donor and other stakeholders regarding the progress of the project. The project produced a report shared with the donor on high level progress, such as the number of latrines and boreholes constructed, in the form of the report prepared by Amref Health Africa. The analysis for the above-described report is not part of this PhD thesis (***see Appendix I(c)***).

The interest and rationale for the study on the effects of poor MHM was based on my initiative as part of learning and curiosity to understand the subject matter. I was at that time the Research Manager with Amref Health Africa conducting the study so as to understand the topic of MHM among in-school adolescent girls during their menarche. I solely conceptualized the focus of my PhD thesis as an aspect within the broader study. As PI of the overall study, I oversaw and led the design, data collection and the quality control of the study. I used both quantitative and qualitative data from the parent study to answer the proposed research questions above. For quantitative data, I extracted some questions from the parent's study questionnaire for analysis to meet my PhD study objectives, while for the qualitative research only relevant data related to MHM were extracted from the interview guides. The quantitative

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component extracted all the data from the parent study's tools for analysis to meet the needs of my PhD study **(*see Appendix F*).**

3.5 Phase 2: Description and analysis of the quantitative data

The overall objective of phase 2 was to analyze the already collected quantitative data that I had developed. Phase 2 aligns to objectives 2, 3, 4, and 5:

1. To examine the knowledge, attitudes, and practices of MHM among adolescent schoolgirls in Kilindi district in Tanzania.
2. To determine the proportion of school absenteeism during menstruation and its associated factors among adolescent schoolgirls in Kilindi district in Tanzania.
3. To investigate the extent and range of psycho-social stress related to fear and embarrassment experienced by schoolgirls while accessing MHM facilities in schools in Kilindi district in Tanzania.
4. To assess the self-reported prevalence of RTI, associated risks with poor MHM and the SRH care seeking behavior on RTIs among adolescent schoolgirls in Kilindi district in Tanzania.

The findings from this section demonstrate the burden and associated factors related to the effect of poor MHM on RTIs, school absenteeism, and psychological wellbeing among the adolescent schoolgirls in resource-limited areas like rural Tanzania.

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3.5.1 Research design

This was a cross-sectional descriptive study accompanied by physical observation of MHM facilities.

3.5.2 Study population

The study targeted adolescent schoolgirls aged between 12-15 years who were in grades 5-7. They were sampled from 10 participating government-owned primary schools in Kilindi district. Eligible girls were randomly sampled from each school within these grades. Issues around menses and MHM knowledge, needs, and self-reported prevalence of RTIs were researched. Eligibility criteria included: being a

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schoolgirl aged between 12-15 years, having obtained parental/caregiver/legal guardian consent and provided her own assent to be interviewed and already started menstruating. Exclusion criteria were: unable to obtain consent from a parent/caregiver/legal guardian to participate, participants unable to provide assent or not able to complete the questionnaire and pre-menarche girls. This cross-sectional survey was conducted among all the sampled girls.

3.5.3 Sampling and approach

Representative samples through a two-step stratified random sampling were used to select primary schools for survey. Firstly, all 113 primary schools in Kilindi district were stratified on the basis of their catchment population and ward. In total, 10 schools were randomly selected from 8 of 21 wards from the district. School registers were used to select 40 adolescent schoolgirls, stratified by grade from each participating school to participate in the study.

3.5.4 Sample size calculations

This study intended to identify the magnitude of effects of poor MHM in relation to SRH, psycho-social and educational outcomes and the associated risks among schoolgirls in Kilindi district, Tanzania. As there were more than one main outcome, I computed a sample size for each of the four outcomes of interest and used the greatest sample size i.e., school absenteeism. The sample was thus estimated at 62% of the adolescent schoolgirls who had ever missed school due to menstruation (Boosey et al., 2014). I used a target population of 7 082 girls, which was the total number of all girls in grades 5-7 in the eight wards of Kilindi district where the study took place in 2018 (URT, 2020b). Therefore, the sample size for the structured questionnaire was obtained by using a simplified formula as shown in the equation below:

$$\mathrm{N} = \frac{t^2 \times p(1-p)\mathrm{D}}{m^2}.$$

Where: N = Sample size, D = Design effect (apply the value of 2), t = Confidence level 95% (Standard value = 1.96), p = Expected frequency= 62%, m= margin of error of 5% (0.05). The minimum sample size was then approximated to ≈345 adolescent schoolgirls being a sufficient number of respondents for the survey. Taking into

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consideration an estimated non-response of 15%, hence the sample size required was added to 396 adolescent schoolgirls who had started menstruating. However, the study collected data from an additional 94 eligible participants, thus a total of 490 were interviewed participants in this study.

3.5.5 Data collection

Prior to data collection, as a study PI, I met with district authorities to explain the study and its potential benefits for policies and future programs both at district and national level. I held a meeting with the District Reproductive Health and WASH focal persons to introduce and explain the study, to obtain their buy-in and feeling of ownership. Data collection took place in July and September 2018. I led a team of three Co-Investigators and twelve mixed-gender-research assistants. All the research assistants were from the Kilindi district and were trained in collecting the data under my supervision and support. Prior to data collection, research assistants were trained on the study protocol, research ethics and study tools to be employed during data collection. In addition, the finalized data collection questionnaires were translated into Swahili and pre-tested among the target population which was not included in the sample prior to the data collection process. I conducted regular visits to all data collection teams and made sure that the process and overall methods of data collection were correct according to the protocol and research ethics.

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The data were collected using structured questionnaires with multiple-choice questions and skip patterns for different questions into Open Data Kit (ODK) software using Samsung Galaxy Tab A 8.0 tablets which support Google's Android operating systems. The schoolgirls self-administered the questionnaire using the tablets provided and a research assistant was close to provide any kind of assistance needed. This approach was selected for its accuracy, speed and cost-effectiveness in collecting data as compared to paper-based processes (Dillon et al., 2014, King et al., 2014, Tomlinson et al., 2009). The questionnaire was categorized into seven sections to obtain girls' socio-demographic information, knowledge and practices of MHM, the presence of symptoms suggestive of RTIs and exposure to teasing during menstruation and while accessing MHM facilities. They were also asked about the

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WASH situation at school and if they had received support from male teachers and boys to make MHM facilities available and friendlier at school.

Trained research assistants, mainly female, were responsible for obtaining informed consent and assent from the guardians of participating girls and the girls themselves respectively and administering the questionnaires to the girls. Participants who reported to have any health or psychological problems were referred to nearby health facilities for further investigation and treatment. Interviews were conducted in a private space in a pre-arranged room where teachers and other students could not interfere. Given the sensitiveness of the menstruation topic, participants were given the freedom to choose their preferred research assistant in order to increase the study completion rate (Bowling, 2005b, Bowling, 2005a, Dy et al., 2012). The system allowed for offline data collection and the uploading of data once an internet connection was available.

3.5.6 Data extraction process

I extracted the quantitative data from the parent study's database to answer the research questions above. The developed data extraction tool describes all the information, both independent and dependent variables for the outcomes of interest that were used to address the objectives above. These variables include socio-demographic information, knowledge, and practices of MHM, the presence of RTIs, school absenteeism, experiences of embarrassment while menstruating and the need for the MHM in schools ***(see Data Extraction Tool in Appendix A, tool number 12)*.**

3.5.7 Data analysis

3.5.7.1 Independent variables

This study chose selected variables as independent variables. An independent variable is the factor or measure that remains constant and cannot be affected in any way by the other variables one is measuring (Andrade, 2021). These factors included socio-demographic characteristics such as age, age at menarche, current grade of schooling, religion, ethnicity, living with both parents, family size, access to radio, prior menstrual information, MHM in school and source of menstrual information.

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3.5.7.2 Dependent variable

A dependent variable is a factor that is likely to change as a result of the researcher's or an experimental manipulation of the independent variable (Andrade, 2021). I selected five dependent variables for analysis in order to measure the effects of poor MHM in school and understand its context. These variables were: knowledge of menstruation, practices of menstruation, school absenteeism, presence of reported RTIs and experience of embarrassment during menses among schoolgirls.

The data was analyzed based on the five primary outcomes for the PhD thesis. Quantitative data were analyzed using a Statistical Package for the Social Sciences (SPSS version 27) (IBM Corp). A descriptive analysis was performed and presented in the forms of means, standard deviations and proportions. Frequency distribution tables of socio-demographic variables, knowledge of MHM, practices of MHM, school absenteeism, the prevalence of RTIs and psychological wellbeing were employed.

In measuring the knowledge related to menstruation, each girl was asked a total of 7 questions **(Table 2)**. For each question answered correctly, 1 point was given. Then, correct answers were summed up and scores were allocated between 0 and 7. Thus, a girl who had answered correctly between 4 to 7 was considered to have good knowledge while one who scored between 0 to 3 was considered to have poor knowledge.

Good MHM practices were assessed based on the combination of the following criteria: 1) Usage of clean absorbents to collect blood during menstruation that can be changed in privacy; 2) Change of the absorbents three times or more within 24 hours; 3) Washing of genitalia with soap and water or with water only twice or more within 24 hours; 4) Adequate and proper disposal of used absorbent material ie, disposal in pit latrine or burning. Each of the four criteria was given 1 point, and therefore a girl who scored 4 out of 4 points was considered to have adequate or good MHM and one who scored 3 points and below was regarded to practice inadequate or poor MHM (Davis et al., 2018).

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Similarly, the adequacy of school MHM facilities was assessed based on the availability of: 1) separate toilets for boys and girls; 2) privacy to change absorbent materials during menstruation (a toilet with locked doors); 3) water and soap; 4) facility for safe disposal of used menstrual waste; and 5) emergency absorbent materials. A school with scores ranging between 3 to 5 was considered to have adequate MHM and schools that scored between 0 to 2 were considered to have inadequate MHM (Davis et al., 2018).

In addition, logistic regression was used to determine the risk factors of the study outcome i.e., the selected socio-demographic and behavioral parameters. Multivariable regression analysis of any bivariate associations with p value of ≤ .05 were included and regarded as statistically significant, while crude odds ratios (OR) and adjusted odds ratios (AORs) with 95% confidence intervals were calculated to determine an association with poor MHM and reported. For example, a multivariable logistic regression analysis was conducted to estimate the association between poor MHM practices in relation to knowledge, practices, experience of embarrassment and teasing about menstruation or the presence of RTIs among the girls. The analysis was categorized based on research objectives 1 to 4 for the PhD thesis, in relation to the independent and dependent variables of the study.

3.5.7.3 Primary outcomes

This study examined the following primary outcomes to establish the effect of poor MHM services on SRH, psycho-social wellbeing and education:

1. Knowledge and correct practices of MHM: the study assessed how many adolescent schoolgirls were able to answer any 10 questions on knowledge and practices of MHM correctly.
2. Prevalence of self-reported RTIs associated with poor MHM and SRH care-seeking behavior: in this aspect, the survey assessed how many adolescent schoolgirls reported experiencing different symptoms related to RTIs during their periods immediately after menses, or at any time in the past three months, and whether poor MHM practices and facilities in the school are associated with reported RTIs prevalence.

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3. School absenteeism: for this outcome, the survey assessed how many adolescent schoolgirls reported having ever missed school or any other school-related activities directly due to menstruation-related reasons in the past three months. In addition, the study cross-checked the school records on absenteeism.
4. Prevalence of psycho-social stress: for this outcome, the survey assessed how many adolescent schoolgirls reported having undergone any kind of psychological stress such as being teased or embarrassed in the course of menstruating and using MHM facilities in the past three months.

3.5.8 Validity and reliability

Validity and reliability are an integral part of any research to ensure how credible, authentic and authoritative the researcher's contribution is to the topic or field (Heale and Twycross, 2015). Validity in quantitative research refers to the accuracy and truthfulness of the study tools and the process of measuring the outcome of interest or answering the research questions. Reliability refers to the consistency, stability and repeatability of the study tools to come up with the same results in the same situation even when repeated several times (Heale and Twycross, 2015).

To ensure reliability and validity of the data, the researcher applied the following techniques. The developed structured questionnaire was piloted in Kilindi district (in different schools from those participating in the parent study) by administering it to schoolgirls. These participants were not included in the study. Thereafter, issues from the pilot were taken into consideration to improve the questionnaire, by re-wording and/or omitting some sections which were not understood by the participants. Questions were then standardized. The study had clearly defined the variables. Eligible participants were obtained using random sampling. During the data collection process of the survey, trained research assistants were used while data were accessed and uploaded to the PIs laptop on a daily basis for storage, then checked to ensure their accuracy. For data quality control, another co-investigator and I independently ran the data files and provided feedback to each research assistant on any inconsistencies found in the data files, such as outliers. If errors were found, the research assistants were required to rectify them. Thus, the confounding factors were

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minimized, and the findings could be generalized to the study population. In analysis, Cronbach's coefficient alpha was used to measure internal consistency: the reliability of the questionnaire was found to be r = 0.89.

3.6 Phase 3: Description and analysis of the qualitative data

The overall objective of phase 3 was to analyze the collected qualitative data. Phase 3 aligns itself with objective 6. The findings from this phase give an overview of support or lack thereof related to MHM that schoolgirls receive from their male counterparts and parents in the Kilindi district in Tanzania.

3.6.1 Research design

The qualitative study used an exploratory and descriptive design in order to understand the issues underpinning the support that schoolgirls received on MHM while in school (Roller and Long, 2001). Qualitative methods are mainly interested in providing descriptions and explanations of phenomena by answering "how and why" questions (Tenny et al, 2022). In addition, qualitative methods are characterized by an inductive and flexible nature. This gives an advantage to the researcher to explore the subject further by probing responses to understand motives for such behaviors or actions (Taylor et al, 2015). Therefore, the approach intends to gain a deeper understanding of interactions and individuals' behaviors through exploration of the meaning and how it affects their lives (Robson & McCartan, 2011). Hence, in order to explore and describe the experiences and perceptions of schoolgirls' MHM, I chose this methodology.

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3.6.2 Focus of qualitative data collected

As mentioned, the data from qualitative interviews were used to answer questions about the support from boys and parents, if any, that girls receive when menstruating while in school. In addition, information from district SRH and WASH coordinators was aimed at providing greater insights on the support and plans at the district level to address the MHM issues at the school level.

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3.6.3 Study population and participant inclusion

The overall population for this qualitative study was schoolboys, schoolgirls, male parents and female parents. The participants were selected based on their experience and knowledge of MHM as important providers and recipients of the support needed to manage menses while in school. In addition, the study also involved the WASH and SRH programs at the district level and healthcare providers at facility levels. Due to their experience and expertise in this topic area, these healthcare providers could provide rich insightful knowledge.

The study conducted individual key informant interviews (KII) with five (5) people involved in WASH and SRH programs at the district level; healthcare providers at one health facility located within the study catchment area; and four (4) focus group discussions (FGDs) with 48 participants that included schoolboys, schoolgirls, male parents and female parents.

3.6.4 Sampling and data collection

The potential respondents for the qualitative part of the study were identified using a purposive sampling approach, as customary in qualitative research. Eligibility criteria for participation in the qualitative part were as follows: fluent in Swahili; and ready to give informed consent and/or assent for study participation (For those <18 years, parental/caregiver consent was also required – ***see ethical consideration section***). Separate FGDs were held for schoolboys, schoolgirls (those who had not participated in the survey) and male and female parents of children who were studying in the respective schools (not necessarily those where their children had participated in the survey or FGDs). Teachers helped the researchers identify and select parents by sending invitations through their children. The grade 7 schoolboys and schoolgirls were purposively selected based on the readiness of the parents to participate in the study (Shah et al, 2019). Four FGDs, consisting of a group of schoolboys, schoolgirls, and parents totaling 12 participants were conducted. In the total of 48 individuals participating in this qualitative study, 12 schoolboys, 12 schoolgirls and 24 parents participated. The size of the FGD enabled each member of the participating groups to freely speak and explain his/her perceptions, needs, experiences and attitudes towards the MHM ***(Appendix B and C)***. KIIs were a face-to-face conversation involving one

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interviewer and one participant. I conducted all the KIIs with the assistance of a trained research assistant.

All the KIIs and FGDs were conducted in pre-arranged rooms, ensuring the privacy of respondents after obtaining their consent and/or assent. As mentioned, I (as a male) facilitated the FGDs, together with a trained research assistant who was responsible for note-taking, particularly with male parents and boys. For reasons of gender-sensitivity, trained female moderators and note-takers facilitated the FGDs with schoolgirls and female parents. All the interviews and FGDs were conducted in the Swahili language (which is spoken by all Tanzanians and is used as the medium of instruction at primary school education level) All individual in-depth interviews and FGDs were audio-taped, with participants' consent. In addition, the facilitators took detailed notes on issues that emerged during the discussions.

3.6.5 Data analysis

I am bilingual and transcribed and translated the interviews with KIIs and FGDs from Swahili to English. I then coded the transcripts in consultation with my PhD supervisors. Data categorization and coding was facilitated using Atlas Ti 9, a computer software package specifically designed to manage, search, and retrieve qualitative data (Atlas.ti, 2020). This assisted with the analysis. The coded pieces of text were read more than once to gain a deeper understanding of what they conveyed. Following repeated reading of the transcribed texts, memos were developed of themes arising from the data. The contents of the memos from different themes were then compared to enable me to arrive at a conclusion on the issues that emerged from qualitative data. This was followed by the examination of relationships among categories in order to confirm and disconfirm examples within the transcripts. The themes were described and justified using participants' quoted perspectives about various aspects of MHM.

3.6.6 Rigor and trustworthiness

Together with the note-takers, I reviewed all KII and FDG scripts on a daily basis, rectifying any inconsistencies and ensuring that the proposed questions had been responded to accordingly. Multiple procedures to ensure the trustworthiness and

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credibility of the research were applied (Merriam and Tisdell, 2015). These included the following procedures, which were applied in this study:

- *Rigorous investigation and adequate engagement*. I took an active role in the process of questioning and checking the process of FGDs and KIIs, checking answers to questions to identify further issues that needed to be followed up to deepen understanding of the experiences. Data collection continued until data saturation was reached (Merriam and Tisdell, 2015, Johnson et al., 2020).
- *Referential adequacy*. An audio-recorder was used during data collection to record the interviews and FGDs, with the permission of the study participants. The recordings were used for transcription, and for undertaking coding of the collected data (Johnson et al., 2020, Merriam and Tisdell, 2015).
- *Reflexivity and triangulation*. Notes on the participant as part of a research journal were kept during the course of the study. These were particularly useful to consider during data analysis. They were also used as a form of triangulation through a diversity in sources informing the analysis (Johnson et al., 2020, Merriam and Tisdell, 2015).
- *Peer debriefing*. The PI and the data collection team had daily "peer debriefing" sessions regarding the nature and implementation of the study. For example, I, as PI, had regular consultations with the supervisor at Amref Health Africa after the pilot study, and during the data collection (Johnson et al., 2020, Merriam and Tisdell, 2015).

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3.7 Ethical considerations

Adolescents are considered a vulnerable population. However, doing research among this age group was necessary, as no other alternative population could have been found to understand issues related to poor MHM in school-going girls, where the common age range of menarche is between 11-14 years old, a time when the majority of the girls are in school (Ahmed et al., 2016, Ameade and Garti, 2016, Boosey et al., 2014, Cherenack and Sikkema, 2021, Ephraim, 2017). Evidence shows that a significant proportion of girls/young women of reproductive age bear the greatest burden of complications related to poor MHM including contracting RTIs (Torondel et al., 2018). Therefore, understanding the effects related to MHM among the primary school age was critical to properly informing policy and programs.

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However, in accordance with Tanzanian law, individuals below 18 years are regarded as minors and thus parental/caregiver consent was needed in addition to their own assent to partake in any of the research activities delineated in the study protocol (NIMR, 2009, Mashalla, 2009). Interviews only took place if both the caregivers and participants provided the consent and assent respectively. Participants who were minors were assured that even though caregivers' consent was necessary for their participation in the study, if they agreed to participate, their individual answers to questions would not be shared with their caregivers or anyone else. Written informed consent was obtained from research participants aged 18 and above. Information sheets and consent forms were standardized to meet the requirements of the study and local ethical requirements. These outlined the purpose of this study, while the potential risks and benefits of participation were highlighted in the information and consent forms. Moreover, permission from participants to tape-record the KIIs and FGDs was requested. If the participant declined to be recorded, then researchers only took notes.

For both qualitative and quantitative components, the information sheet in Swahili was read aloud to the participant by the interviewer. Before obtaining consent and assent, the interviewer asked the participant to explain her/his understanding of the proposed study. Any misunderstandings regarding study procedures were corrected. All research assistants involved in data collection were trained in conducting ethical research before data collection commenced. All participants were assured of their privacy, anonymity and the confidentiality of the data collected prior to consent. Participants were assured that only study assigned numbers or pseudonyms rather than real names would be used in the analysis and publication of study results. Therefore, all the secondary data were de-identified and anonymized once extracted from the parent study's database, during the analysis and presentation of the study findings. Data from the broader study was kept on a password-protected computer in Amref Health Africa's office. These will be retained for five years before being destroyed. Only I and a few selected Amref Health Africa staff that were involved in the overall study had access to the data.

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One of the main concerns of using the secondary data analysis is the lack of consent to re-use the data from the research participants (Tripathy, 2013). However, in the parent study, all the study participants consented to the questions asked, and the publication of the results of the study as long as anonymity was maintained. In addition to leading and implementing the study, this gave me an opportunity to perform secondary analysis of data ***(see consent forms in Appendix H)***. As I was the principal investigator of the parent study responsible for study design and data collection, I obtained permission to use the data for my PhD thesis from Amref Health Africa ***(see Appendix I (b))***. Among the conditions indicated in the permission letter were non-disclosure of the data and sharing with them the final copy of my PhD thesis.

Research ethical clearance for the parent study was obtained from the National Health Ethics Review Committee (NatHREC) in Tanzania, registration number NIMR/HQ/R.8a/Vol IX/2829 ***(see Appendix G(b))***. Permission to conduct the study was sought from the local government authorities in Kilindi district ***(see Appendix G(c))***. Analysis of the secondary data for the PhD study was sought from the University of the Western Cape (UWC) Humanities and Social Sciences Research Ethics Committee (HSSREC) number HS21/10/5 ***(see Appendix G(a))***.

3.8 Dissemination of the study results

The findings from this thesis are submitted to the University of Western Cape, School of Public Health for PhD degree fulfillment. In addition, some findings from this PhD thesis will be extracted and then published in peer-reviewed journals and presented at local and international scientific conferences.

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CHAPTER FOUR: RESULTS FROM RAPID SCOPING LITERATURE REVIEW PHASE

4.0 Chapter overview

The previous chapter documented the research methods and approaches used to answer the research questions. Chapter 4 presents the results from the first objective to understand the prevalence and patterns of RTIs/STIs associated with poor MHM among schoolgirls in LMICs through the rapid scoping review.

4.1 Results

The scope of the literature and data search for this study identified a total of 2, 613 articles in the four databases and the addition of a hand search. Of all the articles screened, 1, 211 were identified as having potential for inclusion in analysis based on their titles. After that, 45 articles were retained for further analysis in this rapid scoping review based on their abstracts, however, the study was unable to retrieve 10 abstracts of the respective articles. Therefore, 35 articles were assessed for eligibility based on reading them in full. Of them, seven articles were excluded for ineligibility of inclusion criteria, based on: targeting different groups without disaggregating their results by age and sex; being a systematic review; and our being unable to obtain the full text of the articles. Consequently, the review remained with 28 studies that estimated the prevalence of RTIs/STIs, health-seeking behavior, and association between poor MHM and RTIs/STIs among the adolescent schoolgirls aged between 12-19 years old. All the reviewed studies were published in English. The **figure 5.** below presents the flow of the reviewed studies under this rapid scoping review.

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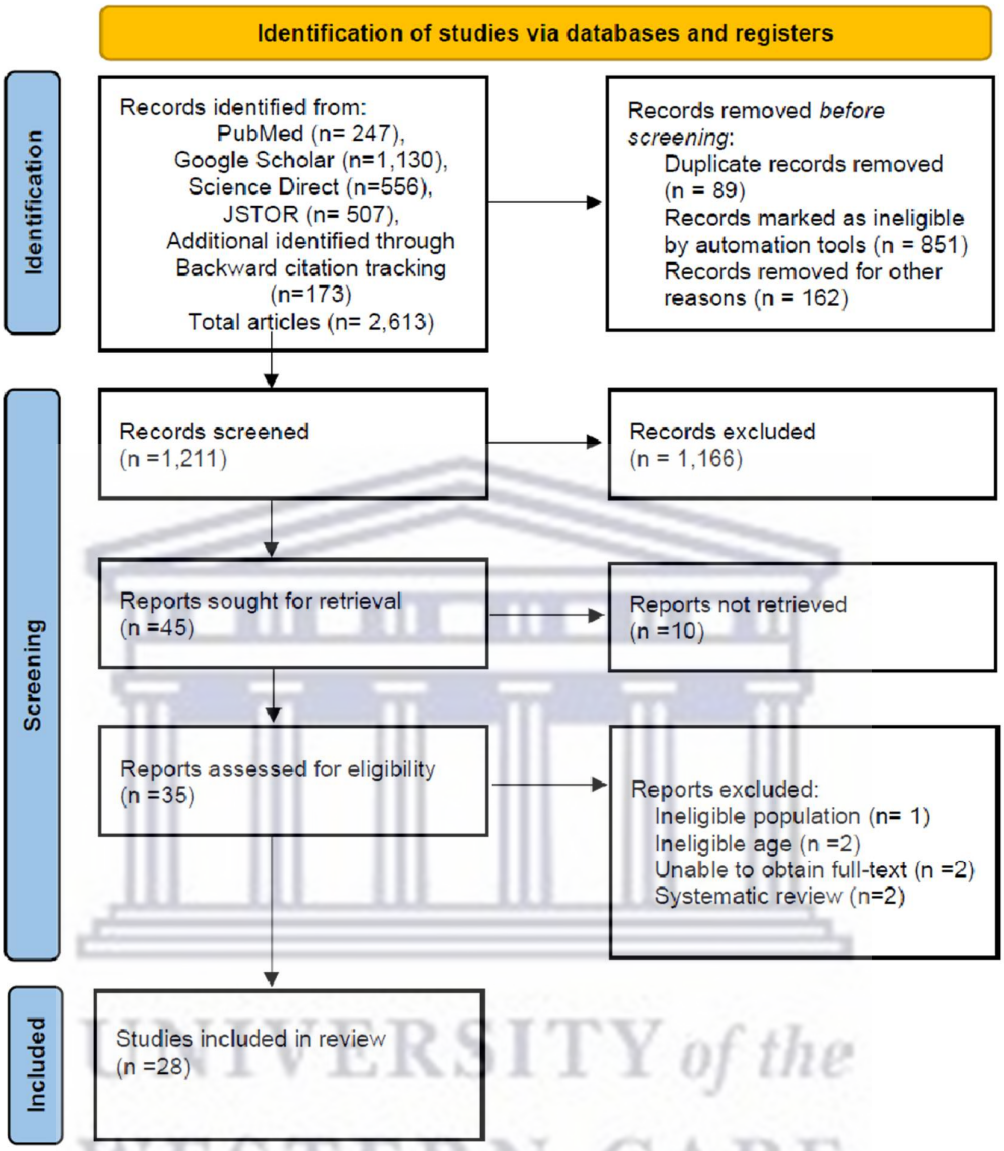

Figure 6. PRISMA Flowchart of search and screening results for the database and additional literature

4.2 Characteristics of the articles included in the review

Of the 28 articles that were eligible for this rapid scoping review, the majority (19/28) were published between 2016 and 2021. All of the reviewed articles emanated from empirical studies. Almost all of the reviewed studies (25/28) used the quantitative methodology while (3/28) used mixed methods. In addition, the majority of the studies used a cross-sectional design (21/28) while the remaining were experimental i.e., randomized trials, cohort and quasi-experimental. The sample size in reviewed studies

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ranged from 124 to 644 participants. The majority of studies (21/28) targeted only girls, however one study targeted both boys and girls while another targeted different groups of women including adolescent schoolgirls. The studies provided disaggregated results for each group. Seventeen studies were conducted in school settings.

In addition, the studies focused predominantly on secondary schools. The reported recall period for the self-reported RTIs/STIs symptoms, other sexual and behavioral information ranged between weeks to twenty-four months. Furthermore, in terms of the geographical focus, a substantial number of the studies took place in India (10/28), Tanzania (5/28) and Kenya (4/28), while Uganda, Nigeria and Zambia each had two studies.

Furthermore, most of the studies (13/28) use the combination of self-reported and laboratory-confirmed tests to estimate the prevalence of the RTIs/STIs, while the remaining used only the self-reported approach. Almost all the studies that used a combination of self-reporting and laboratory-confirmed tests had either instructed the girls to collect vaginal swabs or used trained medical personnel to collect them for the laboratory tests. On the other hand, some studies collected samples of urine, blood and vaginal fluids (Francis et al, 2020, Francis et al, 2019a). Moreover, the same studies reported having complied with quality control and quality assurance testing of the collected samples, to give desired and accurate estimates of the RTIs/ STIs. Furthermore, all the studies stated that they had followed and maintained the stipulated international and local standard operating procedures (SOPs) and guidelines. Six of these studies were nested in larger ongoing randomized clinical trials (RCTs) which evaluated different interventions among the schoolgirls **(Table 1).**

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Table 1: Characteristics of the studies included in the review in LMICs

Characteristic	Frequency (n = 28)	Percentage (%)
Country of publication		
India	10	35.7
Tanzania	5	17.9
Kenya	4	14.3
Others	9	32.1
Year of publication		
2010-2015	9	32.1
2016-2021	19	67.9
Study design		
Cross□sectional	21	75.0
Quasi experimental	2	7.1
Cluster-randomized trial	4	14.3
Cohort	1	3.6
Study methods used		
Quantitative	25	89.3
Mixed methods	3	10.7
Nature of the study		
Stand-alone	22	78.6
Nested	6	21.4
Sample size range		
Below 500	22	78.6
Above 501	6	21.4
Type of school targeted		
Primary	5	17.9
Secondary	21	75.0
College	2	7.1
Type of school environment		
Rural	7	25.0
Urban	14	50.0
Combined urban and rural	7	25.0
Data collection place		
School and clinic-based	10	35.7
School-based	18	64.3
Recall/Follow-up period		
≤ 3 months	26	92.9
> 3 moths	2	7.1
Diagnostic		
Self-reported	15	53.6
Self-reported and laboratory confirmation	13	46.4

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The results of this rapid scoping review were organized based on the pre-defined outcomes of interest i.e., the reported prevalence of the RTIs/STIs, patterns of RTIs/STIs, the association between poor MHM and RTIs/STIs, treatment-seeking behavior and factors affecting the utilization of RTI/STIs treatment services. The studies have been organized in chronological order based on the publication date in all the tables that are going to be presented hereafter.

4.3 The prevalence rates of RTIs/STIs

The RTIs/STIs prevalence was reported in all 28 studies under this rapid review, however, one study (Hennegan et al, 2016a) did not furnish the overall prevalence but rather symptoms suggestive of RTIs/STIs. All the studies included in the final analysis of this rapid scoping review are summarized in **Table 2**.

Overall, the reported prevalence among the adolescent schoolgirls of at least one symptom suggestive of RTIs/ STIs ranged between 0.0% and 88.4% for the studies estimating prevalence through self-reported data (Gupta, 2019, Mathiyalagen et al, 2017). Whereas, for those that used a combination of self-reporting and laboratory-confirmed tests, their prevalence ranged between 7.5% and 28.7% (Francis et al, 2020, Phillips-Howard et al, 2016b).

In one of the studies that combined self-reporting and laboratory tests to measure the RTIs/STIs, girls reported a prevalence of 23.9%, however, after their samples were taken to the laboratory for confirmation, the prevalence rose to 28.2% (Kerubo et al, 2016). Few studies measured the prevalence rate of RTIs/STIs among the different subgroups of adolescent girls depending on their interests, such as the prevalence of RTIs/STIs among users of menstrual absorbents like cloths during the menses (3/26) or menstrual cup users. The detected prevalence ranged between 5.8% and 65.7%, and 23.9% and 28.7% for the self-reported and laboratory-confirmed samples respectively (Bhattacharyya et al, 2015, Mudey et al, 2010, Phillips-Howard et al, 2016b). In addition, another study gave a prevalence of RTIs/STIs amongst schoolgirls who reported having sex and those who did not (Baisley et al, 2020).

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Table 2: Summary of the reviewed studies showing the prevalence of RTIs/STIs among adolescent schoolgirls in LMICs

Author and date of publication	Study settings	Study design	Sample size	Age range of participants	Diagnostic method	RTIs/STIs prevalence
						%
Mudey et al (2010)	Maharashtra, India	Cross-sectional study	300	10-19	Self-reported	65.7 Cloths users 12.3 Sanitary napkins users
Crucitti et al (2010)	Ndola, Zambia	Cross-sectional study	460	13-18	Self-reported and laboratory confirmed	24.6
Crucitti et al (2011)	Ndola, Zambia	Cross-sectional study	460	13-16	Self-reported and laboratory confirmed	27.1
Sudeshna &Aparajita (2012)	West Bengal, India	Cross-sectional study	190	13-19	Self-reported	28.9
Juyal et al (2014)	Dehradun, India	Cross-sectional study	453	15-18	Self-reported	18.4
Houlihan et al (2014)	Mwanza, Tanzania	Cohort study	474	15-16	Self-reported and laboratory confirmed	8.4
Bhattacharyya et al (2015)	Kolkata, India	Cross-sectional study	460	14-16	Self-reported	5.8 Sanitary napkin users 13.3 non-sanitary napkin users
Pavithran et al (2015)	Karnataka, India	Cross-sectional study	400	14-18	Self-reported	17.2
Gothankar et al (2015)	Pune, India	Cross-sectional study	323	17	Self-reported	11.0
Kerubo et al (2016)	Siaya County, Kenya	Cross-sectional study	542	14-17	Self-reported Laboratory confirmed	23.9 28.2
Phillips-Howard et al (2016)	Rural Western Kenya	Cluster-Randomized Trial	644	14-16	Self-reported and laboratory-confirmed	21.5 Menstrual cup users 28.7 Pads users 26.9 non-users of cups and pads
Hennegan et al (2016)	Kamuri district, Uganda	Cross-sectional study	205	10-19	Self-reported	No overall prevalence ratio

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Adegun & Amu (2016)	South Western, Nigeria	Cross-sectional study	560	10-19	Self-reported	39.1
Ali et al (2017)	Kashmir Valley, India	Cross-sectional study	428	12-18	Self-reported	45.3
Akinbo & Oronsaye (2017)	Edo State, Nigeria	Cross-sectional study	272	13-18	Self-reporting and laboratory-confirmed	9.2
Pal et al (2017)	Kolkata, India	Quasi experimental study	200	12 mean age	Self-reporting and laboratory-confirmed	55.4 Intervention 51.9 Control
Mathiyalagen et al (2017)	Puducherry, India	Cross-sectional study	242	12-18	Self-reported	88.4
Juma et al (2017)	Siaya County, Kenya	Cluster-randomized trial	604	14-16	Self-reported and laboratory-confirmed	10.8
Alam et al (2018)	Assiut city, Egypt	Quasi-experimental study	124	15-19	Self-reported	36.6
Francis et al (2019)	Mwanza, Tanzania	Cross-sectional study	386	17-18	Self-reported and laboratory-confirmed	25.0
Gupta (2019)	Uttar Pradesh, India	Cross-sectional study	563	13-17	Self-reported	0.0
Francis et al (2019)	Entebbe, Uganda	Randomized trial	155	15-17	Self-reported and laboratory-confirmed	14.0
Francis et al (2020)	Mwanza, Tanzania	Cross-sectional study	386	17-18	Self-reported and laboratory-confirmed	7.5
Bulto (2021)	Holeta Town, Ethiopia	Cross-sectional study	403	13-19	Self-reported	58.3
Nabwera et al (2021)	Kiang district, Gambia	Cross-sectional study	358	15-21	Self-reported	47.0
Mehta et al (2021)	Siaya County, Kenya	Cluster-randomized trial	440	14-22	Self-reported and laboratory-confirmed	17.6
Cherenack & Sikkema (2021)	Moshi, Tanzania	Cross-sectional study	581	13-21	Self-reported	47.5
Baisley et al (2019)	Mwanza, Tanzania	Cross-sectional study	385	17-18	Self-reported and laboratory-confirmed	32.5

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4.4 Prevalent patterns/types of RTIs/STIs

The most reported RTIs/STIs by the (13/28) studies that used the laboratory tests were: *Trichomonas vaginalis*, *Bacterial vaginosis* (BV), *Human papillomavirus* (HPV), *Herpes simplex virus-2* (HSV-2), *Neisseria gonorrhea* and *Chlamydia trachomatis*. The prevalence of *Trichomonas vaginalis* ranged from 1.3% to 27.1% (Crucitti et al, 2011, Phillips-Howard et al, 2016b, Akinbo and Oronsaye, 2017), and BV prevalence ranged from 11.2% to 71.0% (Mehta et al, 2021, Phillips-Howard et al, 2016b). On the other hand, HPV prevalence was recorded between 8.4% to 32.5% (Baisley et al, 2020, Phillips-Howard et al, 2016b). In addition, *Neisseria gonorrhea* prevalence ranged from <1% to 6.0% (Kerubo et al, 2016, Phillips-Howard et al, 2016b), and *Chlamydia trachomatis* ranged between <1% to 6.2% (Mehta et al, 2021, Phillips-Howard et al, 2016b). One study reported girls who were coinfected with *Bacterial vaginosis* and STIs at 31.0%, while those with STIs having *Bacterial vaginosis* were reported to constitute 35.0% (Mehta et al, 2021). Reports from two studies revealed that the majority of girls (between 50.0% and 75.0%) were healthy and asymptomatic to BV and *Trichomonas vaginalis* respectively (Juma et al, 2017, Kerubo et al, 2016).

The symptoms suggestive of RTIs/STIs were reported in sixteen studies. The most common ones were as follows: abnormal vaginal discharge with prevalence ranging from 10.8% to 87.1% (Kerubo et al, 2016, Ali et al, 2017, Bulto, 2021a) and foul-smelling or fishy smell from the genital area with prevalence ranging from 1.8% to 17.0% (Kerubo et al, 2016, Nabwera et al, 2021). In addition, there were reports of burning sensation during urination with prevalence ranges from 2.0% to 20.0% (Cherenack and Sikkema, 2021, Juyal et al, 2014, Gothankar et al, 2015, Pavithran et al, 2015); itching in genitalia with prevalence ranges from 4.4% to 60.3% (Kerubo et al, 2016, Hennegan et al, 2016a); skin irritation/rashes with prevalence ranges from 2.4% to 54.3% (Juyal et al, 2014, Hennegan et al, 2016a). The details are presented in **Table 3.**

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Table 3: Prevalence of symptoms suggestive of RTIS/STIs and laboratory confirmation from reviewed studies among adolescent schoolgirls in LMICs

Author and date of publication	Self-reported		Laboratory confirmed	
	Symptoms	Prevalence (%)	RTIS/STIs	Prevalence (%)
Crucitti et al (2010)	-	-	Trichomonas vaginalis	24.6
Crucitti et al (2011)	Vaginal discharge	11.7	Trichomonas vaginalis	27.1
	Bad smell and/or dysuria	8.4	Herpes simplex virus-2	17.4
Sudeshna &Aparajita (2012)	White discharge from vagina	18.4	-	-
	Burning sensation during micturition	10.5	-	-
Houlihan et al (2014)	-	-	Human papillomavirus	8.4
Juyal et al (2014)	Discharge from genitalia	18.8	-	-
	Itching in genitalia	7.9	-	-
	Pustules over genitalia	2.4	-	-
	Pain in lower abdomen	9.3	-	-
	Pain in lower back	9.3	-	-
	Difficulty in micturition	2.0	-	-
Bhattacharyya et al (2015)	Symptomatic leucorrhea	19.6	-	-
	Vaginal itching/burning	24.3	-	-
Gothankar et al (2015)	Swollen glands	2.9	-	-
	Itching	60.0	-	-
	Pain when urinating	20.0	-	-
	Unusual vaginal discharge	22.9	-	-
	Lower abdominal pain	17.1	-	-
Pavithran et al (2015)	Lower back pain	12.8	-	-
	Bleeding for more than eight days in nine	2.3	-	-

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	Abdominal pain during menstruation	21.8	-	-
	Excessive white discharge from the vagina	17.2	-	-
	Itching in genitalia	7.7	-	-
	Pain while passing urine	6.9	-	-
	Urgency in passing urine	5.0	-	-
	Excessive clots during menstruation	4.00	-	-
	Leaking of urine	3.0	-	-
Hennegan et al (2016)	Skin irritation/rashes in pelvic area	54.3	-	-
	Itching or burning in the pelvic area	60.3	-	-
	White or green discharge	47.2	-	-
Kerubo et al (2016)	Heavy menstruation	6.5	Bacterial vaginosis	18.3
	Between menses bleeding	3.9	Candida albicans	8.6
	Burning urine	2.2	Chlamydia trachomatis	2.5
	Frequency of urine	2.5	Trichomonas vaginalis	2.5
	Abdominal/vaginal pain	8.8	Neisseria gonorrhea	0.6
	Pain during intercourse	4.3	-	-
	Itchy/sore vagina	4.4	-	-
	Malodorous smell	1.8	-	-
	Vaginal discharge	10.8	-	-
Phillips-Howard et al (2016)	-	-	Trichomonas vaginalis	1.3
	-	-	Chlamydia trachomatis	0.9
	-	-	Neisseria gonorrhea	6.0
	-	-	Bacterial vaginosis & Candida albicans	71.0
	-		Escherichia coli	53.0
Adegun& Amu (2016)	Painful micturition	13.1	-	-
	Genital discharge	12.2	-	-
	Genital wounds/sores	14.1	-	-
	Genital swelling	11.4	-	-

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Ali et al (2017)	Genital itching	27.6	-	-
	Excess/abnormal vaginal discharge	87.1	-	-
	Vulval pruritis	21.1	-	-
	Lower abdominal pain	12.8	-	-
	Burning micturition	6.2	-	-
Akinbo& Oronsaye (2017)			Trichomonas vaginalis	9.2
Mathiyalagen et al (2017)	Discharge from genitalia	25.2	-	-
	Itching in genitalia	22.3	-	-
	Pustules over genitalia	14.0	-	-
	Pain in lower abdomen/lower back	69.8	-	-
	Difficulty in micturition	20.7	-	-
Juma et al (2017)	-	-	Staphylococcus aureus	10.8
Alam et al (2018)	Abnormal vaginal discharge	65.3	-	-
	Itching	53.3	-	-
	Redness	11.1	-	-
	Burning sensation in the pubic /vagina	11.1	-	-
	Copious discharge	8.8	-	-
	All of the above	42.2	-	-
Francis et al (2018)	-	-	Bacterial vaginosis	25.0
	-	-	Intermediate microbiota	7.0
	-	-	Vaginal yeast	5.0
	-	-	Chlamydia trachomatis	2.0
	-	-	Neisseria gonorrhoeae	2.0
	-	-	Trichomonas vaginalis	4.0
	-	-	Mycoplasma genitalium	2.0
	-	-	Active syphilis	0.0
	-	-	Human papillomavirus	32.0
	-	-	Herpes simplex virus-2	2.0
Francis 2019	-	-	Bacterial vaginosis	14.0
Francis 2020	-	-	Bacterial vaginosis	25.0

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	-	-	Intermediate microbiota (Nugent 4–6)	7.5
	-	-	Vaginal yeast	5.0
	-	-	Chlamydia trachomatis	2.0
	-	-	Neisseria gonorrhea	2.0
	-	-	Trichomonas vaginalis	4.0
	-	-	Mycoplasma genitalium	2.0
	-	-	Active syphilis	0.0
	-	-	Human papillomavirus	32.0
	-	-	Herpes simplex virus-2	0.0
Bulto (2021)	Whitish or gray discharge	58.3	-	-
Nabwera et al (2021)	Abnormal vaginal discharge	22.0	-	-
	Foul-smelling/fishy smell from genital area	17.0	-	-
	Burning or itching of genitalia	47.0	-	-
Cherenack & Sikkema (2021)	Itchy, white, thick, clumpy discharge	29.0	-	-
	Pain or burning during urination	20.0	-	-
	Heavy bleeding between periods	19.0	-	-
	Green or yellow discharge	19.0	-	-
	Itching or burning in the genital area or inside the vagina	19.0	-	-
	White and frothy vaginal discharge	16.0	-	-
	Vaginal discharge with a strong, bad smell (eg, fishy smell)	15.0	-	-
	Redness or rash in the genitals	15.0	-	-
	Sores, blisters, or ulcers in the genital area or inside the vagina	14.0	-	-
	Pain or bleeding during sex	10.0	-	-
Mehta et al (2021)	Vaginal discharge	23.0	Bacterial vaginosis	11.2
	Pain on urination	6.3	Chlamydia trachomatis	6.2
	-	-	Neisseria gonorrhea	1.4
	-	-	Trichomonas vaginalis	3.0

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Baisley et al	-	-	Human papillomavirus	32.5
	-	-	Herpes simplex virus-2	3.0
	-	-	Chlamydia trachomatis	5.0
	-	-	Neisseria gonorrhoeae	3.0
	-	-	Trichomonas vaginalis	9.0
	-	-	Active syphilis	0.0
	-	-	Bacterial vaginosis	33.0
	-	-	Mycoplasma genitalium	4.0

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4.5 Association between RTIs/STIs and poor MHM

The association between the RTIs/STIs and poor MHM was described in (21/28) studies. Of them, thirteen studies (13/21) reported the MHM risk factors that increase the chances of infections. Five studies (5/21) reported general poor MHM (Ali et al, 2017, Bhattacharyya et al, 2015, Cherenack and Sikkema, 2021, Mathiyalagen et al, 2017, Juyal et al, 2014) while two studies reported poor knowledge related to MHM (Gupta, 2019, Sudeshna and Aparajita, 2012. Seven studies reported the use of poor absorbent materials and improper cleansing during periods (Baisley et al, 2020, Cherenack and Sikkema, 2021, Crucitti et al, 2011, Houlihan et al, 2014, Mehta et al, 2021, Mudey et al, 2010, Nabwera et al, 2021). On the other, hand, 10 studies describe protective factors against RTIs/STIs which are mainly the opposite of the above risks, including good MHM, good MHM knowledge, use of clean and safe absorbent material, use of water and soap and privacy in school toilets (Alam Eldien et al, 2018, Baisley et al, 2020, Crucitti et al, 2011, Francis et al, 2019a, Hennegan et al, 2016a, Juma et al, 2017, Kerubo et al, 2016, Mudey et al, 2010, Nabwera et al, 2021, Pal et al, 2017, Phillips-Howard et al, 2016b).

In this review, eight studies reported the prevalence of RTIs/STIs among adolescent schoolgirls who reported never to have had penile-vaginal sex at any point in their lifetime. The prevalence was estimated to be between 8.4% and 39.0% (Houlihan et al, 2014, Mehta et al, 2021). **See Table 4.**

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Table 4: Summary of studies included in the review showing the association between RTIs/STIs and poor MHM in LMICs

Author and date of publication	Prevalence of RTIs/STIs among girls who reported had never had sex	Association of RTIS/STIs with poor MHM	Factors increasing risk of RTIs/STIs	Factors decreasing risk of RTIs/STIs
	%			
Mudey et al (2010)	-	Yes	Use of cloths over sanitary pads	Use of sanitary napkins
Crucitti et al (2010)	22.9	No	-	-
Crucitti et al (2011)	24.7	Yes	Non-use of soap inside the vagina	-
Sudeshna&Aparajita (2012)	-	Yes	Poor MHM knowledge	-
Juyal et al (2014)	-	Yes	Poor MHM	-
Houlihan et al (2014)	8.4	Yes	Sanitary item used during menstruation	-
			Poor intravaginal cleansing practices	-
			Frequency of cleansing practices	-
Bhattacharyya et al (2015)	-	Yes	Poor MHM	-
Pavithran et al (2015)	-	No	-	-
Gothankar et al (2015)	98.8	No	-	-
Kerubo et al (2016)	-	Yes	-	Prior use of sanitary pads
Phillips-Howard et al (2016)	-	Yes	-	Menstrual cup over pads and other materials
Hennegan et al (2016)	-	Yes	-	Good MHM
Adegun& Amu (2016)	-	No	-	-
Ali et al (2017)	-	Yes	Poor MHM	-
Akinbo& Oronsaye (2017)	-	No	-	-
Pal et al (2017)	-	Yes	-	MHM knowledge
Mathiyalagen et al (2017)	-	Yes	Poor MHM practices	-
Juma et al (2017)	-	Yes	-	Menstrual cup had no health risk
Alam et al (2018)	-	Yes	-	Good MHM

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Francis et al (2019)	19.0	Yes	-	Use of cloths, toilet paper or pants
Gupta (2019)	-	Yes	Poor MHM knowledge	
Francis et al (2019)	-	No	-	-
Francis et al (2020)	19.0	No	-	-
Bulto(2021)	-	Yes	Poor MHM	-
Nabwera et al (2021)	-	Yes	Extreme pain during menstruation	
			Spent duration<30 minutes to collect water at home	
			-	Availability of soap to wash hands in school toilets
			-	Accessing of clean school toilets
			-	Privacy in school toilets
Mehta et al (2021)	39.0	Yes	Use of cloth to manage last menses	
Cherenack & Sikkema (2021)	-	Yes	Poor MHM	
Baisley et al	18.5	Yes	Inside vaginal cleansing during menses	Use of cloths only during menses
			Use of cloths during menses	
			Use of only underwear during menses	

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4.6 RTIs/STIs treatment-seeking behavior

In general, a relatively small proportion of the studies (7/28) have evaluated the health-seeking behavior for girls with RTIs/STIs. The health-seeking behavior has been reported to range between 11.5% and 62.9% (Pavithran et al, 2015, Adegun & Amu 2016). Of the studies, two (2/7) did not provide overall prevalence of health-seeking behavior; rather they reported on the type of treatment sought by the girls when they experience RTIs/STIs (Mehta et al, 2021, Juyal et al, 2014). In addition, six studies described the type of treatment sought by adolescent girls which included visiting the nearby health facility: this was reported by between 25.2% and 57.1% (Mathiyalagen et al, 2017, Mehta et al, 2021); home remedies and traditional medicine was sought by between 6.1% and 64.0% (Juyal et al, 2014, Sudeshna and Aparajita, 2012); and the use of self-medication was between 3.7% and 31.6% (Mathiyalagen et al, 2017, Juyal et al, 2014). One study went further to describe the type of the health facilities visited and healthcare providers who attended those who sought to visit nearby health facilities (Adegun and Amu, 2017). Most of these reports came from school-based studies that mainly relied on self-reporting of the girls.

In addition, almost all the studies that used laboratory tests to confirm the presence of RTIs/STIs in girls for the prevalence estimation, provided treatment or referrals to those confirmed to be positive as a part of their research ethics compliance (Baisley et al, 2020, Crucitti et al, 2010, Francis et al, 2020, Francis et al, 2019a, Francis et al, 2019b, Houlihan et al, 2014, Juma et al, 2017, Kerubo et al, 2016, Mehta et al, 2021, Nabwera et al, 2021, Phillips-Howard et al, 2016b). The treatment adhered with the national and international guidelines**. See Table 5.**

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Table 5: Summary of the reviewed studies showing the prevalence of RTIs/STIs health seeking-behavior

Author and date of publication	Prevalence of health-seeking behavior %	Type of services sought	Prevalence of services sought %	Treatment or referral provision
Mudey et al (2010)	-	-	-	No
Crucitti et al (2010)	-	-	-	No
Crucitti et al (2011)	-	-	-	Yes
Sudeshna &Aparajita (2012)	-	-	-	Yes
		-	-	
		-	-	
Juyal et al (2014)	No overall prevalence rate	Took up to 2 days rest	43.1	No
		No action taken	44.2	
		Self-medication	31.6	
		Home remedy	6.1	
Houlihan et al (2014)	-	-	-	No
Bhattacharyya et al (2015)		-	-	No
Pavithran et al (2015)	11.5	-	-	No
Gothankar et al (2015)	-	-	-	No
Kerubo et al (2016)	-	-	-	Yes
Phillips-Howard et al (2016)	-	-	-	Yes
Hennegan et al (2016)	-	-	-	No
Adegun & Amu (2016)	62.9	Went to health facility	28.7	No
		Self-medication	15.9	
		Used herbs	10.0	
		Did other things	10.4	
Ali et al (2017)	-	-	-	No
Akinbo & Oronsaye (2017)	-	-	-	No
Pal et al (2017)	-	-	-	No

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Mathiyalagen et al (2017)	41.6	Self-medication	3.7	No
		Private practitioner	7.9	
		Government hospital	25.2	
		Home remedy	34.3	
		No action taken	17.4	
Juma et al (2017)				Yes
Alam et al (2018)	16.1	Medical prescription	35.0	No
		Bathing	60.0	
		Take rest	5.0	
Francis et al (2019)		-	-	Yes
Gupta (2019)	44.0	-	-	No
Francis et al (2019)	-	-	-	Yes
Francis et al (2020)	-	-	-	Yes
Bulto(2021)	-	-	-	-
Nabwera et al (2021)				Yes
Mehta et al (2021)	No overall prevalence rate	Have been to health facility	57.1	Yes
		Used antibiotic	20.0	
Cherenack & Sikkema (2021)				No
Baisley et al				Yes

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4.7 Factors affecting the utilization of RTI/STIs treatment services

In my analysis, I found a limited number of studies describing health-seeking behavior related to RTIs/STIs among adolescent schoolgirls. Despite the prevalence ratio of RTIs/STIs among this population, none of those who studied the subject went further to evaluate and describe the reasons or factors that hinder or influence them to seek the services. This shows the lack of reviews that conducted comprehensive scoping, systematic analysis or original research on the topic to inform programs and policies.

4.8 Summary

This chapter reported the results from a rapid scoping review on prevalence and patterns of STIs/RTIs and associations with poor MHM among adolescent schoolgirls in LMICs. In addition, the chapter provided results on health-seeking behavior and challenges associated with the utilization of the healthcare services. The following chapter will report the quantitative results on the knowledge, attitude and practices of poor MHM and their associated factors. In addition, the chapter will report on the effects of poor MHM in relation to RTIs, school absenteeism and psycho-social well-being among adolescent schoolgirls in Kilindi district, Tanzania.

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CHAPTER FIVE: RESULTS FROM THE QUANTITATIVE PHASE

5.0 Chapter overview

In chapter 5, I present the findings from the quantitative phase of the study which covers objectives 2, 3, 4 and 5. This chapter provides a description of the socio-demographic characteristics of schoolgirls and the status of their schools regarding water, hygiene, and sanitation facilities. Furthermore, it highlights the findings for objective three on the knowledge, attitudes, and practices of MHM and associated factors. It also presents the remaining outcomes of poor MHM on school absenteeism, psychological well-being, and RTIs/STIs; and their associated factors.

5.1 Socio-demographic characteristics of schoolgirls

Four hundred and ninety adolescent schoolgirls participated in this study, with a mean age of 13.7 (SD =0.8). Almost half (48.2%) of the study participants were aged 13 years. Three hundred and eight-two (78.0%) of the girls were Muslim, while the Nguu was the predominant ethnic group among the participants. The highest proportion, 410 (83.7%) of the girls were residing in rural areas while the majority of the girls were living with both their parents 376 (76.7%). The age of menarche was between 12-13 as reported by 351 (71.6%). The mean age at menarche was 13.98 (±1.17) years. Only 144 (29.4%) of the girls had heard about menstruation prior to the onset of their menarche. The most commonly reported source of information on menstruation was the teachers 170 (34.7%), followed by the media and grandmothers. Schoolgirls in this study had limited access to the internet and phone. Only 152 (31.0%) reported to know about the availability of absorbent materials in local markets. Detailed socio-demographic characteristics of study participants are shown in **Table 6**.

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Table 6: Socio-demographic characteristics of adolescent schoolgirls in Kilindi district, Tanzania 2018

Characteristics	Categories	Number (N=490)	Percentage (%)
Age	13	236	48.2
	14	130	26.5
	15	124	25.3
Current grade of study	5	20	4.1
	6	236	48.2
	7	234	47.8
Religion	Muslim	382	78.0
	Christian	108	22.0
Area of living	Rural	410	83.7
	Semi-urban	80	16.3
Ethnic group	Zigua	164	33.5
	Nguu	178	36.3
	Other	148	30.2
Living with	Both parents	376	76.7
	Single parent	68	13.9
	Other relatives	46	9.4
Household size	≤ 3	116	23.7
	4-6	204	41.6
	≥ 7	170	34.7
Access to the telephone	Yes	6	1.2
	No	484	98.8
Access to internet	Yes	2	0.4
	No	488	99.6
Have a boyfriend	Yes	0	0.0
	No	490	100.0
Ever heard about menstruation	Yes	490	100.0
	No	0	0.0
Age when heard about menstruation	11	257	52.8
	12	233	47.6
Source of information about menstruation	Teachers	170	34.7
	Media	115	23.5

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	Grandmothers	103	21.0
	Others	102	20.8
MHM education in your school	Yes	256	52.2
	No	234	47.8
Provider of MHM education in your school	Teachers	14	6.3
	School clubs	242	93.7
Age of menarche	10	32	6.5
	11	64	13.1
	12	123	25.1
	13	228	46.5
	I don't remember	43	8.8
Availability of absorbents in local area	Yes	152	31.0
	No	338	69.0
Receive money/absorbent materials	Yes	490	100.0
	No	0	0.0
Provider of absorbent materials	Parents	296	60.4
	Other relatives	194	39.6

5.2 School MHM-related facilities and support

Overall, 470 (95.9%) of the girls reported that their schools had toilets, while 434 (88.6%) of the girls reported that their schools had separate toilets for the girls and boys. Only 13.5% of the girls said that their schools had separate rooms for menstruating girls to change their sanitary materials. In addition, more than half of the schools were reported as not providing clean water and soaps to wash during the menses. **See Table 7.**

However, direct observations and spot checks found that all the schools had toilets while 9 out 10 schools had separate toilets for boys and girls. None of the schools had separate changing rooms or emergency sanitary pads for girls if they needed them while menstruating. On the other hand, the majority of the schools (8/10) had handwashing facilities available within the school compound, while few schools - two out ten - had water and soap available in washrooms.

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Table 7: School MHM-related facilities and support among the adolescent schoolgirls in Kilindi district, Tanzania 2018

Variable	Categories	Number (N=490)	Percentage (%)
School has toilets	Yes	470	95.9
	No	20	4.1
Privacy in school is maintained during menstruation	Yes	66	13.5
	No	424	86.5
Separate toilets for girls and boys at school	Yes	434	88.6
	No	56	11.4
Separate room for girls to change their sanitary materials	Yes	66	13.5
	No	424	86.5
The toilet ensures privacy of girls to change their menstrual protection materials	Yes	206	42.0
	No	284	58.0
The school provides proper waste disposal facilities as required	Yes	150	30.6
	No	340	69.4
School provides menstrual protecting materials	Yes	38	7.8
	No	452	92.2
Menstrual protection material types provided at school	Emergency menstrual pad	38	100
	Emergency piece of cloth	0	0.0
	Pain relief pills	0	0.0
	Others	0	0.0
School provides clean water and soaps to wash as required	Yes	220	44.9
	No	270	53.1
School provides proper waste disposal facilities as required	Yes	150	30.6
	No	340	69.4

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5.3 Knowledge, attitudes, and practices of MHM among adolescent schoolgirls

5.3.1 Prevalence of knowledge related to menstruation

Only 114 (29.4%) of the girls were aware of menstruation before reaching menarche. Overall, less than a half of the schoolgirls 218 (44.5%) in this study were considered as having good knowledge regarding menstruation and its management. All the schoolgirls who participated in this study had heard about menstruation. However, of these, only 80 (16.3%) reported it to be a physiological process in a woman's body, while 386 (78.8%) knew that absorbent materials are used to manage the menses blood flow. About a quarter of the schoolgirls viewed menstruation as a secret. Among the reasons for this secrecy were cultural beliefs and religion. One hundred fifty-four girls (31.4%) freely discussed menstruation, while 376 (76.7%) felt that good MHM in school improves girls' education. **See Table 8.**

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Table 8: Knowledge about menstruation among adolescent schoolgirls Kilindi district, Tanzania in 2018

Knowledge of menstruation	Categories	Number (N=490)	Percentage (%)
Ever heard about menstruation	Yes	490	100.0
	No	0	0.0
Know the local name of menses	Yes	244	49.8
	No	246	50.2
Causes of menstruation	A sin	2	0.4
	Curse of God	4	0.8
	Disease	16	3.3
	Physiological process	80	16.3
	I don't know	388	79.2
Menstrual blood come from	Abdomen	2	0.4
	Vagina	70	14.3
	Uterus	122	24.9
	I don't know	296	60.4
Know any menstrual materials	Yes	146	29.8
	No	344	70.2
Absorbents materials known	Reusable and washable pac	92	81.2
	Disposable sanitary pads	398	18.8
Absorbent materials are used to	Relieve pain	43	8.8
	Instead of shower	61	12.4
	Manage blood flow	386	78.8
Knowledge score			
Poor (0-3)		272	55.5
Good (4-7)		218	44.5

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5.3.2 Attitudes related to menstruation

As shown in **Table 9** below, 144 schoolgirls (23.3%) consider menstruation is a secret. Amongst them, cultural beliefs, religion and taboos are the reasons for menstruation being a secret. The majority ie, 336 (68.6%) reported not discussing menstruation issues. In addition, 376 (76.7%) believe that good MHM in school improves girls' education.

Table 9: The attitude of adolescent schoolgirls towards menstruation in Kilindi district, Tanzania in 2018

Attitudes towards menstruation	Categories	Number (N=490)	Percentage (%)
Menstruation is a secret	Yes	114	23.3
	No	376	76.7
Awareness of menstruation before mer	Yes	144	29.4
	No	346	70.6
Reasons for being a secret (N=114)	Culture and belief	22	19.2
	Religion	24	21.1
	Taboos	40	35.1
	Others	28	24.6
Freely discuss menstruation	Yes	154	31.4
	No	336	68.6
Reasons for not discussing (N=336)	Shame	72	21.4
	Fear	77	22.9
	Taboos	119	35.5
	Not habitual	68	20.2
(N=154)	About MHM	125	81.2
	Absorbent materials	22	14.3
	Others	7	4.5
Good MHM will increase academic	Yes	376	76.7
	No	114	23.3
Good MHM will	Decrease school absenteeism	122	24.9
	Reduced fear and shame	136	27.8
	Academic performance will increase	232	47.3
Ever bought absorbents in local shop	Yes	78	15.9
	No	412	84.1
Reasons for not buying absorbents	Not long lasting	273	55.7
	Expensive	207	42.2
	Both above	10	2.0

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5.3.3 Factors associated with the respondents' knowledge of MHM

Schoolgirls who reported to be living with both parents were less likely to have good knowledge about menstruation and menstrual hygiene than their counterparts who lived with single parents [Adjusted odds ratio (AOR) = 0.3, 95 % CI: 0.1– 0.7]. In addition, girls who had heard about menstruation when they were 12 years old were less likely to have good knowledge of MHM than their counterparts who heard about it when older [AOR = 0.1, 95 % CI: 0.1– 0.2]. Those whose source of information about menstruation was their grandmothers were less likely to have good knowledge compared to their counterparts who received their information from other sources [AOR = 0.5, 95 % CI: 0.2– 0. 9]. Similar findings were found among the girls who ever missed school due to menses [AOR = 0.5, 95 % CI: 0.2– 0. 9]. On the other hand, girls from families with households with more than seven members were six times more likely to have good knowledge about menstruation and MHM as compared to those with three family members [AOR = 6.4, 95 % CI: 4.0– 10.2] **See Table 10**.

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Table 10: Factors associated with knowledge due to poor MHM among adolescent schoolgirls in Kilindi district, Tanzania 2018

Variable	Categories	Crude odds ratio (9 %CI)	P=value	Adjusted odds ratio (95%CI)	P=value
Age	13	1		1	
	14	0.8 (0.5-1.3)	0.500	1.3 (0.8-2.2)	0.222
	15	1.3 (0.8-2.0)	0.196	1.5 (0.9-2.5)	0.087
Current grade of study	5	1		1	
	6	0.7 (0.3-1.9)	0.609	0.7 (0.2-1.9)	0.553
	7	0.8 (0.3-1.9)	0.632	0.9 (0.6-1.5)	0.936
Religion	Muslim	1		1	
	Christian	0.7 (0.5-1.2)	0.278	0.8 (0.6-1.2)	0.456
Area of living	Rural	1		1	
	Semi urban	0.9 (0.5-1.5)	0.884	0.9 (0.5-1.5)	0.904
Ethnic group	Zigua	1		1	
	Nguu	1.3 (0.9-2.1)	0.131	1.2 (0.8-2.0)	0.294
	Other	1.2 (0.8-2.0)	0.261	0.9 (0.5-1.4)	0.707
Living with	Single parent	1		1	
	Both parents	**0.5 (0.3- 0.9)**	**0.048**	**0.3 (0.1-0.7)**	**0.007**
	Other relatives	**0.3 (0.1-0.7)**	**0.005**	0.6 (0.2-1.4)	0.282
Household size	< 3	1		1	
	4-6	**0.2 (0.1-0.3)**	**<0.001**	1.3 (0.8-2.2)	0.231
	≥ 7	1.2 (0.7-2.0)	0.378	**6.4 (4.0-10.2)**	**<0.001**

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Age when heard about menstruation	11	1		1	
	12	1.1 (0.7-1.5)	0.533	**0.1 (0.1-0.2)**	**<0.001**
Source of information about menstruation	Teachers	1		1	
	Media	**2.6 (1.6-4.3)**	**<0.001**	0.8 (0.4-1.3)	0.449
	Grandmothers	**0.5 (0.3-0.9)**	**0.029**	**0.5 (0.2-0.9)**	**0.034**
	Others	0.8 (0.3-1.4)	0.6110	1.4 (0.7-2.7)	0.236
MHM education in your school	Yes	1		1	
	No	1.0 (0.7-1.4)	0.840	0.7 (0.4-1.3)	0.377
Age of menarche	10-11	1		1	
	12-13	0.7 (0.3-1.6)	0.502	1.2 (0.6-2.6)	0.496
	I don't remember	0.8 (0.3-1.5)	0.585	1.1 (0.6-2.1)	0.650
Awareness of menstruation before menarche	Yes	1.3 (0.9-2.0)	0.114	1.4 (0.9-2.0)	0.090
	No	1			
Embarrassment	Yes	1.3 (0.8-1.9)	0.211	1.3 (0.8-1.9)	0.208
	No	1		1	
Poor MHM practices	Yes	1.1 (0.8-1.6)	0.389	1.1 (0.8-1.7)	0.376
	No	1			
School absenteeism	Yes	**0.5 (0.2-0.9)**	**0.021**	**0.5 (0.2-0.9)**	**0.025**
	No	1			
RTIs	Yes	1.1 (0.5-2.4)	0.562	1.2 (0.5-2.4)	0.622
	No	1			
School has adequate MHM facilities	Yes	1.1 (0.8-1.6)	0.415	1.1 (0.7-1.6)	0.596
	No	1		1	

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5.3.4 Prevalence of MHM practices

Overall, only 183 (37.3%) of the schoolgirls reported practicing good MHM. All 490 participants in this study reported using some kind of material to manage menstruation. The most predominant absorbent materials reported by more than half of the girls were commercially disposable sanitary pads 291(59.1%) followed by disposable pieces of clothes or rags 108 (22.0%). In terms of changing pads, almost three quarters 362 (73.9%) of girls reported changing their pads or clothes daily. One hundred fifty-nine (39.7%) schoolgirls reported disposing of their used sanitary pads by burning them, while slightly more than a quarter, (N=104; 26.0%) of girls threw them in the latrine pit. The majority of those who were using reusable sanitary pads/underwear reported drying them in hidden places 49 (59.6%), where they would not be seen. About three quarters (N= 356; 72.7%) of the schoolgirls reported taking a bath daily with soap during menstruation. Nearly two thirds (N=322; 65.7%) of the schoolgirls reported cleaning their external genitalia during menstruation with soap and water. **See Table 11**.

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Table 11: Practices related to MHM among adolescent schoolgirls in Kilindi district, Tanzania, 2018

Variable	Categories	Number (N=490)	Percentage (%)
Use of any material to manage menstruation	Yes	490	100.0
	No	0	0.0
Types of materials to manage menstruation	Disposable sanitary pads	291	59.4
	Disposable piece of rags	108	22.0
	Reusable cloth	46	9.4
	Reusable pads	45	9.2
Keep reusable sanitary materials after using/washing (N=91)	Hidden place	40	43.9
	Under the mattress of a bed	19	20.8
	Inside bag or cabinet	32	35.1
Drying reusable sanitary pads/underwear	Open sunlight	32	35.1
	Hidden place	49	53.9
	Others	10	11.0
Frequency of changing pads	Every hour	10	2.0
	Every 4-6 hours	100	20.4
	Daily	362	73.9
	I don't know	18	3.7
Change underwear during changing pad	Yes	8	1.6
	No	482	98.4
Frequency of cleaning external genitals	Twice a day	168	34.3
	≥ 3 times a day	322	65.7
Washing external genitals with	Only Water	351	71.6
	Soap and water	139	28.4
Front to back motion to clean of genetalia	Yes	143	29.2
	No	347	70.8
Take bath daily during menstruation	Yes	356	72.7
	No	134	27.3
Wash hands after changing pad	Yes	482	98.4
	No	8	1.6
Use soap and water to wash hands after pad change	Yes	150	30.6
	No	340	69.4
Clean genitalia after every toilet visit	Yes	360	73.5
	No	130	26.5
Dispose of used menstrual materials (N=400)	Throw away	58	14.6
	Throw in rubbish pit	79	19.7
	Throw in latrine	104	26.0
	Burning	159	39.7
Overall menstrual hygiene practices			
Poor MHM (0-2)		307	62.7
Good MHM (3-4)		183	37.3

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5.3.5 Factors associated with the good MHM practices

Schoolgirls from families with households with >7 members were less likely to have practiced good MHM as compared to those with three family members [AOR = 0.6, 95 % CI: 0.4.0– 0.9], while those whose source of information about menstruation was the media were less likely to practice good MHM as compared to their counterparts whose main source was other than the media [AOR = 0.5, 95 % CI: 0.2– 0. 9]. In addition, those girls who had heard about menstruation when they were 12 years were 1.6 more likely to practice good MHM than their counterparts who heard about it when older [AOR = 0.1, 95 % CI: 0.1– 0.2]. Schoolgirls who were living in semi-urban areas were 2.1 times more likely to practice good menstrual hygiene as compared to those who were living in rural areas [AOR = 2.1, 95 % CI: 1.2-3.4]. Girls who had ever experienced embarrassment related to menstruation were 1.5 times more likely to have good practices on menstrual hygiene compared to those who had never experienced embarrassment [AOR = 1.5, 95 % CI: 1.0-2.3]. **See Table 12**.

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Table 12: Factors associated with poor MHM practices among the adolescent schoolgirls in Kilindi district, Tanzania, 2018

Variable	Categories	Crude odds ratio (95%CI)	P=value	Adjusted odds ratio (95%CI)	P=value
Age	13	1		1	
	14	1.1 (0.7-1.7)	0.655	1.1 (0.6-1.8)	0.634
	15	0.9 (0.4-1.5)	0.914	0.8 (0.5-1.4)	0.610
Current grade of study	5	1		1	
	6	1.5 (0.5-4.1)	0.403	1.2 (0.4-3.3)	0.728
	7	1.2 (0.4-3.4)	0.641	0.7 (0.4-1.1)	0.187
Religion	Muslim	1		1	
	Christian	0.9 (0.6-1.5)	0.881	0.9 (0.6-1.4)	0.848
Area of living	Rural	1		1	
	Semi urban	**2.1 (1.3-3.4)**	**0.003**	**2.1 (1.2-3.4)**	**0.003**
Ethnic group	Zigua	1		1	
	Nguu	1.3 (0.8-2.0)	0.215	0.7 (0.4-1.1)	0.182
	Other	1.3 (0.8-2.1)	0.203	0.9 (0.6-1.5)	0.881
Living with	Single parent	1		1	
	Both parents	**0.5 (0.3-0.9)**	**0.034**	1.5 (0.7-2.9)	0.208
	Other relatives	0.6 (0.3-1.2)	0.205	0.8 (0.3-1.8)	0.638
Household size	≤ 3	1		1	
	4-6	0.6 (0.3- 1.0)	0.059	1.0 (0.6-1.6)	0.999
	≥ 7	1.0 (0.6-1.6)	0.870	**0.6 (0.4-0.9)**	**0.028**

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Age when heard about menstruation	11	1		1	
	12	**0.6 (0.4-0.8)**	**0.011**	**1.6 (1.1-2.3)**	**0.010**
Source of information about menstruation	Teachers	1		1	
	Media	**2.4 (1.4-3.9)**	**< 0.001**	**0.5 (0.3-0.9)**	**0.042**
	Grandmothers	1.4 (0.8-2.5)	0.136	1.3 (0.8-2.4)	0.225
	Others	**1.7 (1.0-2.8)**	**0.043**	0.8 (0.4-1.5)	0.610
MHM education in your school	Yes	1		1	
	No	0.9 (0.6-1.3)	0.626	1.0 (0.6-1.7)	0.951
Age of menarche	10-11	1		1	
	12-13	0. 8 (0.5-1.4)	0.611	1.1 (0.5-2.3)	0.785
	I don't remember	0.9 (0.4-1.8)	0.791	0.9 (0.5-1.8)	0.893
Awareness of menstruation before menarche	Yes	1.0 (0.7-1.5)	0.802	0.9 (0.6-1.4)	0.860
	No	1		1	
Poor MHM knowledge score	Yes	1.1 (0.8-1.6)	0.389	1.1 (0.8-1.7)	0.376
	No	1		1	
School absenteeism	Yes	1.1 (0.6-1.9)	0.604	1.1 (0.6-1.9)	0.567
	No	1		1	
RTIs	Yes	0.9 (0.4-1.9)	0.825	0.9 (0.3-1.9)	0.801
	No	1		1	
Ever experienced embarrassment	Yes	**1.5 (1.0-2.3)**	**0.047**	**1.5 (1.0-2.3)**	**0.048**
	No	1		1	
School adequate MHM facilities	Yes	0.8 (0.6-1.2)	0.537	1.1 (0.7-1.6)	0.530
	No	1		1	

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5.4 School absenteeism during menstruation

5.4.1 Prevalence of school absenteeism during menstruation

Of the 490 schoolgirls participants, 62 (12.6%) reported having missed at least one school day per month in the past three months in relation to menstruation. The mean days of school absenteeism were 1.3 (SD = 0.6). Of those who missed school, just over two-thirds of girls 43 (69.3%) reported to have missed one day of schooling due to menstruation. Among the reasons for missing the school during menses were: fear of leakage or blood staining clothes and lack of menstrual absorbent materials **See Table 13.**

Table 13: Prevalence of school absenteeism related to poor MHM among adolescent schoolgirls in Kilindi district, Tanzania in 2018

Variable	Categories	Number (N=490)	Percentage (%)
Ever missed school during periods	Yes	62	12.6
	No	452	87.4
Number of days missed school	1 day	43	69.3
	2-3 days	19	30.7
Reasons for missing school	Fear of leakage/staining	33	53.2
	Had no absorbents	15	24.2
	No MHM facilities at school	11	17.7
	Pain or discomfort	3	4.8

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5.4.2 Factors associated with school absenteeism during menstruation

Univariable analysis showed that the odds of missing school increased with being a member of other ethnic groups as compared to Zigua (OR = 2.1, 95% CI 1.1 - 4.3), living with other relatives (OR = 2.9, 95% CI 1.3- 6.2), grandmother being the source of information (OR = 2.1, 95% CI 1.1 - 4.2), ever having experienced embarrassment (OR = 6.0, 95% CI 3.0-11.0), and practicing poor MHM (OR = 3.2, 95% CI 1.3.0-7.7). On the other hand, the risk of missing school decreased with living with both parents (OR = 0.3, 95% CI 0.1-0.8), having received MHM education at school (OR = 0.3, 95% CI 0.1-0.8), or age of menarche 12-13 years (OR = 0.2, 95% CI 0.1-0.6). However, after adjusting for other socio-demographic and school characteristics, only few variables maintained their significance.

In multivariable analyses, missing at least one day of school during the last three months was independently associated with being a member of other ethnic groups. This was observed to increase the odds of missing school during the menses (AOR = 2.0, 95 % CI: 1.0-4.1). In addition, those girls who had poor MHM practices were seven times more likely to miss school as compared to their counterparts (AOR = 7.4, 95 % CI: 2.5-21.7); and to have ever experienced embarrassment (AOR = 5.7, 95 % CI: 2.8-11.7), while those girls who were studying in schools without adequate MHM facilities were 3.9 times more likely to miss school as compared to their counterparts (AOR = 3.9, 95 % CI: 1.7– 8.9). These findings show that schoolgirls who reported to be living with both parents and other relatives were less likely to miss school during menstruation (AOR = 0.3, 95 % CI: 0.1– 0.7) and (AOR = 0.1, 95 % CI: 0.0– 0.5) respectively. **See Table 14.**

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Table 14: Factors associated with school absenteeism related to poor MHM among adolescent schoolgirls in Kilindi district in Tanzania, 2018

Variable	Categories	Crude odds ratio (95%CI)	P=value	Adjusted odds ratio (95%CI)	P=value
Age	13	1		1	
	14	1.5 (0.7-3.0)	0.243	1.5 (0.7-3.1)	0.224
	15	1.4 (0.6-3.0)	0.396	1.4 (0.6-3.1)	0.378
Current grade of study	5	1		1	
	6	1.5 (0.3-7.0)	0.558	0.7 (0.1-3.5)	0.726
	7	1.0 (0.2-4.9)	0.927	1.5 (0.8-2.6)	0.136
Religion	Muslim	1		1	
	Christian	1.2 (0.6-2.5)	0.491	1.4 (0.7-3.0)	0.299
Area of living	Rural	1		1	
	Semi urban	0.7 (0.7-3.1)	0.233	1.2 (0.6-2.4)	0.545
Ethnic group	Zigua	1		1	
	Nguu	1.2 (0.6-2.7)	0.519	1.1 (0.5-2.5)	0.677
	Other	**2.1 (1.1-4.3)**	**0.026**	**2.0 (1.0-4.1)**	**0.039**
Living with	Single parent	1			
	Both parents	**0.3 (0.1- 0.8)**	**0.012**	**0.3 (0.1-0.7)**	**0.009**
	Other relatives	**2.9 (1.3-6.2)**	**0.005**	**0.1 (0.0-0.5)**	**0.004**
Household size	≤ 3	1		1	
	4-6	0.4 (0.2- 1.0)	0.759	0.6 (0.2-1.4)	0.256
	≥ 7	0.9 (0.5-1.6)	0.787	1.0 (0.5-1.8)	0.951

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Age of menarche	10-11	1		1	
	12-13	**0. 2 (0.1-0.6)**	**0.005**	1.5 (0.5-4.6)	0.420
	I don't remember	0.6 (0.1-2.4)	0.517	0.8 (0.3-2.3)	0.762
Good MHM knowledge and information	Yes	1		1	
	No	1.1 (0.5-2.1)	0.758	1.2 (0.6-2.4)	0.548
Source of information about menstruation	Teachers	1		1	
	Media	0.9 (0.4-2.1)	0.967	0.9 (0.4-2.1)	0.905
	Grandmothers	**2.1 (1.0-4.2)**	**0.270**	0.8 (0.3-2.1)	0.772
	Others	1.0 (0.4-2.2)	0.960	2.0 (0.9-4.4)	0.085
MHM education in your school	Yes	1		1	
	No	**0.3 (0.1-0.8)**	**0.029**	1.8 (0.3-4.0)	0.397
Awareness of menstruation before menarche	Yes	1		1	
	No	0.7 (0.3-1.5)	0.423	0.5 (0.2-1.1)	0.112
Good MHM practices	Yes	1		1	
	No	**3.2 (1.3-7.7)**	**0.006**	**7.4 (2.5-21.7)**	**<0.0001**
Ever experienced embarrassment	Yes	1		1	
	No	**6.0 (3.0-11.0)**	**<0.0001**	**5.7 (2.8-11.7)**	**<0.0001**
School had adequate MHM facilities	Yes	1		1	
	No	1.8 (0.9-3.6)	0.063	**3.9 (1.7-8.9)**	**<0.0001**

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5.5 Psycho-social stress related to poor MHM

5.5.1 Prevalence of fear and embarrassment related to poor MHM

Of the 490 schoolgirls who participated in this survey, 115 (23.5%) reported to have been embarrassed during periods while in school in the past three months. The main reported perpetrators of causing such embarrassment were schoolboys. In addition, more than 80% of schoolgirls were afraid of being teased during menstruation. Of these, their fear was related to menstrual odor and blood leaking 52.2% and 47.8% respectively. **See Table 15.**

Table 15: Prevalence of psychological issues related to poor MHM among adolescent schoolgirls in Kilindi district, Tanzania, 2018

Variable	Categories	Number (N=490)	Percentage (%)
Ever being embarrassment during periods in school	Yes	115	23.5
	No	375	76.5
Kind of embarrassment experienced	Isolated	34	29.6
	Teased	62	53.9
	Insulted	19	16.5
Ever felt ashamed during menstruation	Yes	87	17.8
	No	403	82.2
Fear of being teased during menstruation	Yes	396	80.8
	No	94	19.2
Source of fear	Leaking	207	52.2
	Smelly	189	47.8
Perpetrators	Boys	265	54.0
	Other girls	105	21.4
	Male teachers	119	24.2
	Female teachers	2	0.4
School provides psycho-social support to girls	Yes	50	10.2
	No	440	89.8

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5.5.2 Factors associated with fear and embarrassment related to poor MHM

Univariable analysis showed that the odds of fear and embarrassment while at school increased with living in semi urban areas (OR = 3.2, 95% CI 1.9-4.3), living with other relatives (OR = 2.9, 95% CI 1.3-6.2), the media being the source of information (OR = 2.8, 95% CI 1.6-5.0), being able to freely discuss menstruation (OR = 1.7, 95% CI 1.1-2.6) and poor MHM practices (OR = 1.5, 95% CI 1.0-2.3). On the other hand, the risks of experiencing fear and embarrassment in school during menstrual periods decreased with living with both parents (OR = 0.3, 95% CI 0.1-0.8), belonging to households with 4-6 members (OR = 0.1, 95% CI 0.0-0.5) and having poor knowledge of MHM (OR = 0.4, 95% CI 0.2-0.6). However, after adjusting for other socio-demographic and school characteristics, only a few variables maintained their significance.

In multivariable analyses, experiencing fear and embarrassment in school related to menses in the last three months and was independently associated with living in semi urban areas (AOR = 3.2, 95% CI 1.9-5.3), with other relatives (AOR = 9.7, 95% CI 2.9-32.8), media being the source of information (AOR = 3.1, 95% CI 1.6-5.7); and freely discussing menstruation (AOR = 1.7, 95% CI 1.1-2.7). **See Table 16.**

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Table 16: Factors associated with fear and embarrassment related to poor MHM among adolescent schoolgirls in Kilindi district, Tanzania, 2018

Variable	Categories	Crude odds ratio (95%CI)	P=value	Adjusted odds ratio (95%CI)	P=value
Age	13	1		1	
	14	1.5 (0.7-3.0)	0.590	0.9 (0.5-1.6)	0.945
	15	1.4 (0.6-3.0)	0.948	0.8 (0.4-1.5)	0.599
Current grade of study	5	1		1	
	6	0.7 (0.2-1.8)	0.444	0.7 (0.2-2.0)	0.560
	7	0.7 (0.3-2.0)	0.546	1.0 (0.7-1.6)	0.711
Religion	Muslim	1			
	Christian	0.8 (0.5-1.4)	0.491	0.8 (0.5-1.3)	0.484
Area of living	Rural	1		1	
	Semi-urban	**3.2 (1.9-4.3)**	**< 0.001**	**3.2 (1.9-5.3)**	**< 0.001**
Ethnic group	Zigua	1		1	
	Nguu	0.6 (0.3-1.0)	0.070	0.7 (0.4-1.2)	0.317
	Other	0.8 (0.4-1.2)	0.306	1.2 (0.7-2.0)	0.461
Living with	Single parent	1		1	
	Both parents	**0.3 (0.1- 0.8)**	**< 0.001**	1.7 (0.8-3.5)	0.140
	Other relatives	**2.9 (1.3-6.2)**	**< 0.001**	**9.7 (2.9-32.8)**	**< 0.001**
Household size	≤ 3	1		1	
	4-6	**0.1 (0.0-0.5)**	**< 0.001**	1.3 (0.7-2.4)	0.281
	≥ 7	0.9 (0.5-1.6)	0.169	1.5 (0.9-2.5)	0.068
Good MHM knowledge and information	Yes	**1**		1	
	No	**0.4 (0.2-0.6)**	**< 0.001**	0.5 (0.3-1.0)	0.0520

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Source of information about menstruation	Teachers	1		1	
	Media	**2.8 (1.6-5.0)**	**< 0.001**	**3.1 (1.6-5.7)**	**< 0.001**
	Grandmothers	1.2 (0.6-2.3)	0.543	1.0 (0.5-1.9)	0.879
	Other	**2.9 (1.6-5.2)**	**< 0.001**	**2.5 (1.2-5.1)**	**< 0.001**
MHM education in your school	Yes	1		1	
	No	1.3 (0.8-2.0)	0.274	1.3 (0.7-2.2)	0.287
Psychological support at school	Yes	1		1	
	No	0.6 (0.3-1.0)	0.100	1.7 (0.8-3.4)	0.132
Awareness of menstruation before menarche	Yes	1		1	
	No	0.9 (0.5-1.5)	0.798	0.9 (0.4-1.5)	0.741
Freely discussed menstruation	Yes	1		1	
	No	**1.7 (1.1-2.6)**	**0.013**	**1.7 (1.1-2.7)**	**0.012**
Good MHM practices	Yes	1		1	
	No	**2.0 (1.0-4.2)**	**0.0480**	1.2 (0.5-2.8)	0.546
Adequate school MHM facilities	Yes	1		1	
	No	0.6 (0.4-1.0)	0.106	0.5 (0.3-1.0)	0.052

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5.6 Reproductive Tract Infections related to poor MHM

5.6.1 Prevalence of RTIs

Overall, thirty-one (6.3%) of the schoolgirls self-reported to have experienced one or more symptoms suggestive of the RTIs in the past three months. The most reported common symptom of RTIs was pain in the vagina/lower abdomen - 32.3%, burning micturition - 19.4% and skin irritation/rashes - 19.4%. All the schoolgirls who had RTIs sought treatment from either health facilities or advice from their relatives. **See Table 17.**

Table 17: Prevalence of Reproductive Tract Infections related to poor MHM among adolescent schoolgirls in Kilindi district, Tanzania, 2018

Variable	Categories	Number (N=490)	Percentage (%)
Ever experinced symptoms suggestive of RTIs	Yes	31	6.3
	No	459	93.7
Type of symptoms suggestive of RTIs	White/green vaginal discharg	5	16.0
	Burning when pass urine	6	19.4
	Pain in vagina/abdomen	10	32.3
	Skin irritation/rashes	6	19.4
	Unpleasant smell from vagin	4	12.9
When experienced such symptoms?	During MP	0	0.0
	After MP	0	0.0
	All the times	31	100.0
Opted for health-seeking behaviour	Yes	31	100.0
	No	0	0.0
Kind of the services sought	Medical care	17	54.8
	Relative advice	14	45.2
Know anyone who faced similar symptoms	Yes	53	10.8
	No	437	89.2

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5.6.2 Factors associated with the respondents' RTIs related to poor MHM

Results from the univariable analysis showed that the odds of getting infected with RTIs decreases as the study grade goes up. For example, those who were in grades 6 and 7 were less likely to get infections i.e., (OR = 0.2, 95% CI 0.0-0.9) and (OR = 0.1, 95% CI 0.0-0.6) respectively. In addition, being Nguu (OR = 0.4, 95% CI 0.1-0.9), other ethnic groups (OR = 0.2, 95% CI 0.1-0.5) and studying in school with adequate MHM facilities (OR = 0.3, 95% CI 0.1-0.9) contributed to protection from RTIs.

After adjusting for these socio-demographic factors, some of the variables maintained their significance while for grade 6 pupils, these findings were maintained, though in the opposite direction. In multivariable analyses, risks of having RTI suggestive symptoms in the last three months were independently associated with being in grade 6 (AOR = 5.9, 95% CI 1.5-22.9). In most cases, the findings show that as the girls' age increases, the risks of having the symptoms suggestive of RTIs decreased, however this was not statistically significant. For instance, those who were 14 and 16 years had been less likely to have RTIs (AOR = 0.4, 95% CI 0.1-1.2) and (AOR = 0.6, 95% CI 0.2-1.8) as compared to those who were 13 years old. In addition, schoolgirls from schools with inadequate MHM facilities had a lower risk of having symptoms suggestive of RTIs compared to those with adequate MHM facilities (AOR = 0.3, 95% CI 0.1-0.9). **See Table 18.**

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Table 18: Factors associated with Reproductive Tract Infections related to poor MHM among adolescent schoolgirls in Kilindi district in Tanzania, 2018

Variable	Categories	Crude odds ratio (95%CI)	P=value	Adjusted odds ratio (95%CI)	P=value
Age	13	1		1	
	14	0.9 (0.2-2.2)	0.829	0.4 (0.1-1.2)	0.137
	15	1.3 (0.5-3.2)	0.443	0.6 (0.2-1.8)	0.469
Current grade of study	5	1		1	
	6	**0.2 (0.0-0.9)**	**0.045**	**5.9 (1.5-22.9)**	**0.009**
	7	**0.1 (0.0-0.6)**	**0.011**	2.0 (0.8-4.9)	0.133
Religion	Muslim	1		1	
	Christian	0.6 (0.3-1.5)	0.491	1.5 (0.6-3.4)	0.294
Area of living	Rural	1		1	
	Semi urban	0.9 (0.3-2.6)	0.975	0.6 (0.2-1.7)	0.364
Ethnic group	Zigua	1		1	
	Nguu	**0.4 (0.1-0.9)**	**0.041**	**0.3 (0.1-0.9)**	**0.029**
	Other	**0.2 (0.1-0.5)**	**0.001**	**0.1 (0.0-0.4)**	**< 0.001**
Living with	Single parent	1		1	
	Both parents	0.9 (0.3- 2.7)	0.876	0.9 (0.2-3.7)	0.921
	Other relatives	1.1 (0.3-3.5)	0.971	0.8 (0.1-4.4)	0.886
Household size	≤ 3	1		1	
	4-6	0.9 (0.3- 2.3)	0.856	1.2 (0.3-4.3)	0.731
	≥ 7	0.8 (0.3-2.2)	0.729	0.7 (0.1-4.5)	0.755

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Age when heard about menstruation	11	1		1	
	12	1.0 (0.4-2.1)	0.809	0.7 (0.1-4.6)	0.776
Good MHM knowledge and information	Yes	1		1	
	No	0.8 (0.4-1.7)	0.652	0.4 (0.2-1.0)	0.076
Source of information about menstruation	Teachers	1		1	
	Media	0.9 (0.3-2.5)	0.811	1.1 (0.3-3.4)	0.860
	Grandmothers	1.7 (0.7-4.3)	0.244	0.6 (0.1-2.9)	0.622
	Other	0.8 (0.3-2.5)	0.732	1.1 (0.3-3.8)	0.830
MHM education in your school	Yes	1		1	
	No	0. 5 (0.2-1.2)	0.123	0.6 (0.3-1.4)	0.320
Awareness of menstruation before menarche	Yes	1		1	
	No	1.5 (0.7-3.3)	0.242	1.1 (0.5-2.7)	0.698
School adequate MHM facilities	Yes	1		1	
	No	**0.3 (0.1-0.9)**	**0.034**	**0.3 (0.1-0.9)**	**0.038**

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5.7 Summary

This chapter reported the quantitative results concerning knowledge, attitudes and practices of poor MHM and their associated factors. In addition, the chapter reported the effects of poor MHM in relation to RTIs, school absenteeism and psycho-social well-being among adolescent schoolgirls in Kilindi district, Tanzania. The following chapter will report findings from the qualitative study on the type of support that adolescent schoolgirls have been receiving from parents and schoolboys while in school during their menses in Kilindi district, Tanzania.

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CHAPTER SIX: RESULTS FROM THE QUALITATIVE PHASE

6.0 Chapter overview

Chapter 6 presents the findings from the qualitative approach of the study which corresponds with objective 6. From the findings emerged four thematic areas related to support provided by the parents and schoolboys. These are: guidance and counseling, provision of menstrual materials, provision of space and privacy and refraining from teasing and embarrassing schoolgirls who are in their menstrual periods while in school. The findings are supported by quotations from the specific focus group that provided such evidence.

6.1 Socio-demographic characteristics of the respondents

In this qualitative component, a total of 48 participants participated in four (4) focus group discussions (FGDs) including schoolboys, schoolgirls, male parents and female parents. In addition, 5 KII from five (5) WASH and SRH programs at the district level were conducted. The age of the schoolboys and schoolgirls ranged between 13-16. The majority of them were Muslims, belonging to Nguu ethnic group and residing in rural areas. The age of the parents ranged between 32 and 53 with a mean age of 38.2 years. Their education was mostly secondary school-level. In terms of their livelihoods, the majority of them were engaged in subsistence agriculture and others reported undertaking informal economic activities like petty trading. In comparing them, men reported having better income than the women in the sample. In most cases, participants reported being married and living together with their partners. The majority of them were Muslims, belonging to the Nguu ethnic group and residing in rural areas as shown in **Table 19** below.

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Table 19: Socio-demographic characteristics of qualitative study participants in Kilindi district, Tanzania in 2018

Characteristics	Categories	Parents		Pupils	
		(N=24)	(%)	(N=24)	(%)
Age	10-19			24	100
	20-29				
	30-39	8	33.3		
	40-49	14	58.3		
	≥ 50	2	8.4		
Sex	Male	12	50.0	12	50.0
	Fema	12	50.0	12	50.0
Religion	Muslim	16	66.7	14	58.3
	Christian	8	33.3	10	41.7
Area of living	Rural	19	79.2	18	75.0
	Semi-urban	5	20.8	6	25.0
Ethnic group	Zigua	5	20.8	8	33.3
	Nguu	16	66.7	11	45.8
	Others	3	12.5	5	20.8
Marital status	Married	22	91.6		
	Divorced	1	4.2		
	Separated	1	4.2		
Occupation	Government	3	12.5		
	Private	21	87.5		
Educational level	Primary education	8	33.3		
	Secondary education	14	58.3		
	College/University	2	8.4		

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6.2 Support provided by schoolboys and parents to schoolgirls

6.2.1 Guidance and counselling

The narratives from this study show that parents, particularly mothers, play a vital and primary role in providing the support which the girls need during their menses while in school. The majority of the mothers reported advising their daughters on how to behave while in school, especially when they experience sudden soiling of their garments. Most pieces of advice are based on effectively hygienically managing menses while at school

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by seeking support from teachers. However, a handful of women reported asking their daughters to leave the school compound immediately after noticing soiling of their garments with the justification that schools are not equipped with the necessary facilities to manage menses. In addition, parents reported guiding their daughters to stay away from the boys.

> *…after noticing that my daughter has reached menarche, I constantly guide her how to manage the menses while in school and when suddenly menses happen then she should seek help from female teachers or any female elder…* ***(Female parents, FGD).***

Another mother reported,

> *... I know that most of the schools face the challenges of inadequate WASH facilities thus instead of risking my daughters to be embarrassed, I usually advise her either to remain at home until they finish their menses (if period starts while at home) and when it happens while in school she should go home* ***(Female parents, FGD).***

Some schoolgirls confirmed to have been advised in the same way by their parents, however, they also acknowledged limited knowledge on the subject among their female parents.

> *... my mother has always been beside me in guiding how to manage my periods while in school. On some occasions she would counsel me on how to avoid boys. However, not all the time she was able to answer all the questions I had regarding menstruation ...* ***(Schoolgirls, FGD).***

Furthermore, the authority at the district mentioned plans to build the capacity and skills of the teachers to provide necessary support and education to the schoolgirls and schoolboys.

> *... the district will train all the teachers on MHM particular on providing the support to girls before end of the year* ***(District Official, KII).***

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6.2.2 Provision of MHM materials

Almost all the participants in this study, particularly women, admitted to being responsible for the provision of sanitary towels to their daughters.

> *Every month I ensure that my daughter has the supply of sanitary pads before going to school as they are not available there (school).* ***(Female parents, FGD).***

On the contrary, the majority of the male parents felt that this is not their responsibility. Few fathers reported having been providing financial assistance either directly to daughters or to their wives to buy sanitary pads for their schoolgirls.

> *…. despite that, I do not directly buy sanitary pads for my daughter but as a responsible father, I provide money to my wife and daughters to cater to all their needs including sanitary pads …* ***(Male parents, FGD).***

On the other hand, some girls described having received the bulk of sanitary pads for use on a monthly basis, while other girls gave descriptions of receiving the pocket money from their fathers and realizing that that money should go to buy sanitary towels.

> *…my mother has been so kind, particularly in buying me sanitary pads* ***(Schoolgirls, FGD).***

Another schoolgirl added that

> *… my father provides me with monthly pocket money, my mother helps me with buying sanitary pads from the same money* ***(Schoolgirls, FGD).***

In addition, boys asserted this by mentioning having witnessed their counterparts receiving huge amounts of pocket money compared to them. Boys noted that they had realized that this was due to girls having extra needs.

> *The only reason for them (girls) to receive extra money from their parents is because they have more needs including pads* ***(Schoolboys, FGD).***

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6.2.3 Space and privacy for the girls to manage menses

Schoolboys in this study narrated their encounters with schoolgirls who accidentally stained their garments. The majority of them reported that when they see such incidents, schoolboys resort to leaving the classrooms or engaging in different activities as a way of providing privacy and space for the girls to hygienically attend to themselves. Other schoolboys reported such incidents to the female teachers. When asked the reasons for such actions, schoolboys attributed them to the girls as results of education and guidance they have received through their health clubs.

> *... we undoubtedly know when a girl is in menses, her behavior changes, for example she looks to be down and reduces her movements. The situation becomes worse if she accidentally starts menses while in class. Therefore, instead of staying to witness the whole process, we decide to go outside the classroom or go to the toilet regardless if we need to go there or not…. and leave her and other girls in the like nothing has happened.* ***(Schoolboy, FGD).***

> *…. here (at school) we have different clubs, including health clubs, we are being taught different health issues such as reproductive health. We have learned about menstruation and how it occurs and as potential fathers, we need to respect our sisters particularly when they are on their period.* ***(Schoolboy, FGD).***

However, disagreement was also observed among a handful of schoolboys who felt that supporting the schoolgirls who accidentally start menses is not their responsibility. Instead, schoolgirls' parents should guide their daughters and provide them with sanitary pads to effectively manage menses while in school to avoid embarrassment.

> *…. this is nothing to do with me, parents should ensure that each girl receives a constant supply of sanitary pads to avoid such embarrassment of soiling the garments. Again, girls should be aware that such accidents might happen otherwise they (girls) will always be embarrassed.* ***(Schoolboy, FGD).***

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6.2.4 Teasing of menstruating schoolgirls

Teasing and discrimination against schoolgirls who are experiencing menses while in school has gone down significantly compared to a few years back. Disparities in the knowledge of menstruation were suggested to be a critical factor among the schoolboys. The majority of the schoolboys who participated in the FGDs feel that schoolgirls are also human beings who have the right to access education and concentrate just as boys do. Therefore, teasing them for experiencing the natural condition that girls do not have control over, is unfair.

> *…in this school, we no longer tease the girls who are in menses. Girls are also human beings who deserve respect and dignity. Moreover, they experience menses because God has made them in that way, they did not like to experience that way …* ***(Schoolboys, FGD).***

Most of the girls were in agreement with such findings, stating that they mingle with schoolboys regardless if they are on periods or not.

> *… boys used to tease and mock the girls during their periods, but I don't know what has happened. This behavior has not completely disappeared though….* ***(Schoolgirls, FGD).***

However, disagreement was also observed among a handful of schoolboys who reported persistently teasing the girls during the menses. Such schoolboys were of the view that menses is culturally unacceptable and girls who undergo such a situation should be restricted to remain home so if they disobey and come to school, then they deserve to be teased.

> *…some girls are not conversant with managing menses while in school, therefore it is advised that they remain at home during these times so as to avoid embarrassments related to soiling and smell. Besides, our traditions restrict girls in their periods to mingle with others. Those who disobey are being teased … Few friends are still teasing such girls as a way of teaching them…* ***(Schoolboys, FGD).***

6.3 Summary

This chapter has augmented the MHM results among schoolgirls by providing findings from the qualitative study. This gave insights into and lived experiences around the

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support that schoolgirls are provided with while in school during their menses. The following chapter will discuss the main results from the study.

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CHAPTER SEVEN: DISCUSSIONS OF THE FINDINGS

7.0 Chapter overview

This chapter provides a summary and interpretation of the findings presented in chapters 4-6 of my PhD thesis. The chapter provides an explicit linkage between the study findings and the existing literature and theoretical framework. The chapter starts with a discussion of the main findings around knowledge, attitude and practices related to MHM; school absenteeism; reported RTIs and psycho-social well-being in association with poor MHM among the schoolgirls. In addition, the chapter discusses the support provided by schoolboys and parents in relation to the MHM needs of adolescent schoolgirls. Lastly, the limitations, strengths and weaknesses of the study are discussed.

This study was framed to answer the six research questions as presented in the results chapters 4,5 and 6. The study found a high reported prevalence of STIs/RTIs among the learners in LMICs; a high reported prevalence of poor practices of MHM; a high reported prevalence of school absenteeism and teasing related to menses; and reportedly increasing support of schoolgirls to manage their menses while in school. In addition, the study assessed the extent to which the socio-ecological model underpinned the relationships between multiple external and internal factors that led to poor MHM in schools.

7.1 Prevalence and factors associated with poor knowledge of MHM

I found that, despite the fact that majority of the schoolgirls in this sample having heard about menstruation as a biological process that a woman undergoes as she transitions from childhood to adulthood, more than half of them had inadequate comprehensive knowledge regarding MHM. For example, 55.5% of the schoolgirls had poor knowledge regarding MHM. My finding is lower compared to the most recent Tanzania national estimates of 65% (NIMR, 2021). In addition, the other two studies conducted in Ethiopia and Ghana showed that the good knowledge of MHM in those countries was between 65% and 72% respectively (Bulto, 2021, Shumie and Mengie, 2022, Boakye-Yiadom et al., 2018). However, my finding is in agreement with studies conducted in Ethiopia and Kenya of between 32 and 52% respectively (Korir et al., 2018, Belayneh and Mekuriaw, 2019). Furthermore, another study from Bhutan among college students on knowledge on MHM was as low as 35% (Tshomo

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et al., 2021). The difference between my study and theirs might be due to the different populations studied, varied socio-economic status, access to MHM education and settings. Most of the studies compared in knowledge related to MHM were conducted among the secondary schoolgirls and in urban areas. Whereas, my study was conducted in rural areas where it is possible that access to information on MHM might be low compared with urban areas. Again, secondary schoolgirls might be more knowledgeable and experienced compared to those in my study population of primary schoolgirls. These findings indicate a need for more interventions on MHM knowledge targeting the pupils in primary schools in areas like Kilindi district. This is because in my study setting a remarkably low reported percentage, only about thirty percent of the schoolgirls said they freely discussed menstruation.

This study found that living with parents was associated with good knowledge of MHM. For example, schoolgirls who reported living with both parents were more likely to have good knowledge about menstruation and MHM compared to those girls living with single parents. These findings are in line with studies conducted in Ghana which showed that living with mothers only, was associated with poor menstrual knowledge (Boakye-Yiadom et al., 2018). This might mean that girls living with both parents are likely to have information on MHM from both parents and other relatives at home compared to those living with single parents. In addition, perhaps single mothers are very busy and have less time to discuss MHM with their daughters.

In addition, the study found that schoolgirls from households with more than seven members were more likely to have good knowledge about menstruation and MHM compared to those with three family members. This result might be attributed to the access of information that the girls have been able to obtain from a larger number of people in contrast to those with fewer f members. However, I did not explore this further to find out the composition of such household members in terms of their age, additional number of female members of the family, level of education, their relationship to schoolgirls, their knowledge about MHM and how frequently they discussed this with schoolgirls. Further studies should be conducted in similar settings to Kilindi district to determine the households members' influence on schoolgirls' MHM knowledge.

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7.2 Prevalence and factors associated with poor practice of MHM

I found that 63% of schoolgirls were practicing poor MHM. This result is in agreement with studies conducted in Indonesia and Lao PDR (Sychareun et al., 2020, Davis et al., 2018). However, it is in disagreement with studies conducted in Ethiopia and Ghana which reported good practices as high as between 52% and 85% (Shibeshi et al., 2021, Asumah et al., 2022, Mohammed Gena, 2020). The observed differences might be due to the study population involved as my study targeted primary schoolgirls in rural districts of Tanzania, contrary to most of the studies which focus on secondary schoolgirls. These primary schoolgirls like those in Kilindi district in Tanzania lack MHM education and information at school; money to buy sanitary pads, disposal facilities, and water. Therefore, they are likely to face stigma and hesitation from parents and guardians to discuss menstruation and its related hygiene practices. Besides, in spot checks on the MHM facilities I found that none of the participating schools had separate changing rooms or emergency sanitary pads for girls who are in menses which may increase the chances of practicing poor MHM in the Kilindi district.

In addition, all the participants in this study reported using any kind of absorbent materials to manage menstruation. Similar results were observed in the studies conducted in Bangladesh, Ethiopia, Nigeria, Ghana, Uganda and Indonesia that also reported high rate use of any available menstrual materials whereby commercial disposable sanitary pads were predominant and preferred due to availability and accessibility (Van Eijk et al., 2016, Ahmed et al., 2021, Mohammed Gena, 2020, Boakye-Yiadom et al., 2018, Miiro et al., 2018, Belayneh and Mekuriaw, 2019, Sahiledengle et al., 2022, Okafor-Terver and Chuemchit, 2017, Biruk et al., 2018, Shallo et al., 2020, Bulto, 2021, Davis et al., 2018). This high use of any kind of menstrual materials observed in the Kilindi district might be the attributed to the knowledge that schoolgirls have as a result of various reproductive health programs implemented by some NGOs including Amref Health Africa that are involved in provision of SRHR education and provision of menstrual materials. Nevertheless, further rigorous evaluations need to be conducted to obtain the attribution of the programs.

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Furthermore, the most predominant absorbent materials reported by more than half of the girls were commercial disposable sanitary pads. Similarly, studies in Bangladesh, Ethiopia, Nigeria, Ghana, Uganda and Indonesia confirmed such preference among the schoolgirls (Ahmed et al., 2021, Mohammed Gena, 2020, Boakye-Yiadom et al., 2018, Miiro et al., 2018, Belayneh and Mekuriaw, 2019, Sahiledengle et al., 2022, Okafor-Terver and Chuemchit, 2017, Biruk et al., 2018, Shallo et al., 2020, Bulto, 2021, Davis et al., 2018). This suggests that despite schoolgirls living in rural areas, availability, affordability, and promotion of commercial disposable sanitary pads led to their use. This calls for the intensification of the programs to support the girls in using the commercial disposable pads as more hygienic materials.

Moreover, I found that about three-quarters of the schoolgirls reported changing their pads or menstrual clothes daily. This finding is low as compared to those found in Ghana and Ethiopia, whereby the majority of the schoolgirls were changing their sanitary pads once to three times a day (Mohammed Gena, 2020, Mohammed et al., 2020). The reasons for this difference could be socio-economic, as well as awareness of the importance of changing the sanitary pads at least three times a day. Therefore, more education is needed for the schoolgirls, parents and other stakeholders that promote the accessibility, affordability, use and proper disposal of MHM products, which enhance frequently changing of the pads. As frequently changing sanitary wear is associated with decreasing the risks of RTIs (Kerubo et al., 2016).

On the other hand, disposal of used sanitary materials remains as one core component of good MHM. Thus, any improper discard of such material jeopardizes the quality of MHM. My study found that about 40% and 26% of the schoolgirls were disposing of the used sanitary pads by burning and throwing them in latrine pits respectively. Similar results were seen in the most recent national representative study conducted in Tanzania (NIMR, 2021). A study conducted elsewhere also supports my finding by highlighting the preferred disposal approaches identified in my study (Davis et al., 2018). In addition, my finding is supported by a qualitative study from Zambia (Chinyama et al., 2019). This finding suggests that interventions related to education coupled with the provision of incinerators and important facilities for the disposal of the used menstrual materials is important to be implemented.

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In terms of personal hygiene during menstruation, I found that about three-quarters of schoolgirls reported bathing with soap daily during menstruation, while the other two-thirds were reported to clean their external genitalia during menstruation with soap and water. It is assumed that such high rates of cleaning could be due to the education provided to schoolgirls during menarche and the availability of water in schools, this is due to the implementation of the WASH programs in schools in Kilindi district though further studies are needed to confirm this assumption.

In this study I found that the geography of living was associated with good practices of menstrual hygiene. For example, schoolgirls who were living in semi-urban areas were twice as likely to practice good menstrual hygiene compared to those who were living in rural areas. This finding is in line with studies conducted elsewhere (Korir et al., 2018, Belayneh and Mekuriaw, 2019, Davis et al., 2018, Shallo et al., 2020, Mohammed and Larsen-Reindorf, 2020). Possible reasons for such a finding in Kilindi district could be that the semi-urban areas are more developed, and their parents engaged in formal jobs with stable income and thus have access to water and other sanitation facilities than rural areas. Moreover, access to MHM information through media particularly television, as well as easier access to and sanitary pads may give the schoolgirls living in semi-urban areas an advantage over their counterparts living in rural areas.

The study also found that schoolgirls who had heard about menstruation by the time they were 12 years old had a greater likelihood of practicing good MHM than those who heard while they were 11 years old. A possible explanation for this could be that older girls tended to follow the information better and ask more questions than younger ones, or maybe they were provided with information only once they had started menstruating. Again, sources of information such as female relatives were probably more likely to give detailed explanations on MHM to the older girls than to younger ones. This would facilitate the knowledge and later the good practice of the MHM among older girls.

Regarding embarrassment in relation to MHM practices, I found that schoolgirls who had ever experienced embarrassment related to menstruation were more likely to have good practices of MHM compared to those who had never experienced

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embarrassment. This finding is consistent with one study carried out in Kenya (Korir et al., 2018). A possible explanation for this finding is that after experiencing embarrassment due to leaking of menstrual blood, schoolgirls tended to be careful and took all necessary precautions during their subsequent menses. This may have led to good MHM practices and less likelihood thereafter of being embarrassed by leaking blood, for example. This could be supported by the finding from my qualitative study in FGD with female parents, who described how well they knew the adequacy of school MHM facilities. If they deemed them to be inadequate, they may be hesitant to allow their daughters to go school during menses, to avoid embarrassment when blood stains are seen by schoolboys.

In addition, my study found that schoolgirls who reported that their source of information on menstruation was the media were less likely to practice good MHM as compared to those whose source of information of menstruation was teachers. This might be due to the fact that the media are likely to produce superficial messages that may be difficult to understand. In addition, it might be that schoolgirls feel more comfortable to access the information from the teachers than the media. In the qualitative component of this thesis, during the interview with a district official, the study found that the district had plans to build the capacity of the teachers both male and female to address the issues related to menstruation in schools. This finding underscores the need for MHM studies to understand the role and capacity of the teachers in teaching MHM; and empowering the teachers with knowledge and skills.

Furthermore, the study also found that schoolgirls from families with households with more than seven members are less likely to practice good MHM compared to those with three family members. This may be as a result of the high number of family members needing access to wash and sanitation facilities, so that there is more intense competition for necessary resources for MHM like WASH facilities and sanitary pads. There is a need to further understand the reasons for such differences.

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7.3 Prevalence of school absenteeism and factors associated with MHM

In this study, about thirteen percent of the girls reported having ever missed at least one school day in a month in relation to menstruation. This finding from the current study seems to be slightly lower as compared to the most recent Tanzania national estimates which reported the prevalence of 16.8% (NIMR, 2021). However, the observed findings in other studies are deemed to be between 20-30% in some African countries including Uganda, Gambia, Burkina Faso, Niger and Nigeria (Shah et al., 2019, Hennegan et al., 2021, Miiro et al., 2018). Other studies conducted in Indonesia reported similar or lower rates of absenteeism as compared to what we obtained in Kilindi district (Davis et al., 2018). The possible reasons for such differences could be the socio-economic status of the study population and availability of the menstrual materials and facilities at the schools as some of the governments and NGOs are providing free or subsidized rates for the products. In addition, different research methodologies used could be another reason for differences observed. Systematic or scoping literature reviews should be carried out to better understand the magnitude of the differences within and across the countries.

The mean days of reported school absenteeism was 1.3 days. This finding is low compared to those reported in studies conducted across LMICs, which range from 1.6 to 2.8 every month (Wilson et al., 2014, Alam et al., 2017). A possible explanation of the low average of recorded days missed in my study could be the Kilindi districts' initiatives such as the occasional provision of sanitary pads to girls through NGOs, and ongoing campaigns to ensure that all girls never miss school. However, the reasons for this need to be evaluated more rigorously.

I found that fear of leakage or blood stains and lack of absorbent materials were the main reasons for missing school while on menses. This is consistent with findings from studies conducted in different LMICs (Sivakami et al., 2019, Shrestha et al., 2022, Vashisht et al., 2018, Hasan et al., 2021, Alam et al., 2017, Kumbeni et al., 2021). Therefore, the interventions targeting increased knowledge and reduction of stigma towards the menses among students and teachers is important. Moreover, developing policies and programs that will increase the accessibility and affordability of hygienic sanitary pads for the schoolgirls will help them to attend school without barriers.

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Surprisingly, this study found the association between school environment and absenteeism. Interestingly, in this study I found that girls studying in schools with adequate MHM facilities were more likely to miss school as compared to those from inadequate MHM schools. However, this finding is in contradiction to studies conducted elsewhere (Miiro et al., 2018). The observed difference in my study could be due to the fact that the current study targeted primary school girls who possibly had newly started menstruation, thus their parents or guardians might have had an influence in inhibiting girls not to go to school while on menses. Further studies should be conducted to explore the reasons for such findings.

As expected, I found that those girls with poor MHM practices were more likely to miss school as compared to those with good practices. This finding is in line with a study conducted South Africa (Khamisa et al., 2022). Therefore, interventions focusing on knowledge related to MHM should be promoted among schoolgirls from the early stages of education. This will promote hygienic and private management of menses while in school and thus promoting school attendance.

Furthermore, schoolgirls who have never experienced embarrassment while in school were reported to have increased risk of missing school during menstruation compared to those who have experienced embarrassment. This might be because schoolgirls who have experienced embarrassment tend to acquire knowledge through difficult experiences, thus learning how to take care in their subsequent menses by having the necessities for the MHM, such as sanitary pads and support during menses. Upcoming counselling and guidance intervention programs should also focus on the schoolgirls who have experienced embarrassment and those who have not.

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7.4 Prevalence of fear and embarrassment related to poor MHM

In this study, about a quarter of schoolgirls reported having been embarrassed during periods while in school. Studies conducted in Bangladesh and Uganda showed a slightly higher rate of prevalence in comparison to this study - 30% and 46% respectively (Hennegan et al., 2016a, Davis et al., 2018). In addition, previous studies in Tanzania and Kenya each reported that 13% of the schoolgirls had been embarrassed during their periods (Korir et al., 2018, Benshaul-Tolonen et al., 2019). There is a difference in terms of the findings obtained in these studies compared to the current study. This might be due to the different methodologies used. More studies are needed to confirm such findings.

In addition, more than 80% of schoolgirls in this study feared of being teased during menstruation. The main reasons for such fears are related to menstrual odor and blood leaking. The same findings were observed in studies conducted in Tanzania and elsewhere (Hennegan et al., 2016a, Benshaul-Tolonen et al., 2020a). In such a situation, it is important to develop and implement an educational intervention targeting both schoolboys and schoolgirls to reduce stigma related to menstruation.

I found an association between fear and embarrassment and the source of information about menstruation, whereby the schoolgirls relying on the media and other relatives had an increased risk of being embarrassed, as compared to those who depend on their teachers. This finding suggests that teachers are probably likely to provide accurate menstrual information as compared to other sources. Media information might be too superficial, and other relatives might not be knowledgeable about the subject. This would decrease schoolgirls' confidence and ability to deal with challenges related to embarrassment and fear. However, more studies need to be conducted to substantiate our premise.

In addition, those who did not freely discuss menstruation were more likely to be embarrassed compared to those who discuss it. This could be due to the fact that they lacked information and the capacity to explain the situation of menses they are experienced at that particular moment, although further studies are needed to justify this.

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7.5 Prevalence and factors associated with STIs/RTIs related to poor MHM

Results from the rapid scoping literature review and the quantitative findings in this thesis show that the reported prevalence of the STIs/RTIs among adolescent schoolgirls in LMICs is relatively high. In the rapid scoping review of 28 papers, I found that in less than half of the studies had used a combination of laboratory-confirmed tests and self-reported information to establish the prevalence of STIs/RTIs, the prevalence was between 7.5% and 28.7%. My study results are inconsistent with other studies that estimated the prevalence of STIs/RTIs in different populations and countries in some country contexts. For example, a systematic literature review conducted in India by Nagarkar and Mhaskar reported a prevalence of between 11 to 72% (Nagarkar and Mhaskar, 2015). Whereas a scoping review of literature from Tanzania reported the prevalence of STIs, excluding HIV infection to be as low as between 0.1 and 13.7% among adolescents 12-19 years old (Nkata et al., 2019). This suggests that the differences between my study and others might be due to the different geographical locations of the studies, methodologies including the inclusion and exclusion criteria, and/or the sample size of the study involved in scoping reviews. In addition, the fact that some studies reviewed literature in one country might suggest the under-reporting or over-reporting of STIs/RTIs within those countries, compared to the studies I reviewed which had a regional focus.

In my rapid scoping review, I noticed a relatively high prevalence of the STIs/RTIs in the studies that used a self-reporting approach to estimate the prevalence compared to laboratory confirmed reporting. For example, in one of the studies that asked schoolgirls if they have any symptoms suggestive of the RTIs, showed that 88% reported to have at least one (Mathiyalagen et al., 2017). In addition, one of the studies in Kenya reported that girls may be underestimating or inaccurately reporting their RTIs related symptoms. In the Kenyan study, initially reported the occurrence was 23.9%, however, after their samples were taken to the laboratory for confirmation the prevalence rose to 28.2% (Kerubo et al., 2016). In the quantitative study component of my thesis the prevalence through self-reporting was six percent. These were schoolgirls who reported having at least one or more symptoms suggestive of the RTIs in Kilindi district. The reported prevalence from my study is low compared to those conducted in Tanzania and elsewhere (Nabwera et al., 2021, Cherenack and Sikkema, 2021, Adegun and Amu, 2017). Once again, the disparity may be due to differences

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in the study population, as few studies among the primary schoolgirls were conducted compared to secondary schoolgirls. Studies in primary school that use a comprehensive questionnaire with laboratory confirmed-tests are likely to lead to a more accurate result, overcoming the bias in self-reporting in a school context. Arrangements for screening interventions for RTIs that link schoolgirls diagnosed to health facilities for further management of RTIs/STIs earlier would be helpful.

My rapid scoping review found that the *Bacterial Vaginosis (BV)*, *Human papillomavirus* (HPV) and *Trichomonas vaginalis* to be the most prevalent RTIs/STIs reported among the school-going girls in LMICs, particularly when the laboratory-based tests were conducted (Crucitti et al., 2011, Francis et al., 2019). In addition, coinfection of BV and STIs was common (Mehta et al., 2021). The same results were observed in studies conducted among the adult women in Africa (Stewart et al., 2020, Jarolimova et al., 2022). Furthermore, studies found those that were healthy and asymptomatic to BV and *trichomonas vaginalis* were between 50.0% and 75.0% respectively (Juma et al., 2017, Kerubo et al., 2016). Since most infections are asymptomatic, if they are not diagnosed early and don't receive proper management these might cause long-term implications for the schoolgirls later in their lives. This calls for further studies to understand the magnitude of the problem to be conducted hand-in-hand with the regular screening of RTIs in schools. In my quantitative study, I found that the most common symptoms of RTIs self-reported by the schoolgirls were; a pain in vagina/lower abdomen (32.3%), burning micturition (19.4%) and Skin irritation/rashes (19.4%). Initiating screening and testing for the STIs/RTIs in schools with girls reporting some of these common symptoms can be used to detect if the schoolgirls have the infection or not. My study did not investigate the distribution of the reported RTIs across different socio-demographic characteristics, therefore it is unable to determine which group age was reportedly affected most. We recommend such studies be conducted in the future.

In the rapid scoping review, the majority of the studies reported an association between the poor MHM and RTIs/STIs among the schoolgirls in LMICs. The association was particularly shown in relation to poor MHM knowledge, use of unhygienic absorbent materials; and inappropriate vaginal cleansing during menstrual periods (Ali et al., 2017, Bhattacharyya et al., 2015, Cherenack and Sikkema, 2021, Mathiyalagen et al.,

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2017, Juyal et al., 2014). This finding is also supported by the results from the quantitative component of my study. I found that there is an association between reported RTIs and poor MHM. For example, there were decreased risks of reportedly getting RTIs among schoolgirls from schools with adequate MHM facilities compared to those with inadequate facilities. A similar finding was noticed in a study conducted by Nabwera et al (2021) in Gambia in whereby they found that girls from school with adequate WASH facilities were less likely to get RTIs (Nabwera et al., 2021). The studies in my rapid literature scoping review were reported to have wide heterogeneity, implying geographical variations. Hence results appear to be generalizable to different settings. However, the methodological differences across the reviewed studies such as study designs, sample size, validation of the tools and laboratory-confirmed tests; and the control of the confounders are among the issues that limit the generalization of the findings on a regional basis. It is imperative for the governments in collaboration with other stakeholders, to design interventions that will increase availability and utilization of the: the MHM education, social support, materials, and facilities.

My rapid scoping review of literature found that eight studies reporting a prevalence of STIs/RTIs of between 8.4% and 39.0% amongst schoolgirls who had never had penile-vaginal sex (Houlihan et al., 2014, Mehta et al., 2021). These results may be a proxy of poor MHM practices and the associated factors for presence of infections in the said populations. However, this cannot be determined, hence more studies using the rigorous methodologies should be conducted to establish the available strong associations or cause-effects relationships between poor MHM and STIs/RTIs among schoolgirls who never had penile-vaginal sex. It is necessary to uncover the reasons for this or if there is indeed an association in order to develop appropriate interventions.

In my rapid scoping review, the reported health-seeking behavior for those schoolgirls who had reported RTIs/STIs was between 12% and 63%. This is particularly when treatment was not provided as part of the study (Adegun and Amu, 2017, Pavithran et al., 2015). However, there were limited studies in this rapid scoping review that evaluated the health-seeking behaviors of the schoolgirls. The available findings are contrary to my associations in the quantitative component of my study, in which all schoolgirls who had symptoms suggestive of RTIs sought treatment from either health facilities or advice from their relatives. The high reported uptake might be linked to

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sensitization activities available at youth-friendly centers within the district. This needs to be further investigated. Given the high possible prevalence of the RTIs/STIs in the target population, understanding the treatment-seeking behavior remains critical in order to inform the future programs and policies on the utilization, needs, preferences and affordability of treatment. None of the reviewed studies assessed and described factors that either hinder or influence respondents in seeking treatment services. If such studies were conducted, programs and policies would be in a better position to plan and implement appropriate services for the adolescent schoolgirls. Furthermore, adolescent schoolgirls would be more likely to seek and utilize appropriate care provision from the appropriate and competent practitioners within their reach, and prevent the progression of infection and related complications. This is a wake-up call for conducting comprehensive scoping or systematic analysis or original research on the topic, so that they are useful to inform programs and policies.

7.6 Support from the parents and schoolboys during menses schoolgirls

In this current study, I found that mothers admitted to being the primary supporters of their daughters during menses. Mothers reported guiding their daughters on how to hygienically handle themselves during the menses and sometimes to seek guidance from their teachers especially if they find any difficulties while in school. There was evidence that mothers also advised their daughters not to go to school on those days of menses particularly when girls were feeling uncomfortable or had no sanitary materials. However, despite the fact that they are so supportive, mothers' advice and guidance is based on their experience of going through the same process as their daughters and some of the mothers lack technical knowledge of menses. Thus, mothers are unable to answer some of the questions asked by their daughters on the subject. The same observation was noted in the study conducted in Uganda, Kenya, Mali, and Zambia (Miiro et al., 2018, Chinyama et al., 2019, Kansiime et al., 2020, Boosey et al., 2014, Trinies et al., 2015, Hennegan et al., 2017, Crichton et al., 2012, Sommer et al., 2015a). In my study, there was a wide age range among the parents who participated. This could have impacted their support for the girls. Older or younger parents (this may be explored further) might have greater knowledge and experience to support their daughters. My PhD study is one of the fewer available types of evidence sought to understand the support provided by mothers, thus adding to the body of knowledge. Further research should be designed to seek a deeper

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understanding about menstruation and its management among the female parents. Interventions should be designed to equip the mothers with the knowledge rather than based on assumptions that mothers have comprehensive knowledge of MHM.

It appears that male parents may be becoming responsible for MHM in school by providing their daughters with funds to buy sanitary materials. The findings show that some male parents were reported to be directly buying and proving the sanitary pads for their daughters. This was also confirmed by the schoolgirls and schoolboys in the FGDs I had with them. A similar finding emerged by studies conducted in India, South Sudan and Uganda that demonstrated that male parents were providing support for their daughters by buying sanitary pads (Hennegan et al., 2017, Mahon et al., 2015, Atari et al., 2021). In my quantitative study component, I found that all the girls reported having received either sanitary pads or money to buy them. In addition, sixty percent reported receiving pads or money from the parents, without specifying if the parent was male or female. However, it appears from my findings that support for girls makes boys uncomfortable. Boys felt that girls were favored by their parents as they received more pocket money. Thus, intensive MHM education programs that explain the needs of adolescent girls are important to prepare boys to become supporters of MHM and later, responsible fathers.

I found that schoolboys reported having witnessed several events of girls soiling their garments during menstruation. However, it was after learning from their health clubs at school about menstruation, they learned to be supportive to the girls by providing them with privacy during emergency menses. Schoolboys reported either leaving class or engaging in other things that would take them out of the class to create comfortable environments and a chance for the girl who soiled the garments to go to the toilets for changing. This finding aligns with those from the quantitative study, which show that 10% of the girls reported that their schools provided some form of support to girls during the menses. However, the number of such schools and initiatives is too low to bring about desirable change for the schoolgirls. Therefore, different approaches are needed to impart education and information to the boys, particularly those who perceive MHM as not requiring the participation of the boys. This would reduce stigma and increase their support for the girls.

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I found that the teasing and discrimination against schoolgirls seems to has been reduced over the years in the study area. The majority of the schoolboys reported that awareness of human rights and gender equality had helped them to support girls and stop teasing them during menses. In addition, some of the schoolboys felt that this was a girl's and women's matter, and that girls should not be blamed for coming to school and soiling their garments. Instead, schoolgirls should be supported. This is in line with findings from Uganda and India (Mason et al., 2017, Kansiime et al., 2020). Nevertheless, some schoolboys in my study reported feeling that menses is the responsibility of girls and if they are at risk in coming to school of soiling their garments, they should rather they should remain home. This calls for the intensification of menstruation education among schoolboys so as to reduce stigma and help them to become responsible and supportive.

7.7 PhD original contributions to the literature

This PhD study made efforts to tackle research gaps identified in the literature among the schoolgirls. It makes important and original contributions to literature and the fields of sexual and reproductive health; and water hygiene and sanitation. To my knowledge this is among the first studies of this kind, to be conducted in Tanzania among primary schoolgirls, schoolboys and parents in a rural district. Most studies have rather been conducted in urban areas targeting secondary schoolgirls and teachers. In addition, it shows an association, although not causal, between poor MHM and reported STIs/RTIs among schoolgirls. It also provides new data on support provided by parents and schoolboys to the schoolgirls during their menses. Policy makers and programmers in public and non-governmental organizations can benefit from the evidence generated on the effects of poor MHM on education and SRH . This can assist in designing interventions to curb the effects of poor MHM for schoolgirls.

7.8 Strengths and limitations of the study

Among the strengths of my rapid scoping review of literature, is the inclusion of all studies conducted 12 years back targeting MHM among adolescent schoolgirls with reported STIs/RTIs when the importance of MHM was starting to gain attention. All studies included in these reviews were heterogeneous in terms of the study settings, study designs, and approaches used for assessing the outcomes of interest. As I have pointed out, it brings both advantages and disadvantages. Furthermore, the review

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focused on all STIs/RTIs and their association with the poor MHM, rather than only reported STI/RTIs. In addition, the results from quantitative findings can be generalizable to Kilindi district and similar settings. The qualitative study elucidated different perspectives from male parents, female parents, schoolboys, schoolgirls, and key informants from the district. My study is one of the few studies conducted in Tanzania and other parts of SSA targeting male parents, female parents and schoolboys. My study maintained the quality and control of data collection, analysis and presentation. The findings from my study's quantitative component can be generalized to the similar contexts like the Kilindi district and others with limited knowledge and information on menstrual materials; WASH facilities and social support.

The review has several limitations. Firstly, my review assessed only articles published in English, lack of knowledge of other languages restricted me from reviewing articles published in other languages that evaluated the same subject. That may introduce some bias. I made efforts to ensure that the full articles were obtained in order to ensure that all the needed information for review was in place for the analysis. Hence, despite this my review provides a broad overview of STIs/RTIs in relation to poor MHM in LMICs that may inform further research and programs for adolescent schoolgirls. Secondly, my review did not assess the quality of the articles, as would be done in a systematic literature review. As it was a scoping review it placed greater emphasis on the content of literature.

The quantitative study was a cross-sectional study that collected the data at one point in time, therefore it is not possible to show causal-effect relationships between the poor MHM and other outcomes of the interests. Even if it was a longitudinal study this likely would have been difficult to show. Only experimental studies could establish causal effects. It would not carry out an experimental study ethically. The study made efforts to recruit research assistants to conduct the research who were familiar with the socio-cultural settings of participants and experience in conducting similar research. Despite assurances that the information collected would be anonymous self-reporting in assessing the prevalence of RTIs, there are risks of over-reporting or under-reporting of the responses. There may have been socially desirable responses expressed in some cases. Clinical examinations and laboratory tests are a more

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accurate measure of the prevalence of RTIs and STI. It was not possible to do biological measurements in the study setting. In the qualitative study, in the selection of particularly parent participants, I had to rely on the opinion of the teachers who helped in the recruitment of the participants, which may have led to bias.

7.9 Conclusion and summary

The rapid scoping review was conducted to contribute to the existing evidence base on the prevalence and patterns of RTIs/STIs associated with poor MHM; and health-seeking behavior among adolescent schoolgirls in LMICs. The findings from the reviewed literature showed that the prevalence of STIs/RTIs among adolescent schoolgirls is relatively high coupled with low treatment-seeking behavior. Although this evidence was limited by differences in methods and some of the data being self-reported. The reviewed evidence suggests the existence of an association between poor MHM and STIs/RTIs. The studies' limitations mentioned above indicate an unmet need for research into STIs/RTIs using a combination of self-reported and laboratory-confirmed tests to establish a more accurate prevalence and its association with poor MHM, using these strong methodological approaches.

The qualitative study provided some insights that parents, particularly males, and schoolboys could be important agents for change in pushing forward the MHM agenda. The study findings show that schoolboys and male parents were mostly supportive and sympathetic to the schoolgirls, and some have been providing the necessary support needed. In order for the support to continue being provided t further research should be conducted to explore the needs of the males in education and information on MHM. In addition, intervention programs and policies targeting schoolboys and male parents should focus more on addressing stigma related to MHM.

Chapter 7 presented a discussion and interpretation of the main findings of the study from all the three phases. The last chapter will present conclusions and recommendations for policy, intervention programs and future research considerations.

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CHAPTER EIGHT: CONCLUSION AND RECOMMENDATIONS

8.0 Chapter overview

The previous chapter provided a summary description of the results, findings and their interpretation. In this final chapter of the thesis, I provide the conclusion and recommendations, synthesizing all three phases of the study. In addition, I again describe the original contribution the study has made to the body of available knowledge. The chapter further describes the research implications of MHM among adolescent schoolgirls. The chapter highlights recommendations for actions, policies and suggestions for further research in the area of MHM among schoolgirls in Tanzania.

8.1 Conclusion

The purpose of this PhD study was to determine and describe the effects of poor MHM among adolescent schoolgirls in rural Tanzania. The scarcity of evidence, particularly focused on primary school girls, was the rationale for conducting this study, to inform policy and subsequent interventions. The rapid scoping review of studies conducted in LMICs showed that RTIs/STIs were prevalent among schoolgirls and associated with poor MHM, coupled with low uptake of the utilization of treatment. The prevalence of poor MHM among the learners was alarmingly high among the schoolgirls in Kilindi district, Tanzania.

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Poor MHM associated with RTIs, school absenteeism and psycho-social stress was related to fear and embarrassment. More sources of information about menstruation, availability of MHM education in school, MHM practices, experience related to embarrassment while in school during menses, the availability of adequate MHM facilities in school; and free discussions on menstruation with others are important. Despite the need for more information and knowledge, although there were exceptions, qualitative findings revealed that male and female parents and schoolboys were primarily supportive to girls during menses by providing them with material and moral support. This tallied with the findings from schoolgirls. Although the evidence is limited, there is a need to strengthen the health systems by empowering the primary health care facilities to screen, diagnose and manage the RTIs/STIs among schoolgirls. In addition, education, support and provision of MHM facilities programs should be

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provided to improve the health and education of girls to enable the full realization of their dreams.

8.2 Research implications and recommendations

The effects of poor MHM on school absenteeism, psycho-social stress and RTIs have predisposing and enabling factors at multiple levels as suggested by the Socio-Ecological Model (SEM). The SEM shows the factors enabling or impeding individuals arise from the entire environment in which an individual lives. The study was able to describe the ages of the girls, sources of information regarding MHM and how many times pads are changed, that all may impact menstrual hygiene practices. In planning and considering MHM services and interventions at school, at the individual level, issues such as knowledge, attitude and practices related to MHM need to be given important consideration.

Secondly, at the family and school level, schoolgirls require support from their parents/guardians, both males and females, and schoolboys. In order for the schoolgirls to attend school and to manage emergency menses while in school, they need support from parents and school to provide them with the necessary means for managing menses including sanitary pads and counselling. In addition, open discussions and reduction of menstrual stigma will enable the girls to open up and feel safe and comfortable in school. Involvement of the parents and schoolboys will help girls to effectively manage their menses.

Lastly, at the community and structural levels, changes in policy and practice are needed to ensure the availability of MHM facilities, information, sanitary materials and regular screening of RTIs, to support schoolgirls to effectively be able attend schooling. In addition, the community should receive the necessary education through available, appropriate forums so as to dispel some of the negative connotations of menstruation, which fuel poor MHM in schools.

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8.3 Recommendations

8.3.3 Recommendations for further research

My thesis contributes evidence that adds to the body of knowledge on understanding the effects of poor MHM on school absenteeism, RTIs, and fear and embarrassment among the schoolgirls.

The findings show that there is a high prevalence of poor knowledge and practices of MHM among primary schoolgirls in Kilindi district, Tanzania, which are associated with school absenteeism, RTIs and psychosocial wellbeing. However, there are a number of gaps in my research that would benefit from future research:

1) Most of the reviewed studies in the rapid scoping review of literature and the quantitative component of the study, measured the prevalence of the RTIs among the schoolgirls relying on self-reported suggestive symptoms of RTIs. In the future, to establish the more accurate prevalence of STIs/RTIs and its association with poor MHM, it would be valuable where possible, to obtain a combination of data on self-reported and laboratory-based tests rather than self-reported data alone.

2) There is a need to conduct a study to understand the low levels of reported health-seeking behavior related to STIs/RTIs and factors affecting utilization among adolescent schoolgirls.

3) It would be valuable to conduct comprehensive research to explore the relationship more accurately between girls from schools with adequate MHM facilities being less likely to acquire RTIs compared to those from inadequate facilities.

4) Longitudinal studies should be carried out among schoolgirls to understand the attribution of other factors such as socio-economic and home environments, including parents' education, income, to girls' poor knowledge and practices related to MHM while in school and how this may change over time.

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5) Mixed methods studies should be conducted to understand the role of male parents, schoolboys and male teachers on their perceptions and attitudes towards provision of the social support to the schoolgirls, to manage the menses while in school.

8.3.1 Recommendations for actions

Issues need to be resolved in school so as to eradicate poor MHM, which is mainly underscored by the poor MHM facilities, poor education and information, and inadequate social support and menstrual materials. The following recommendations are suggested for the different actors at district and national levels:

1) I recommend that education and awareness creation programs on MHM should be implemented in schools, targeting all adolescent schoolboys, teachers and parents. The education should focus on practices related to MHM, the prevention of RTIs, addressing stigma reduction and provision of support to schoolgirls. The government in collaboration with nearby health facilities, civil society organizations (CSOs) and school managements should design tailor-made programs and approaches, such as health clubs, debates and seminars to reach the target groups.

1) Government and CSOs development partners should work closely to ensure MHM facilities are available, by conducting their construction and rehabilitation so that schoolgirls can access them without any impediments. These should include facilities such as toilets, changing rooms, disposal facilities, water, and soap.

2) Teachers and health providers from health facilities near schools should be capacitated to conduct routine screening of the RTIs among the schoolgirls. This will enable them to detect asymptomatic RTIs among girls and facilitate their access to treatment. In addition, treatment of RTIs among adolescent girls and boys should be intensified and provided at primary health care through youth-friendly services, particularly in rural areas.

3) Emergency absorbent materials should be made available at all the times at school to support the schoolgirls during their menses. The government in collaboration

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with NGOs and school committees should make necessary arrangements to distribute emergency menstrual pads to needy girls.

4) Design of education programs and sessions targeting male parents and schoolboys are important to impart knowledge to support their daughters and sisters respectively. This will not only make them more responsible and supportive of current and future fathers, but will ensure that stigma and issues around teasing girls improves.

8.3.2 Recommendations for policy

The following policy recommendations are based on findings from my study to improve MHM in schools in Tanzania:

1) The government of Tanzania should develop an MHM strategy that will address access and utilization of quality and adequate MHM facilities in accordance with and in collaboration with the WHO and UNICEF.

2) The government should subsidize absorbent menstrual products and ensure that they are accessible to girls, thus ensuring they remain in school.

3) A national curriculum of reproductive health, of which menstruation and MHM are part, should be rolled out across Tanzania to pre- and post-menarche girls as well as to boys.

4) Policies related to SWASH including MHM facilities and education are being implemented and monitored regularly. The schools that perform best should be incentivized by the authorities.

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9.0 APPENDICES

Appendix A. Questionnaire for In-School Girls (English and Kiswahili)

Appendix B. Focused Group Discussion Guide for male and female parents (English and Kiswahili)

Appendix C. Focus Group Discussion Guide for schoolgirls and boys (English and Kiswahili)

Appendix D. Key Informant Interview with district officials (English and Kiswahili)

Appendix E. Checklists for School toilets/latrines (English)

Appendix F. Secondary Data Extraction Tool (English)

Appendix G. Ethical approval letters

Appendix H. Informed Consent Forms (English and Kiswahili)

Appendix I. Data use permission

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APPENDIX A.

a) Questionnaire for In-School Girls (English)

b) Questionnaire for In-School Girls (Kiswahili)

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(a)

Questionnaire for In-School Girls (English version)

The impact of Integrating Sexual and Reproductive Health Rights; and Water, Sanitation and Hygiene interventions to adolescent schoolgirls health in rural Tanzania

Introduction

1. Name of the interviewer……Date……..…..……
2. Village/School name……Ward……...District……

Good morning/afternoon. My name is _____. I am working for Amref Health Africa. We are conducting a survey about Sexual and Reproductive Health and WASH in Kilindi district. The information we collect will inform Amref Health Africa and other stakeholders; the community, health care providers, policy makers and the Government on specific best practices in addressing the adolescents with sexual and reproductive health services. The questions usually take about 60 minutes. All of the answers you give will be confidential and will not be shared with anyone other than members of our survey team. If I ask you any question you don't want to answer, just let me know and I will go on to the next question or you can stop the interview at any time.

Do you have any questions?

Do you agree to partake?

If agrees, take her/him through informed consent process

If declines also thank her/her and go to the next person

May I begin the interview now?

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No	Question	Coding	Skip
Section A. General questions			
1	How old are you?	Years……	
2	What is the highest level of school you are attending currently?	Current Grade:…….	
3	Where are you living?	a) Urban b) Rural	
4	What is your religion?	a) Christian b) Muslim c) I don't wish to disclose d) Others……..	
5	What is ethnic group	……..	
6	Present living arrangement	a) Both parents b) Single parent c) Others (specify)…….	
7	Family size	a) Three or less b) 4-6 c) More than 7 members	
8	Do you have access to the telephone	a) Yes b) No	
9	Do you have regular access to Internet	a) Yes b) No	
10	Do you have a boyfriend?	a) Yes b) No	
11	Have you ever heard about menstruation?	a) Yes b) No	
12	At what age did you hear about menstruation for the first time?	Age……..years	
13	Where did you get the information about menstruation? (you can circle more than one response)	a) Mother b) Sister/aunt c) Grandmother d) Friend e) Any Media f) Reading g) If Other (Specify)……	
14	Is there MHM education in your school	a) Yes b) No	
15	If your answer is 'Yes; by whom? (you can circle more than one response)	a) Teachers b) School Clubs c) School Mini-media d) Reading materials e) Others, specify ---------	
16	Have you stared menstruating?	a) Yes b) No	If **No**, go to **section G** on utilization of SRHR services
17	At what age did you begin menstruation?	a) Age in Year (…….) b) I don't remember	
18	Were you aware about menstruation during your menarche?	a) Yes b) No	
19	If yes what is the sources of the information?	a) Family b) Friend c) Radio d) Reading e) School f) Other/specify ---	

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Section B. Perception about Menstruation			
1	What is called menstruation in this locality? *(mention)*		
2	What do you think the cause of menstruation? *(You can circle one response only)*	a) It is a physiological process b) It is caused by a sin c) It is curse of God d) It is caused by a disease e) I don't know	
3	From which organ do you thing is the menstrual blood come from? *(You can circle one response only)*	a) Uterus b) Abdomen c) I don't know d) If other, specify____	
4	Do you think menstruation is a secret?	a) Yes b) No	
5	Why do you think is menstruation secret? *(You can circle more than one response)*	a) Due to culture and believes of the society b) Due to religion c) Due to Taboos d) If other, specify_____	
6	Do you freely discuss about menstruation issues with your family members or friends?	a) Yes b) No	
7	If yes, what are the issues you are discussing on	a) About MHM b) About use of sanitary pads c) If other, please specify_____	
8	If you don't discuss freely, why*? (You can circle more than one response)*	a) Shame b) Fear c) Taboos d) Not habitual e) Religious f) If other, specify-------	
9	What absorbent materials should be ideally used during menstruation? *(you can circle more than one response)*	a) Disposable sanitary pad b) Reusable and washable cloth pad c) Dispensable Rag or Pieces of cloth d) If other, please specify_____	
10	If the silence on Menstrual issues was broken, do you think the educational participation of girls would be increased?	a) Yes b) No	
11	In which factors do you think the women could be advantageous? *(you can circle more than one response)*	a) It could be avoided fear and shamefulness b) School girls' absenteeism will be decreased c) Educational performance of school girls will be increased d) School girls drop out will be decreased e) School girls' menstrual hygiene will be improved f) If others, specify ------	
Section C. Practice of Menstrual Hygiene Management			
1	Do you use any material to manage menstruation?	a) Yes b) No	
2	What types of material do you use to manage menstruation?	a) Disposable sanitary pads b) Disposable piece of rags	

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	(You *can circle more than one response)*	c) Reusable cloth d) Paper/toilet paper e) Factory made sanitary pads f) Reusable pads g) Mensal cup h) If others, specify____	
3	If you use sanitary pad, why?	a) Manage blood flow and maintain hygiene b) To relieve pain c) Instead of taking shower d) Don't know	
4	If you use reusable sanitary materials; where do put/keep your reusable materials after using or washing? (*you can circle more than one response)*	a) Hidden place b) Under the mattress of a bed c) Inside bag or cabinet d) Inside plastic bag e) If other, specify_____	
5	If you put it in hidden places, why do you put in hidden place? (*You can circle more than one response)*	a) Shame/disgrace b) Soiling/dirtiness of the rags c) Taboos d) If other, specify____	
6	Where do you dry your reusable sanitary pads and underwear?	a) Open sunlight b) Hidden place c) Other	
7	How often do you clean your external Genitals?	a) Once a day b) Twice a day c) More than twice in a day d) I don't wash daily	
8	How often do you change your sanitary pads?	a) Every hour b) Every 4-6 hours c) Daily d) Don't know	
9	What do you use for your external genital cleaning purpose?	a) Only Water b) Soap and water c) If other, specify____	
10	Do you clean genitalia in front to back motion water and soap during menstruation?	a) Yes b) No	
11	Do you take bath daily during menstruation?	a) Yes b) No	
12	Do you change underwear during changing pad	a) Yes b) No	
13	Is there any feeling of discomfort in your skins/ reproductive organ?	a) Yes b) No	
14	What type of discomfort do you feel*? (You can circle more than one response)*	a) Skin burning b) Skin itching c) Urinary Infections d) If other (specify)____	
15	Do you think your privacy in school is maintained during menstruation?	a) Yes b) No	
16	Why do you think your privacy is not maintained in the school? *(you can circle more than one response)*	a) Lack of toilet in school b) Common toilet for male and female students c) Lack of door for toilets d) Lack of water e) If other(specify)_____	

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Section D. Sanitation and Hygiene Facility in School			
1	Do you have toilet facilities in your school?	a) Yes b) No	
2	If your answer is No, what other alternatives do you use? *(You can circle more than one response)*	a) Remain at home b) Use Bush or Open Areas around school c) If other(specify)----------	
3	If your answer for question 4.1 is 'Yes'; does the school have separate toilet for girls and boys?	a) Yes b) No	
4	Does the school have separate room for menstrual girls to change their sanitary materials?	a) Yes b) No	
5	Does the toilet ensure privacy of girls to change their menstrual protection materials?	a) Yes b) No	
6	How do you dispose-off the used menstrual materials? *(You can circle more than one response)*	a) Throw in latrine b) Burning c) Throw in rubbish pit d) Wash and re-use e) Burying f) Throw away	
7	Does the school provide clean water and soaps to wash as required?	a) Yes b) No	
8	Do you wash hands after changing pad?	a) Yes b) No	
9	Uses soap water to wash hands after pad change	a) Yes b) No	
10	Do you clean genitalia after every toilet visit during menstruation?	a) Yes b) No	
11	Does the school provide proper waste disposal facilities as required	a) Yes b) No	
Section E. Information about Sanitary Pads			
1	Do you know some sanitary pads at your local market?	a) Yes b) No	
2	If your answer is 'Yes', what types disposable sanity pads do you know? *(You can circle more than one response)*	a) Eve b) Comfort c) Flexi d) If others, specify -----	
3	Are disposable sanitary pads available at your local market?	a) Yes b) No	
4	If your answer is 'Yes' for the above question 5.3, have you ever bought disposable sanitary pads from local shops?	a) Yes b) No	
5	If your answer is 'No' for Question No.5.4, why? *(You can circle more than one response)*	a) Expensiveness b) Not long lasting c) Both A and B d) 6I didn't reach menarche	
6	Who is providing your menstrual protecting materials? *(You can circle more than one response)*	a) Parents/families b) Schools c) NGOs d) Private e) If others, specify------	
7	Is there menstrual protection materials provided at your school?	a) Emergency menstrual pad b) Emergency piece of cloth c) Pain relief pills d) If, others, specify -----	

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Section F. Effects of Menstruation in Girls Health			
1	What are the problems that you faced at school during your menstruation period? *(You can circle more than one response)*	a) Cannot concentrate b) Feel physically sick at school c) Psychological effects d) Absent from school e) All of them f) None	
2	How many days of school have you missed in the last three months for menstruation related?	a) None b) One day only c) 2-3 days d) 4 days and more	
3	If schooling is missed, what were the reasons for your missing school during your periods?	a) Shame/fear of leakage/staining b) Had no pad or other material to manage period at school c) Didn't have enough or continuous water supply d) Pain or discomfort e) No place to throw away the pad or material f) No separate and private place or toilet for girls	
4	Have you ever experienced embarrassment of any kind during any of *your periods* while you are in school?	a) Yes b) No	
5	If yes, what kind of embarrassment you have experienced during any of your periods while in school?	a) Actual leaking of blood or soiling of clothes b) Fear of unexpected bleeding c) Mocked/teased by boys d) Mocked/teased by teachers e) Mocked teased by other girls f) Others (Please say what these are)	
6	During any of your periods while in school have you ever felt ashamed?	a) Yes b) No	
7	If yes, why you felt ashamed?	a) Smelly b) Painful c) Inconvenient d) Others(specify)	
8	Have you ever had any unpleasant thing happening while using facilities for hygienic management of your periods while at school?	a) Bullying b) Making fun of you c) Teasing d) Beaten	
9	If yes for the above question 6, from whom?	a) Male teacher b) Female teacher c) Boy d) Other male school staff e) e) Other female school staff	
10	Does the school provide psycho-social support for menstruating girls?	a) Yes b) No	
11	Did you ever face any problem related to menstruation	a) Yes b) No	

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12	If yes what are there?	a) Isolation b) Insult c) Discrimination d) Infections e) Other /specify	
13	If infections, have you ever experienced the any of the following in the past three months (circle all that applies)	a) Skin irritation or rashes in the area near your private parts b) Heavy bleeding from your periods c) Bleeding between periods d) Burning when you pass urine very often e) Pain in your vagina or your tummy area f) Pain if you had sex g) An itchy/sore vagina h) An unpleasant smell in a private part i) A white or green vaginal discharge (substance coming j) out of your vagina) k) Bleeding while having sex	
14	During which time were such symptoms experienced?	a) During the time of having a period b) Immediate after having a period c) All the times	
15	What did you do when you experienced any of these symptoms?	a) Ignored symptoms b) Treated self c) Looked for medical care d) Asked a relative to give advice (e.g. mother, sister, aunt, grandmother)	
16	Did you receive medical attention for such infections?	a) Yes b) No	
17	Do you know somebody faced problems related to menses?	a) Yes b) No	
18	If yes what are there?	a) Isolation b) Insult c) Discrimination d) Other /specify	
19	Has the availability of WASH facilities reduced incidences of harassment, bullying, and discrimination in school?	a) Yes b) No	
20	Has the stress associated with fetching water been reduced with WASH intervention?	a) Yes b) No	
21	Has WASH services reduced incidences related to rape and assaults from using sanitary facilities outside of the home at night.	a) Yes b) No	
Section G. Utilization of SRH services			
1	Are you aware of available Youth Friendly SRHR services in your locality?	a) Yes b) No	
2	What were the sources of such information?	a) Teachers b) Peers c) Healthcare workers d) Parents	

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		e) Media	
3	Have you ever utilized the services?	a) Yes b) No	
4	If No, what were the reasons?	a) Do not know where to go b) Lack of privacy/confidentiality c) Unfriendly health workers d) Lack of awareness/knowledge e) Fear of stigma f) not socially and culturally acceptable	
5	Have if Yes, utilized YF SRH services within last three months?	a) Yes b) No	
6	What kind of services did you seek?	a) Contraceptive b) Education c) Counseling d) HIV testing e) Others(specify)…….	
7	What kind of YF SRH services facility you utilized?	a) Government health facility b) Private health facility c) I don't know	
8	Reason for preferring facility	a) Geographic proximity b) Cost/affordability c) Staff friendliness d) Others (specify)……	

Do you have any questions for me!

Thank you for your participation

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(b)

Questionnaire for In-School Girls (Swahili version)

Tathmini ya Ujumuishaji wa Huduma za Haki ya Afya ya Uuzazi pamoja na Maji, Usafi wa Mazingira Katika Kuboresha Afya ya *Wasichana* walio katika *rika balehe* Walio Shuleni Katika maeneo ya Vijijini nchini Tanzania.

Utangulizi

Jina la Mhojaji……

Tarehe……..……

Jina la kijiji…….……

Kata/shule..…..

Wilaya…….……

Habari ya asubuhi/mchana, Jina langu ni……Ninafanya kazi na kazi na Amref Health Africa. Tunafanya utafiti kuhusu haki ya afya ya uzazi na WASH katika wilaya ya Kilindi. Taarifa tutakazokusanya zitawajulisha Amref Health Africa na wadau wengine; jamii, wahudumu wa afya, waandaaji sera, na serikali kwa ujumla utaratibu bora zaidi katika kushughulikia huduma za afya ya uzazi kwa vijana balehe. Kwa kawaida maswali yanaweza kuchukua takribani dakika 60. Taaarifa zote unakazozitoa zitakuwa ni siri na hazitatolewa kwa mtu yeyote mbali na timu yetu ya utafiti. Kama nikikuuliza swali lolote ambalo hutaki kujibu, niambie tu na nitaendelea na swali linalofuata au unaweza kusitisha mahojiano muda wowote.

Una swali lolote?

Je unakubali kushiriki?

Kama akikubali mpitishe kwenye fomu ya ridhaa

Kama akikataa pia mshukuru/washukuru na nenda kwa mtu/watu mwingine

Naweza kuanza mahojiano,

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No	Swali	Chagua	Ruka
General questionsMaswali ya jumla			
1	Una umri gani?	Miaka……	
2	Kiwango chako kikubwa cha elimu kwa sasa	Darasa lako sasa:…….	
3	Unaishi wapi?	a) Mjini b) Kijijini	
4	Dini yako ni ipi?	a) Mkristo b) Muislamu c) Sitapenda kutaja d) Nyinginezo…….	
5	Kabila lako ni lipi?	……..	
6	Unaishi na nani kwa sasa?	a) Wazazi wote wawili b) Mzazi mmoja c) Mwingine (Taja)…….	
7	Ukubwa wa familia	a) Watatu au chini b) 4-6 c) Zaidi ya wanafamilia 7	
8	Je unaweza kupata simu?	a) Ndio b) Hapana	
9	Je unapata mtandao/internet mara kwa mara?	a) Ndio b) Hapana	
10	Je una mchumba?	a) Ndio b) Hapana	
11	Je, umewahi kusikia kuhusu hedhi?	a) Ndio b) Hapana	
12	Ulikuwa na umri gani ulivosikia kuhusu hedhi kwa mara ya kwanza?	Umri……..miaka	
13	Ulipata taarifa kuhusu hedhi kutoka wapi? (Unaweza kuchagua jibu zaidi ya moja)	a) Mama b) Dada/shangazi c) Bibi d) Rafiki e) Vyombo vya habari f) Kusoma g) Kama nyinginezo (taja)……	
14	lKuna elimu ya usimamizi safi wa hedhi katika shule yako?	a) Ndio b) Hapana	
15	IKama jibu ni ndio; inatolewa na nani? (Unaweza chagua jibu zaidi ya moja)	a) Walimu b) Klabu za shule c) Chombo kidogo cha habari cha shule d) Vifaa vya kusoma e) Nyingine, taja---------	
16	Umeshaanza kupata hedhi?	a) Ndio b) Hapana	Ikiwa **Hapana**, nenda **sehemu G kwenye matumizi ya huduma za afya ya uzazi**
17	Ulikuwa na umri gani ulipopata hedhi kwa mara ya kwanza?	a) Mwaka uliopita b) Sikumbuki	
18	Ulikuwa unafahamu kuhusu hedhi kabla ya kuanza kupata?	a) Ndio b) Hapana	

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19	If yes what is the sources of the information? Kama ndio, ulipata taarifa kutoka wapi?	a) Familia b) Rafiki c) Redio d) Kusoma e) Shule f) Nyinginezo, taja ---	
Perception about Menstruation			
1	*Hapa kwenu hedhi inaitwaje? (taja)*		
2	Unafikiri nini kinasababisha hedhi? *(Unaweza kuchagua jibu zaidi ya moja?*	a) Kutokana na saikolojia b) Inasababishwa na dhambi c) Ni laana kutoka kwa Mungu d) Inasababishwa na ugonjwa e) Sijui	
3	*Je unadhani damu ya hedhi inatoka katika kiungo gani cha mwili?*	a) Mfuko wa uzazi b) Tumboni c) Sijui d) Nyingineyo, taja____	
4	Unadhani hedhi ni siri?	a) Ndio b) Hapana	
5	*Kwanini unadhani hedhi ni siri? (Unaweza kuchagua jibu zaidi ya moja?*	a) Kwasababu ya mila na imani za jamii b) Kwasababu ya dini c) Kwasababu ya miiko d) Nyinginezo, taja_____	
6	Je, huwa mnajadili kwa uhuru kuhusu hedhi na wanafamilia yako au marafiki?	a) Ndio b) Hapana	
7	Kama ndio, ni mambo gani ambayo mnayajadili?	a) Kuhusu usimamamizi safi wa hedhi b) Kuhusu matumizi ya pedi c) Kama nyinginezo, taja_____	
8	*Kama hamjadili kwa uhuru, kwanini? (Unawezakuchagua jibu zaidi ya moja)*	a) Aibu b) Uoga c) Miiko d) Sio kawaida e) Dini f) Nyinginezo, taja-------	
9	Ni vifaa gani vinavofaa kutumika wakati wa hedhi? *(Unaweza kuchagua zaidi ya moja)*	a) Pedi za kutupa b) Kitambaa unachoweza kufua na kutumia tena c) Kitambaa cha kutumia na kutupa d) Nyinginezo, taja_____	
10	Kama ukimya kuhusiana na mambo ya hedhi ukivunjwa, unadhani ushiriki wa wasichana katika elimu utaweza kuongezeka?	a) Ndio b) Yes	
11	Unadhani wanawake watafaidika vipi? *(Unaweza kuchagua jibu zaidi ya moja)*	a) Kuepuka aibu na uoga b) Kutokuhudhuria shule kwa wanafunzi wa kike kutafungua c) Ufaulu wa wanafunzi wa kike utaongezeka d) Kuacha shule kwa wanafunzi wa kike kutapungua e) Hedhi safi kwa wanafunzi wakike itaboreshwa f) Kama nyinginezo zipo, taja ,	
Dhana ya usafi wa hedhi			
1	Unatumia kifaa chochote kwenye kudhibiti hedhi?	a) Ndio b) Hapana	

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2	Ni vifaa gani unavitumia kudhibiti hedhi? *(Unaweza kuchagua zaidi ya jibu moja?*	a) Pedi za kutumia na kutupa b) Kipande cha nguo cha kutumia na kutupa c) Kipande cha nguo cha kutumia na kufua d) Karatasi/karatasi ya chooni e) Pedi za viwandani f) Pedi inayotumika tena g) Kikombe cha hedhi h) Kama nyinginezo, taja____	
3	Kama unatumia pedi za kutupa, kwanini?	a) Kuthibiti mtiririko wa damu na kuhakikisha usafi b) Inatuliza maumivu c) Badala ya kuoga d) Sijui	
4	Kama unatumia vifaa vya kufua na kutumika tena; unavitunza wapi baada ya kutumia au kufua? *(Unaweza kuchagua jibu zaidi ya moja)*	a) Sehemu ya siri b) Chini ya godoro la kitanda changu c) Ndani ya begi au kabati d) Ndani ya mfuko wa rambo e) Kama kuna nyinginezo, taja _____	
5	Kama unaweka sehemu yenyeusiri? Kwanini? (Unaweza kuchagua jibu zaidi ya moja)	a) Aibu b) Uchafu wa vifaa c) Miiko d) Kama nyinginezo, taja____	
6	Je, unakausha wapi vifaa vyako vya hedhi na nguo za ndani?	a) Kwenye jua b) Sehemu yenye usiri c) Nyinginezo	
7	Ni mara ngapi unasafisha viungo vyako vya nje vya uzazi?	a) Mara moja kwa siku b) Mara mbili kwa siku c) Zaidi ya mara mbili kwa siku d) Sioshi kila siku	
8	Mara ngapi unabadilisha pedi?	a) Kila saa b) Kila baada ya masaa 4-6 c) Mara moja kwa siku d) Sijui	
9	Unatumia nini kusafisha viungo vyako vya nje vya uzazi	a) Maji tu b) Sabubi na maji c) Kama kuna nyinginezo, taja____	
10	Unaosha viungo vyako vya nje vya uzazi kutoka mbele kwenda nyuma kwa kutumia maji na sabuni kipindi cha hedhi?	a) Ndio b) Hapana	
11	Je, Unaoga kila siku wakati wa hedhi?	a) Ndio b) Hapana	
12	Huwa unabadilisha nguo ya ndani/chupi unapobadilisha pedi?	a) Ndio b) Hapana	
13	Kuna hali yoyote ya usumbufu katika Ngozi yako/viungo vya uzazi wakatiwa hedhi?	a) Ndio b) Hapana	
14	*Aina gani ya usumbufu unaojisikia (Unaweza kuchagua jibu zaidi ya moja)*	a) Ngozi kuwaka moto b) Ngozi kuwasha c) Maambukizi kwenye via vya mkojo d) Kama kuna nyinginezo (taja)____	
15	Unadhani usiri shuleni unazingatiwa wakati ukiwa hedhi?	a) Ndio b) Hapana	
16	*Unadhani kwanini usiri hauzingatiwi katika shule yako? (Unaweza kuchagua jibu zaidi ya moja)*	a) Ukosefu wa choo shuleni b) Choo kimoja kwa wanafunzi wa kiume na wa kike	

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		c) Ukosefu wa milango katika vyoo d) Ukosefu wa maji e) Kama kuna nyinginezo (taya)_____	
Usafi wa mazingira na vifaa vya usafi shuleni			
1	Je, mna majengo ya vyoo katika shule yenu?	a) Ndio b) Hapana	
2	Kama jibu lako ni hapana, Mnatumia nini badala ya choo? *(Unaweza kuchagua jibu zaidi moja)*	a) Kubaki nyumbani b) Kutumia vichaka au sehemu za wazi karibu na shule c) Kama nyinginezo (taja)----------	
3	Kama jibu la swali 4.1 ni ndio, Je shule ina vyoo tofauti kwa ajili ya wanafunzi wa kike na kiume?	a) Ndio b) Hapana	
4	Je, shule ina chumba tofauti kwa ajili ya kubadilisha pedi wakati wa hedhi?	a) Ndio b) Hapana	
5	Je, Kuna usiri wa kutosha chooni kwa ajili ya wasichana ili waweze kubadilisha pedi wakati wa hedhi?	a) Ndio b) Hapana	
6	Je unaweka wapi vifaa vyako unavyotumia wakati wa hedhi? *(Unaweza kuchagua jibu zaidi ya moja)*	a) Kutupa chooni b) Kuchoma c) Kutupa sehemu ya takataka d) Kuosha na kutumia tena e) Kuchimbia f) Kutupa	
7	Je shule inatoa maji masafi na sabuni kwa ajili ya kujisafisha kama inavyotakiwa?	a) Ndio b) Hapana	
8	Je, unaosha mikono baada ya kubadilisha pedi?	a) Ndio b) Hapana	
9	Unatumia sabani kuosha mikono baada ya kubadilisha pedi?	a) Ndio b) Hapana	
10	Je unaosha viungo vyako vya uzazi kila mara unapoenda chooni wakati wa hedhi?	a) Ndio b) Hapana	
11	Je, shule ina sehemu zinazofaa kwa ajili ya kutupa vifaa vilivyotumika wakati wa hedhi?	a) Ndio b) Hapana	
Information about Sanitary Pads Taarifa kuhusu pedi			
1	Je, unafahamu pedi ambazo zinauzwa katika masoko ya mitaani kwenu?	a) Ndio b) Hapana	
2	Kama jibu ni ndio, ni aina gani za pedi unazozijua? *(Unaweza kuchagua jibu zaidi ya moja)*	a) Eve b) Comfort c) Flexi d) Kama nyinginezo, taja-----	
3	Je, pedi za kutumia na kutupa zinapatikana masoko ya mtaani kwenu?	a) Ndio b) Hapana	
4	Kama jibu ni ndio, umeshawahi kununua pedi za kutumia na kutupa katika maduka ya mtaani kwenu?	a) Ndio b) Hapana	
5	Kama jibu ni hapana kwa swali 5.4, kwanini? *(Unaweza kuchagua jibu zaidi ya moja)*	a) Gharama kubwa b) Hazidumu muda mrefu c) Yote A na B d) Sijaanza kupata hedhi	
6	Nani anakupa vifaa vya kujikinga na hedhi? *(Unaweza kuchagua jibu zaidi ya moja)*	a) Wazazi/familia b) Shule c) Mashirika yasiyo ya kiserikali d) Binafsi e) Kama nyinginezo, taja------	
7	Kuna vifaa vyovyote vya kujikinga na hedhi vinatolewa shuleni kwako?	a) Pedi ya dharura b) Kipande cha nguo cha dharura	

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		c) Vidonge vya kupunguza maumivu d) Kama nyinginezo, taja-----	
Effects of Menstruation in Girls HealthAthari za hedhi kwa afya ya wasichana			
1	Ni matatizo gani huwa unakutana nayo wakati wa hedhi ukiwa shuleni? *(Unaweza kuchagua jibu zaidi ya moja)*	a) Siwezi kuzingatia b) Kujisikia kuumwa shuleni c) Athari za kisaikolojia d) Kutohudhulia shuleni e) Majibu yote f) Hakuna	
2	Je shule inatoa misaada ya kisaikologia wakati wa hedhi?	a) Ndio b) Hapana	
3	Umewahi kupata tatizo linalohusiana na hedhi?	a) Ndio b) Hapana	
4	Kama ndio, ni lipi?	a) Kutengwa b) Kutukana c) Kubaguliwa d) Maambukizi e) Nyingine/taja	
5	Kama maambukizi, yapi?	……..	
6	Ulipata msaada wa kitabibu wa maambukizi hayo?	a) Ndio b) Hapana	
7	Unamfahamu mtu ambaye amewahi kupata matatizo kutokana na hedhi?	a) Ndio b) Hapana	
8	Kama ndio, ni yapi?	a) Kutengwa b) Kutukanwa c) Kubaguliwa d) Nyingine/taja	
9	Je, kuwepo kwa vifaa vya WASH kumepunguza matukio ya unyanyasaji na ubaguzi shuleni?	a) Ndio b) Hapana	
10	Je shida zinazohusiana na kuchota maji zimepunguzwa baada ya WASH kuingilia kati?	a) Ndio b) Hapana	
11	Je huduma za WASH zimepunguza matukio yanayohusiana na kubakwa na mashambulizi kutokana na kutumia vifaa vilivyopo nje ya nyumba wakati wa usiku	a) Ndio b) Hapana	
Utilization of SRH services Utumiaji wa huduma za afya ya uzazi			
1	Je, unafahamu uwepo wa huduma rafiki kwa vijana za afya ya uzazi katika mtaa wenu?	a) Ndio b) Hapana	
2	Nini kilikuwa chanzo cha hizo taarifa?	a) Walimu b) Wenzangu c) Watoaji huduma za afya d) Wazazi e) Vyombo vya habari	
3	Je, umewahi kutumia huduma hizo?	a) Ndiyo b) Hapana	
4	Kama hapana, sababu ni nini?	a) Sijui mahali pa kwenda b) kukosekana usiri c) Watoaji wa huduma ya afya kutokuwa wakarimu d) Ukosefu wa ufahamu e) Hofu ya unyanyapaa f) Haikubaliki kijamii na kimila	
5	Kama ni ndio, umetumia huduma rafiki kwa vijana ya afya ya uzazi katika kipindi cha miezi sita iliyopita?	a) Ndiyo b) Hapana	

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6	Ni huduma gani unafuata?	a) Njia za uzazi wa mpango b) Elimu c) Ushauri d) Kupima ukimwi e) Nyinginezo (taja)…….	
7	Ni kituo gani kinachotoa huduma rafiki ya vijana ya afya ya uzazi unachohudhuria?	a) Kituo cha afya cha serikali b) Kituo binafsi cha afya c) Sijui	
8	Sababu za kupendelea kituo hicho	a) Mahali kilipo b) Gharama c) Ukarimu/urafiki wa wafanyakazi d) Nyinginezo (taja)……..	

Je una swali lolote kwangu? Asante kwa kushiriki

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APPENDIX B.

a) Focused Group Discussion Guide for Male and Female Parents (English)

b) Focused Group Discussion Guide for Male and Female Parents (Kiswahili)

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(a)

Focused Group Discussion Guide for Male and Female Parents (English version)

The impact of Integrating Sexual and Reproductive Health Rights; and Water, Sanitation and Hygiene interventions to adolescent schoolgirls health in rural Tanzania

Part 1: Introduction

Date of visit (dd/mm/yyyy):_____

Interviewer name_____

Ward/school_____

Village_____

Hello. My name is……..I will be moderating this discussion and my colleague's name is…….He/she will be taking notes to make sure that I don't miss any point discussed here. We are both working with Amref Health Africa. We are currently conducting a survey about Sexual and Reproductive Health and Rights and WASH in Kilindi district. The information we collect will inform Amref Health Africa and other stakeholders; the community, health care providers, policy makers and the Government on specific best practices in addressing the adolescents and youth with sexual and reproductive health services. You have been selected to participate in this survey; this survey will take up to 1 hour. All of the answers you give will be treated in confidential way.

Do you have any questions?

Do you agree to partake?

If agrees, take her/him/them through informed consent process

If declines also thank her/her/them and go to the next person/group

May I begin the interview now?

1. How does the community here view FGM? Probe for meaning of FGM, value and importance is attached to the practice? how prevalent is the practice is?
2. In your view, how does the government view FGM? Probe for: Knowledge of legality, Awareness of prosecutions nationally, locally

3. In your understanding, why do some families choose to circumcise their girls while others decide not to circumcise them? Probe for, why do some girls choose to be circumcised and others decide not to be circumcised?

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4. What kind of people support and encourage the practice and what kind of people discourage or don't practice female circumcision?

5. In your view, what are the main differences between circumcised and uncircumcised girls? Probe for their acceptability to the community for marriage and their participation in other social events?

6. Are you aware of any alternative rite of passage (ARP) (circumcision through words) programmes in your district? Probe for: What issues does the ARP address? Have any girls in this community participated in such a programme/activity? When did the alternative ritual intervention begin in this community? What experience, if any, do you have of ARP?

7. What do you know about how girls are prepared for ARP? Probe for: Age when went through the rite, Who made the decision? What they knew about the alternative rite of passage? The number of other girls involved in the ceremony? The kind of information provided before and after the rite, by whom and whether in written form? How long the ARP process took?

8. What are the most positive and most negative aspects about ARP? Probe for: Do you think the alternative female circumcision rite benefits girls? Does the ARP in any way disadvantage girls in this community? Do you think this approach has been effective in getting families to abandon female circumcision? Are there any advantages of ARP? Are there any limitations to ARP? Do girls or their parents need to be able to read and write to take part in ARP processes?

9. Do you know of girls who have been through ARP but who were later circumcised? Probe for: Did they personally decide, or were they forcibly circumcised? Please explain the rationale behind this and the circumstances of this case (or cases).

10. To what extent would you say that ARP has increased the SRH knowledge in this community? Probe for changes in attitude and practice towards FGM in the community.

11. What would comment on the integration of WASH and SRHR interventions in the community? a) Probe for access of WASH facilities among the community members, students, women and health facilities. b) Probe for reduction of GBV incidences related to vulnerability of women to rape, assault. e.t.c .

12. In what ways would you say that ARP/WASH project has improved the Menstrual Hygiene Management (MHM) of schoolgirls in your community? Probe for accessibility of WASH facilities including toilets, water, sanitary pads, and disposal of sanitary pads.

13. How do you as a mother/father support your daughter to manage the menstruation while at school? Probe: Who tells the father if the daughter need support? What kind of support mothers/fathers provide? Any differences in the support he provided? Financial support? Moral?

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14. What recommendations do you have on how mothers/fathers can best support their girls to manage menses while at school? How about fathers/mothers?

15. How the schools can do best support girls during menstruation while at school?

16. What is opinion on CSE for pupils? Probe is he/she things if Comprehensive Sexuality Education has changed his attitudes towards premarital sex, early and unintended pregnancies among schoolgirls.

17. In what ways would you say that ARP/WASH project has increased the access and utilization of SRHR services?

18. In what ways do you think that solving communities pressing WASH needs will encourage the reception of SRHR and Anti-FGC messages?

19. In what ways do you think WASH facilities in schools has increased girls school attendance during their menstruation periods?

20. Do you think that If WASH services are easily available, men will have less motivation to marry young girls? Probe why? If men will be able to fetch water in nearby points?

21. In what ways do you think that improved access to WASH services has reduced the number of teenage pregnancies? Probe for reducing the walking distance to water sources hence less chances of being raped

22. What are your recommendations for the project implementation?

Thank you for responding our questions, do you have any questions for me.

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(b)

Focused Group Discussion Guide for Male and Female Parents (Swahili version)

Tathmini ya Ujumuishaji wa Huduma za Haki ya Afya ya Uuzazi pamoja na Maji, Usafi wa Mazingira Katika Kuboresha Afya ya *Wasichana* walio katika *rika balehe* Walio Shuleni Katika maeneo ya Vijijini nchini Tanzania.

Sehemu ya 1: Utangulizi

Tarehe ya kutembelea _____

Jina la anayehoji_____

Kata/shule_____

Kijiji _____

Habari, Jina langu ni……Nitakuwa naendesha majadiliano haya na mwenzangu anaitwa…….yeye atakuwa anaandika majadiliano haya ili kuhakikisha maelezo yote ambayo yatajadiliwa hapa yanachukuliwa kwa usahihi. Sisi wote tunafanya kazi na Amref Health Africa. Tunafanya utafiti kuhusu haki ya afya ya uzazi na WASH katika wilaya ya Kilindi. Taarifa tutakazokusanya zitawajulisha Amref Health Africa na wadau wengine; jamii, wahudumu wa afya, waandaaji sera, na serikali kwa ujumla utaratibu bora zaidi katika kushughulikia huduma za afya ya uzazi kwa vijana balehe. Umechaguliwa kushiriki katika utafiti huu; na utafiti huu unaweza kuchukua hadi saa moja. Majibu yenu yote yatachukuliwa na kushughulikiwa kwa usiri mkubwa.

Je una swali lolote?

Unakubali kushiriki?

Kama akikubali mpitishe kwenye fomu ya ridhaa

Kama akikataa pia mshukuru/washukuru na nenda kwa mtu/watu wengine

Naweza kuanza mazungumzo yetu sasa?

1. Je jamii ya hapa inaonaje kuhusu ukeketaji/tohara kwa wanawake? Dodosa maana ya ukeketaji, thamani na umuhimu unaohusishwa na vitendo hivyo?Ni jinsi gani kitendo hiki kimeenea?

2. Kwa maoni yako, serikali inaonaje kuhusu vitendovya ukeketaji? Dodosa ujuzi wa uhalali na ufahamu wa mashtaka kitaifa

3. Kwa uelewa wako, kwanini familia zingine zinaamua kuwakeketa mabinti zao na zingine hawafanyi hivo? Dodosa kwa nini wasichana wengine wanaamua kukeketwa na wengine hawataki?

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4. Ni watu gani wanasaidia na kuhimiza dhana ya ukeketaji wa mabinti/wasichana na ni watu gani wanapinga au hawafanyi ukeketaji/tohara kwa wanawake?

5. Kwa maoni yako, nini tofauti kati ya wasichana waliokeketwa na ambao hawajakeketwa? Dodosa kukubaliwa kwao katika jamii kuhusiana na ndoa na ushiriki wao katika shughuli/matukio mbalimbali ya jamii

6. Je una ufahamu kuhusu programu za tohara mbadala (tohara kwa maneno) katika wilaya yako? Dodosa kuhusu: Ni masuala gani ambayo tohara mbadalainashughulikia? Kuna wasichana ambao washashiriki katika shughuli/programu hizo katika jamii hii? Je tohara mbadala imeanza lini katika jamii hii? Je ni uzoefu gani, kama upo, unano kuhusiana na tohara mbadala?

7. Je unajua nini kuhusu namna ambavyo wasichana wanaandaliwa kwa ajili ya tohara mbadala? Dodosa kuhusu: Umri ambapo wanaenda katika mafunzo/sherehe, nani anafanya maamuzi? Wanaelewa nini kuhusu tohara mbadala? Idadi ya wasichana wengine wanaoshiriki katika sherehe?Taarifa wanayopewa kabla na baada ya mafunzo, nani anatoa taarifa hizo, na je taarifa inatolewa kwa maandishi ama siyo? Ni muda gani unatumika hadi kumaliza shughuli za tohara mbadala?

8. Je ni mambo gani mazuri zaidi na mabaya zaidi kuhusiana na tohara mbadala? Dodosa kuhusu: Unadhani tohara mbadala inanufaisha wasichana? Je tohara mbadala inaleta hasara kwa wasichana katika jamii?

9. Je unawafahamu wasichana ambao walishiriki katika tohara mbadala lakini baadae wakafanyiwa tohara/wakakeketwa? Dodosa kuhusu: Je ni wao wenyewe waliamua au walifanyiwa ukeketaji/tohara kwa nguvu? Tafadhali naomba elezea sababu ya jambo hili na hali ya kesi hii/hizi

10. Kwa kiwango gani tohara mbadala imeongeza uelewa wa afya ya uzazi katika jamii hii? Dodosa mabadiliko ya kimtazamo na mazoea kuhusiana na ukeketaji/tohara katika jamii

11. Nini maoni yako kuhusiana na kushirikiana na kuingiliana kati ya WASH na afya ya uzazi katika jamii? a) Dodosa kuhusu upatikanaji wa vifaa vya WASH kwa wanajamii, wanafunzi, wanawake na vituo vya afya. b) Dodosa kuhusu kupungua kwa matukio ya unyanyasaji wa kijinsiakama vile wanawake kuwa hatarishi kubakwa, kushambuliwa na mengineyo.

12. Kwa njia gani mradi wa tohara mbadala/WASH umehimarisha usimamizi usafi wa hedhi kwa wanafunzi wasichana katika jamii yako? Dodosa upatikanaji wa vifaa vya WASH ikiwa ni pamoja na vyoo, maji, pedi, na sehemu za kutupa pedi.

13. Nini maoni yako kuhusu elimu ya afya ya uzazi kwa wanafunzi? Dodosa kama anafikiri kama CSE imebadili mtazamo kuhusiana na ngono za utotoni, mimba za utotoni na zisizotarajiwa kwa wasichana wa shule?

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14. Je, unaweza kumtambua msichana anayekuja shuleni akiwa kwenye hedhi? Iwapo ndiyo, je huwa unachukua hatua gani hasa kwa wale wanaopata hedhi kwa ghafla?

15. Kwa namna gani unadhani wavulana wanaweza kuwasaidia wasichana walio kwenye hedhi? Dadisi kuhusu wale wanaopata hedhi ghafla? Msaada gani unaweza kuutoa? Vipi kuhusu kuwatania? Msaada gani wa vitu au usio wa vitu unaoweza kuutoa?

16. Je, unadhani kuwa kuna umuhimu wa wavulana kujua mambo ya hedhi za wanawake au wasichana?

17. Ni mapendekeso yako kuhusu namna ambayo wavulana wanaweza kusaidia wasichana wanaopata hedhi kuwapa kwa salama na bila tatizo wakiwa shuleni?

18. Ni kwa namna shule zinaweza kusaidia wasichana kupata hedhi salama wakiwa katika mazingira ya shuleni?

19. Kwa njia gani mradi wa tohara mbadala/WASH umeongeza upatikanaji na matumizi ya huduma ya afya ya uzazi?

20. Unafikirini kwa njia ganikutatua mahitahi yote ya WASH katika jamii kutahimiza mapokezi mazuri ya ujumbe kuhusu afya ya uzazi na kupinga tohara kwa wasichana?

21. Unafikiri ni kwa njia gani vifaa vya WASH katika mashule imeongeza mahudhurio ya wasichana wakati wa hedhi?.

22. Unafikiri huduma za WASH zikipatikana kirahisi, wanaume watapunguza msukumo wa kuoa wasichana wadogo? Dodosa kwanini? Kama wanaume watakuwa wanaweza kuchota maji katika sehemu za karibu?

23. Je, unafikiri ni kwa njia gani, kurahisishwa kwa upatikanaji wa huduma za WASH kumepunguza mimba za utotoni?

24. Nini mapendekezo yako kuhusiana na utekelezaji wa mradi huu?

Asante kwa kujibu maswali yetu, je una swali lolote kwangu

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APPENDIX C.

a) Focus Group Discussion Guide for schoolgirls and boys (English)

b) Focus Group Discussions for schoolgirls and boys (Kiswahili)

(a)

Focus Group Discussions for schoolgirls and boys (English version)

The impact of Integrating Sexual and Reproductive Health Rights; and Water, Sanitation and Hygiene interventions to adolescent schoolgirls health in rural Tanzania

Part 1: Introduction

Date of visit (dd/mm/yyyy):_____

Interviewer name_____

Ward/school_____

Village_____

Hello. My name is……..I will be moderating this discussion and my colleague's name is…….He/she will be taking notes to make sure that I don't miss any point discussed here. We are both working with Amref Health Africa. We are currently conducting a survey about Sexual and Reproductive Health and Rights and WASH in Kilindi district. The information we collect will inform Amref Health Africa and other stakeholders; the community, health care providers, policy makers and the Government on specific best practices in addressing the adolescents and youth with sexual and reproductive health services. You have been selected to participate in this survey; this survey will take up to 1 hour. All of the answers you give will be treated in confidential way.

Do you have any questions?

Do you agree to partake?

If agrees, take her/him/them through informed consent process

If declines also thank her/her/them and go to the next person/group

May I begin the interview now?

1. What is menstruation? Probe for the causes of menstruation?

2. How the school environment does support girls to manage their, menses? Probe for availability of water, disposal of sanitary towel, separate and safe toilets for girls and boys

3. How is practicing Menstrual Hygiene Management (MHM) of girls in your school?

4. What are the roles of teachers, parents and boys students on addressing MHM of schoolgirls?

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5. What are the types of taboos and cultural barriers on menstrual issues?

6. How is poor MHM affecting your health? Probe for if ever got infections, how the treatment was given, how many days never been to school

7. What types of sanitary materials you have been using during menstruation period? What make you use such materials?

8. Are disposable sanitary pads available at shop? Is it affordable? How?

9. What are the key important factors to keep you in school?

10. What are the challenges that you face in accessing support in the MHM in school? Probe for availability of psychological support

11. Do you know if girls go to school when they are menstruating? If yes, how do you react for the sudden soiling of the garment? Do feel comfortable being there?

12. How best can the boys support the girls during menstruation in school? Probe: sudden soiling of the garment?

13. Do you think it is important for boys to know about menstruation?

14. How do you as a boy/girl support other girls to manage the menstruation while at school? Probe: what kind of support you provide? How about teasing them? Any material supports? Non material support?

15. What recommendations do you have on how boys can best support their girls to manage menses while at school?

16. How the schools can do best support girls during menstruation while at school?

17. What challenges do you face in accessing menstrual hygiene materials outside the school?

18. What do you think is the sustainable way of managing menstrual hygiene for school girls?

19. What is your suggestion and opinion towards improving MHM and Comprehensive Sexuality Education in school?

20. What is your opinion in terms of accessibility and utilization of youth friendly SRHR services among adolescents in your area? Probe for what make them to go or not to go, type of services they prefer, communities' attitude, and friendliness of the service providers.

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21. Would you tell me, in what ways would you think that it important to provide MHM education at the same time with WASH facilities? Probe for the situation before when they were only getting SRHR education alone, how was it?

22. What are your recommendations for the project implementation?

Thank you for responding our questions, do you have any questions for me.

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(b)

Focus Group Discussions for schoolgirls and boys (Swahili version)

Tathmini ya Ujumuishaji wa Huduma za Haki ya Afya ya Uzazi pamoja na Maji, Usafi wa Mazingira Katika Kuboresha Afya ya *Wasichana* walio katika *rika balehe* Walio Shuleni Katika maeneo ya Vijijini nchini Tanzania.

Sehemu ya kwanza:Utangulizi

Tarehe ya kutembelea:_____
Jina kamili la anayehoji_____
Kata/shule_____
Kijiji_____

Habari,Jina langu ni……..Nitakuwa naendesha majadiliano haya na mwenzangu anaitwa……..yeye atakuwa anandika majadiliano haya ili kuhakikisha maelezo yote ambayo yatajadiliwa hapa yanachukuliwa kwa usahihi.Sisi wote tunafanya kazi na Amref Health Africa.Tunafanya utafiti kuhusu haki ya afya ya uzazi na WASH katika wilaya ya Kilindi.Taarifa tutakazokusanya zitawajulisha Amref health Africa, wadau,jamii,watoa huduma,watunga sera na serikali kwa ujumla utaratibu bora zaidi katika kushughulikia huduma ya afya ya uzazi kwa vijana balehe. Mmechaguliwa kushiriki katiaka utafiti huu; na utafiti huu unaweza kuchukua hadi saa moja.Majibu yenu yote yatachukuliwa na kushughulikiwa kwa usiri mkubwa.

Je una swali lolote?

Je umekubali kushiriki?

Kama amekubali kushiriki mpitishe kwenye fomu ya ridhaa

Kama amekataa kushiriki mshukuru kwa muda wake nenda kwa mtu/kikundi kingine

Naweza kuanza mahojiano sasa?

1. Hedhi maana yake ni nini?dodosa kuhusu kinachosababisha hedhi?

2. Ni kwa jinsi gani mazingira ya shule yanasaidia wasichana katika hedhi zao?dodosa upatikanaji wa maji,sehemu ya kutupa pedi,vyoo salama tofauti vya wasichana na wavulana

3. Je ni kwa jinsi gani mnafanya udhibiti wa usafi wa hedhi kwa wasichana katika shule yako?

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4. Ni nini kazi ya walimu,wazazi na wanafunzi wa kiume katika kushughulikia usafi wa hedhi kwa wasichana katika shule?

5. Je ni nini miiko na vikwazo vya kiutamaduni juu ya masuala ya hedhi?

6. Ni kwa nanmna gani usafi wa hedhi mmbaya unavyoathiri afya yako? Dodosa kama alishawahi kupata maambukizi,matibabu aliyopewa yalikuwaje, siku ngapi hakuweza kwenda shule

7. Ni aina gani ya vifaa vya usafi unavitumia wakati wa hedhi? Ni nini kinakufanya utumie vifaa hivyo?

8. Je pedi zinapatikana madukani?Je ni nafuu? Vipi?

9. Ni vitu gani vya muhimu vinavyokuweka shuleni?

10. Ni changamoto zipi unazokutana nazo kwenye kupata msaada wakuthibiti usafi wa hedhi shuleni? Dodosa upatikanaji wa msaada wa kisaikolojia

11. Ni changamoto zipi unazokutana nazo kwenye kupata vifaa vya usafi wa hedhi nje ya shule?

12. Je, unaweza kumtambua msichana anayekuja shuleni akiwa kwenye hedhi? Iwapo ndiyo, je huwa unachukua hatua gani hasa kwa wale wanaopata hedhi kwa ghafla?

13. Kwa namna gani unadhani wavulana wanaweza kuwasaidia wasichana walio kwenye hedhi? Dadisi kuhusu wale wanaopata hedhi ghafla? Msaada gani unaweza kuutoa? Vipi kuhusu kuwatania? Msaada gani wa vitu au usio wa vitu unaoweza kuutoa?

14. Je, unadhani kuwa kuna umuhimu wa wavulana kujua mambo ya hedhi za wanawake au wasichana?

15. Ni mapendekeso yako kuhusu namna ambayo wavulana wanaweza kusaidia wasichana wanaopata hedhi kuwapa kwa salama na bila tatizo wakiwa shuleni?

16. Ni kwa namna shule zinaweza kusaidia wasichana kupata hedhi salama wakiwa katika mazingira ya shuleni?

17. Je unafikiri ni njia gani endelevu za kusimamia usafi wa hedhi kwa wasichana wa shule?

18. Je una maoni na mapendekezo gani juu yakuboresha udhibiti wa usafi wa hedhi na elimu ya afya ya uzazi shuleni?

19. Je una maoni gani kwenye upatikanaji na utumiaji wa huduma rafiki ya afya ya uzazi miongoni mwa vijana katika eneo lako? Dodosa ni kitu gani kinafanya waende au wasiende, aina ya huduma wanazopendelea , mtazamo wa jamii, na huduma rafiki kwa watoa huduma.

20. Je naweza kuaniambia kuna umuhimu wa kiasi gani kuwapatia elimu ya udhibiti wa usafi wa hedhi na wakati huo huo kupatia vifaa vya WASH? Dodosa hali iliyokuepo kipindi wanapewa tu elimu ya haki ya afya ya uzazi,ilikuwaje?

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21. Je una mapendekezo gani kwenye utekelezaji wa mradi?

Asante sana kwa kujibu maswali yetu,Je una maswali yoyote kwangu.

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APPENDIX D.

a) Key Informant Interview with district officials (English)

b) Key Informant Interview with district officials (Kiswahili)

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(a)

Key Informant Interview with district officials (English version)

The impact of Integrating Sexual and Reproductive Health Rights; and Water, Sanitation and Hygiene interventions to adolescent schoolgirls health in rural Tanzania

Interviewee----------
Position----------
Ward:----------
School:----------
Date:----------

Moderator:----------

- *Introduce yourself and give brief background of the study*
- *Tell the participant duration of the session (Maximum 20-30 minutes).*
- *Tell the respondent that you may come back to collect required data if not readily available during interview.*
- *Inform DEO and WEO that you will visit some schools to interview their heads observe status of WASH facilities.*

Interview:

1. What is the current status of access to water in your school (s)----------
2. Any comments you have on the current status of access to sanitation facilities including toilets in your school(s)----------
3. What hygiene education promotional materials that are available in schools? ----------
4. What other initiatives that are in schools aimed to promote awareness of SRH&R information and education? ----------
5. What facilities that are in schools to cater for menstruating girls so that they do not miss classes because of their periods? ----------
6. To your experience, how is menstrual period affecting girls academically in your school/s. Give an example and magnitude----------
7. How is/are your school/s affected by incidence of school pregnancy, give examples of the incidences in the recent years----------
8. How is/are your school/s affected by incidence of early marriages, give examples of the incidences in the recent years----------
9. Any ideas you have behind major reason for FGM in this community because we believe messages have been passed to the community and the practice is still going on----------
10. How would you comment on the current status of incidences of girls' circumcision in the communities where your school(s) are; is it still high or declining? ----------
11. To your experience, how is FGM affecting girls academically in your school/s. Give an example and magnitude----------

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12. What ongoing efforts to discourage FGM that you are aware of----------
---

13. What other alternative rites of passage are you aware of and you recommend will be acceptable and adapted? ----------

14. For DEO & WEO, kindly provide us with data on the following:

Indicators - 2015		**Value**
14.1.	Proportional of schools in your district / ward that provide comprehensive sexuality education	
14.2.	Incidence of school pregnancy over the last one year	
14.3.	Truancy due to FGM amongst girls	
14.4.	School dropout due to marriages	
14.5.	Percent of schools with access to improved water service	
14.6.	Percent of schools with access to improved sanitation and with proper hygienic practice	

15. Any other comments you have, if any: ----------

OBSERVATION IN SCHOOLS:

16. Observe if water is available and easily accessible at the school and if they have storage mechanism including water harvesting;
    COMMENTS----------
17. Observe types and condition (*cleanliness; smell; hand washing facilities*) of toilets available for use at the school;
    COMMENTS----------
18. Observe if there is provision for hand washing facilities close to and in the toilets and if water is running for that purpose
    COMMENTS----------
19. Observe if girls latrines have bathrooms to cater for menstruating girls;
    COMMENTS----------
20. Observe refuse disposal practice
    COMMENTS----------

Thank you

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(b)

Key Informant Interview with district officials (Swahili version)

Tathmini ya Ujumuishaji wa Huduma za Haki ya Afya ya Uzazi pamoja na Maji, Usafi wa Mazingira Katika Kuboresha Afya ya *Wasichana* walio katika *rika balehe* Walio Shuleni Katika maeneo ya Vijijini nchini Tanzania.

Mhojiwa----------
Nafasi/kazi----------
Kata:----------
Shule:----------
Tarehe:----------

Mhojaji:----------

- *Jitambulishe na wajulishe kuhusu lengo utafiti huu na lengo lake*
- *Mahojiano haya yatakuwa kwa muda usiozidi dakika 30*
- *Wajulishe kuwa utahitaji takwimu mbalimbali na kama hawatakuwa nazo wakati huu basi unaweza kurudi baadaye kwa ajili ya kuzifuata mara baada ya usaili.*
- *Mjulishe DEO na WEO kuwa utahidi kuzunguka katika mazingira yao ili kujionea hali ya vifaa ya maji na usafi wa mazingira.*

Mahojiano:

1. Hali ya upatikanaji wa maji ikoje kwa sasa? ----------
2. Je, una maoni gani kuhusu hali hiyo ya upatikanaji wa maji na miundombinu ya usafi ikiwemo vyoo katika shule yako? ----------
3. Je, ni aina gani ya vifaa na elimu ya usafi wa mazingira inayotolewa katika shule zako/yako?-
4. Je, kuna juhudi gani zinazofanyika katika kuhakikisha kuwa uelewa na taarifa juu ya afya ya uzazi na elimu inafika katika mashule? ----------
5. Je, kuna miundombino na vifaa gani katika kuhakikisha kuwa wanafunzi wa kike wanapata hedhi salama na hawakosi masomo? ----------
6. Kwa uzoefu wako unadhani ni kwa namna gani kipindi cha hedhi kinaathiri wanafunzi wa kike kitaaluma. Unaweza kutueleza ukubwa wa tatizo ulivyo? ----------

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7. Kwa na namna gani shule yako/zako zimeathirika na matukio ya mimba za utotoni, toa mifano wa matukio haya siku za jaribuni? ----------

8. Je, una mawazo uwepo wa ukeketaji katika jamii hii kwa sababu tunaamini ujumbe ulipita lakini matendo haya yamekuwa yanaendelea?----------

9. Kwa namna gani unaweza kuzungumzia hali ya sasa ya matukio ya ukeketaji katika jamii ambako shule zako/yako ilipo, je bado ni kubwa au inapungua?----------

10. Kwa uzoefu wako, ni kwa namna gani ukeketaji unaathiri wasichana kimasomo katika shule yako? Toa mfano na ukubwa wa tatizo----------

11. Kuna juhudi gani zinazoendelea kufanyika katika kutokomeza ukeketaji ambazo unazifahamu?---
---

12. Ni aina gani ya tohara mbadala unayoifahamu ambayo unashauri iweze kutumika kwa jamii yako?
---

13. Kwa DEOs na WEO, tafadhali tupatie takwimu zifuatazo:

Takwimu - 2015	**Value**
a. Asilimia ya shule kwenye wilaya/kata yako zinazotoa elimu ya afya ya uzazi	
b. Hali ya mimba za utotoni kwa kipindi cha mwaka mmoja	
c. Hali ya utoro sababu ya ukeketaji kwa wasichana	
d. Idadi ya wanafunzi walioacha shule sababu ya ujauzito	
e. Asilimia ya shule zenye mifumo iliyoboreshwa ya huduma za maji	
f. Asilimia ya shule zenye upatikanaji wa miundombinu iliyoboreshwa ya usafi na kufuata misingi ya usafi	
g.	

14. Maoni mengine kama unayo:----------

UKAGUZI KATIKA SHULE:

15. Kagua kuona kama upatikanaji wa maji shuleni ni rahisi hapo shuleni na kuna mfumo wa uhifadhi wa maji hasa uvunaji wa maji ya mvua;
Maoni ----------

16. Kagua kuona kama hali ya vyoo (*usafi wake, harufu, vifaa ya kunawa mikono*) kama vipo choo kwa matumizi katika shule;
Maoni ----------

17. Kagua kuona kama kuna maji kwa ajili ya kunawa mikono ambayo yapo karibu na vyoo na yanatiririka
Maoni ----------

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19. Kagua kuona kama vyoo vina vifaa vya kujihidhi wakati wa hedhi
Maoni----------

20. Kagua namna takataka ikiwemo choo na taulo za hedhi zinaharibiwa/kutupwa
Maoni----------

Thank you

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APPENDIX E

Checklists for School Toilets/Latrines (English version)

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Checklists for School Toilets/Latrines (English version)

The impact of Integrating Sexual and Reproductive Health Rights; and Water, Sanitation and Hygiene interventions to adolescent schoolgirls health in rural Tanzania

1. Menstrual Hygiene Management Facilities/Materials		
Category	Yes	No
Changing room for girls available		
Sanitary Materials Available		
Basins/Buckets Available		
Sickbay Available		
Wash rooms next to girls changing room/latrines		
Water Available		
Soap Available in Washrooms		
Latrine		
School Latrines Available		
Latrines in Good Condition and Functionality		
Separate Latrines for Boys, Girls and Teachers		
Latrines in sometimes/regular use		
Latrines Swept Clean		
Feces on the Floor of the Latrines		
Full of faces and dirty		
Latrines with cover		
Flies and Bad Smell		
Open Defecation not Practiced		
Type of Latrine		
Latrines made from Permanent structure with bricks		
Made from Iron Sheet		
Hole No Superstructure		
Latrine with No Door and Key		
Larine Outdated/No functional		
Grass thatched/Mud Walls		
Latrines made of grass		
Latrine with wall but no roof		
Number of Latrine Stances/Seats		
Boys		
Girls		
Teachers		

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Water Sources		
Not available		
Rarely available but not functioning		
Rarely available and functioning		
Some Schools have water source within school compound		
Water source within 1KM		
Water source more than 1KM		
Water source environment clean		
Hand Washing		
Hand washing facility available		
Facility functioning and not damaged		
Soap/Detergent/Ash used		

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APPENDIX F.

Secondary Data Extraction Tool (English)

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The Effects of Poor Menstrual Hygiene Management on Sexual and Reproductive Health and education outcomes among adolescent schoolgirls in rural Tanzania

Secondary Data Extraction Tool

Variable	Response
1. Socio-demographic characteristics • Age • Grade • Religion • Ethnicity • If living with both parents • Family size • Access to internet	Binary, nominal and categorical
2. Knowledge of menstruation • Source of menstruation information • Causes of menstruation	Binary, nominal and categorical
3. Practices of menstruation • How the girls manage their menses while in school	Binary, nominal and categorical
4. School absenteeism • Number of days absent from school during menses • Factors contributing to school absenteeism during menses (fear of soiling, lack of facilities, discomfort or no pads)	Binary, nominal and categorical
5. Presence of Reproductive Tract Infections • Any RTIs symptoms experienced in the last 3 months • Treatment seeking behavior	Binary, nominal and categorical
6. Experience of embarrassment during while at school • Actual leaking of blood or soiling of clothes • Fear of unexpected bleeding • Mocked/teased by boys/teachers/colleagues	
7. Utilization of Health care services: • Ever used Youth Friendly Service.	
8. Needs for the menstrual hygiene management in school • Availability of MHM facilities like gender-sensitive toilets, MHM cubicles, sanitary towel disposal bins, water and soaps; and psychosocial support for menstruation	

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APPENDIX G.

a) University of Western Cape Ethical Approval

b) National Institute of Medical Research (Tanzania) Approval

c) Kilindi District Authority permission for data collection

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60 YEARS of hope, action & knowledge

09 December 2021

Mr D Ngilangwa
School of Public Health
Faculty of Community and Health Sciences

HSSREC Reference Number: HS21/10/5

Project Title: The Effects of Poor Menstrual Hygiene Management on Sexual and Reproductive Health and education outcomes among adolescent schoolgirls in rural Tanzania

Approval Period: **25 November 2021 – 25 November 2024**

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology, and amendments to the ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report by 30 November each year for the duration of the project.

For permission to conduct research using student and/or staff data or to distribute research surveys/questionnaires please apply via:
https://sites.google.com/uwc.ac.za/permissionresearch/home

The permission letter must then be submitted to HSSREC for record keeping purposes.

The Committee must be informed of any serious adverse events and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Director: Research Development
University of the Western Cape
Private Bag X 17
Bellville 7535
Republic of South Africa
Tel: +27 21 959 4111
Email: research-ethics@uwc.ac.za

NHREC Registration Number: HSSREC-130416-049

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FROM HOPE TO ACTION THROUGH KNOWLEDGE.

THE UNITED REPUBLIC OF TANZANIA

National Institute for Medical Research
3 Barack Obama Drive
P.O. Box 9653
11101 Dar es Salaam
Tel: 255 22 2121400
Fax: 255 22 2121360
E-mail: ethics@nimr.or.tz

Ministry of Health, Community
Development, Gender, Elderly & Children
University of Dodoma, Faculty of Arts
and Social Sciences
Building No. 11
P.O. Box 743
40478 Dodoma

NIMR/HQ/R.8a/Vol. IX/2829

27th July 2018

David Paul Ngilangwa
AMREF Health Africa Tanzania
P.O. Box 14112
Dar es Salaam

RE: ETHICAL CLEARANCE CERTIFICATE FOR CONDUCTING MEDICAL RESEARCH IN TANZANIA

This is to certify that the research entitled: The impact of integrating sexual and reproductive health rights; and water, sanitation and hygiene interventions to improve adolescent schoolgirls' health in rural Tanzania (Ngilangwa D.P *et al.*) has been granted ethical clearance to be conducted in Tanzania.

The Principal Investigator of the study must ensure that the following conditions are fulfilled:

1. Progress report is submitted to the Ministry of Health, Community Development, Gender, Elderly & Children and the National Institute for Medical Research, Regional and District Medical Officers after every six months.
2. Permission to publish the results is obtained from National Institute for Medical Research.
3. Copies of final publications are made available to the Ministry of Health, Community Development, Gender, Elderly & Children and the National Institute for Medical Research.
4. Any researcher, who contravenes or fails to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III Section 10(2).
5. Site: Tanga region in Tanzania.

Approval is valid for one year: 27th July 2018 to 26th July 2019.

Name: Prof. Yunus Daud Mgaya

Signature
CHAIRPERSON
MEDICAL RESEARCH
COORDINATING COMMITTEE

Name: Prof. Muhammad Bakari Kambi

Signature
CHIEF MEDICAL OFFICER
MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT, GENDER, ELDERLY & CHILDREN

CC: Director, Health Services-TAMISEMI Dodoma
RMO of Mara and Kagera regions
DMO/DED of respective districts

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HALMASHAURI YA WILAYA KILINDI

(Barua zote zitumwe kwa Mkurugenzi Mtendaji (W))

Simu : 027–2977306
Nukushi: 027 – 2977307
Barua Pepe: kilindidc@tanga.go.tz
Unapojibu taja

Mkurugenzi Mtendaji (W)
S.L.P. 18
SONGE - KILINDI

Kumb. Na KDC/M/20/40/186 **29/06/2018**

Meneja wa Mradi
AMREF HEALTH AFRICA
KILINDI

YAH: OMBI LA KIBALI CHA MUDA MFUPI CHA KUFANYA UKUSANYAJI WA TAARIFA KWA AJILI YA TATHMINI YA KATA YA UTEKELEZAJI WA MRADI WA AFYA YA UZAZI, MAJI NA USAFI WA MAZINGIRA.

Rejea barua yako ya tarehe **26/06/2018** iliyohusu kupatiwa kibali cha muda mfupi cha kufanya ukusanyaji wa taarifa.

Kwa barua hii ofisi inapenda kukujulisha kuwa mmeruhusiwa kuendelea na zoezi hilo la ukusanyaji wa taarifa. Aidha unatakiwa kuwataarifu wahusika wote ili waweze kushirirki katika zoezi hilo.

Nakutakia kazi njema.

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Clemence A. Mwakasendo
MKURUGENZI MTENDAJI (W)
KILINDI.

MKURUGENZI MTENDAJI
HALMASHAURI YA WILAYA
KILINDI

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APPENDIX H.

a) Informed Consent (English)

b) Informed Consent (Kiswahili)

c) Assent form (English)

d) Assent form (Kiswahili)

(a)

Informed Consent Form

The impact of Integrating Sexual and Reproductive Health Rights; and Water, Sanitation and Hygiene interventions to adolescent schoolgirls health in rural Tanzania

(To be read to participant by the Interviewer)

Name of Principal Investigator:

David Paul Ngilangwa
Amref Health Africa
Ali Hassan Mwinyi Road 1019,
P.O Box 2773,
Dar es Salaam, Tanzania
Email: dngilangwa@yahoo.com

Background and invitation to Participate: Researchers from Amref Health Africa are doing research in this area to understand the impact of integrating the Water, Hygiene and Sanitation with Sexual and Reproductive Health Rights interventions in improving the health of school girls in Kilindi district, Tanga region in order to inform program and policy makers for the purpose of improving healthcare delivery of youth and entire population in the country. Youth of in-school, Healthcare Workers, Community members from in Kilindi district and other stakeholders will be interviewed. You are invited to participate in a research study. This form is designed to help you decide if you would like to take part as a participant in this research or not.

You will be asked to **participate in an in-depth interview, focus group discussion and/or structured questionnaire** to provide information which will enable us to understand how the Water, Hygiene and Sanitation with Sexual and Reproductive Health Rights interventions in area have impacted the health of school girls in this area and what the level of its uptake in this area. This interview will last for up to one hour, if you do not feel comfortable answering some questions, we ask that you skip the question or discontinue your participation in the study. If you agree, in-depth interview will be tape recorded.

The risks for your participation in this research are minimal. The risks of taking part in the discussion are very minimal, if any. However, some questions might make you feel uncomfortable or embarrassed. You may choose to refuse answering them or any questions. For both in-depth and structured interviews, findings will not be attributed to identifiable respondents; attribution will be by broad categories such as "Woman, Kilindi''.

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There are **no immediate and direct benefits** to you; however, answers that you will provide us are likely to help us understand the the impact of Water, Hygiene and Sanitation with Sexual and Reproductive Health Rights interventions in Tanzania. We hope that this knowledge will assist the policy makers at local, national and international level to improve the planning, provision,coordination and delivery of healthcare services that may be beneficial to the community. Despite the fact that, there are no costs to you for taking part in this research but you will receive **Tshs 2,000** for refreshment during the discussion.

The information that we collect from this research project will be kept completely **confidential.** Information that identifies you will be protected. Specifically, only the informed consent will bear your name. All the other study documents and tapes will have a study code only, making it difficult to identify the participant. Besides, your name will not appear in my notes or in any report or publication about this research. We will keep the information you tell us confidential. The only people who will see my notes are people working on this research, although this cannot be absolutely guaranteed. I will, however, do my best to keep this information from being seen from others. For example, my notes and audiotapes will be kept in a locked cabinet and in a locked office for three years and then they will be destroyed. However, at any point during and after the study IRB may require to access records for audit purposes.

Your participation in this study is completely **voluntary.** You have the **right to stop the study and/or withdraw from it** at any time without penalty or jeopardizing access of services provided by Amref Health Africa and its other partners. If you choose to withdraw from the study, all the data collected will be destroyed. **If at any point you want to stop participating or to withdraw from the study**, simply tell the researcher and the session will be ended immediately. **There is no penalty for withdrawing.**

This research has been reviewed and approved by the Amref Health Africa's Institutional Review Board. This board reviews research studies in order to help protect participants. If you have any questions about your rights as a research participant you may contact

The Secretary,
Amref Health Africa Institutional Review Board
Tel: +255-22-2131981/ 2116610/ 2136731
Email: info.tanzania@amref.org

If you have any further questions, please ask me/us for further explanation now.

Verification of Consent

I would like to remind you that your participation in this research is completely voluntary. You have the right to decline to be in this research. You can also stop taking part at any point. If you choose not to participate in this research, there will be no penalty or loss of benefits that you receive at the center/clinic/organization where you were contacted about this interview.

If you agree to participate, tick as appropriate:

☐ I wish what I say to remain anonymous:

☐ I do not mind if my first name is linked to my comments:

☐ I do not mind if my first name and surname are linked to my comments:

Your signature below indicates that you have voluntarily decided to participate in this research, that you have read and understand the information provided above. Please return a copy and keep one for your records.

Name (optional):_____

_____	_____	_____
Participant's Signature/thumbprint	Printed Name	Date
_____	_____	_____
Participant's Witness Signature*	Printed Name	Date
_____	_____	_____
Researcher's Signature	Printed Name	Date

Date of IRB approval of this consent:

Expiration date of IRB approval of this consent:

**If participant is not able to read*

(b)

Fomu ya Kutoa Idhini ya Kushiriki katika Utafiti

Tathmini ya Ujumuishaji wa Huduma za Haki ya Afya ya Uzazi pamoja na Maji, Usafi wa Mazingira Katika Kuboresha Afya ya *Wasichana* walio katika *rika balehe* Walio Shuleni Katika maeneo ya Vijijini nchini Tanzania.

(*Msahili amsomee maelezo haya msahiliwa)*

Jina la Mtafiti Mkuu:

David Paul Ngilangwa
Amref Health Africa
P.O. Box 2773 Dar es Salaam
Barua pepe: dngilangwa@yahoo.com

Utangulizi/Madhumuni ya Utafiti: Watafiti kutoka Amref Health Africa wanafanya utafiti katika eneo hili ili kujua athari za kuunganisha maji, usafi na usafi wa mazingira kwenye kuboresha haki afya ya uzazi ya wasichana shuleni katika wilaya ya Kilindi,mkoa wa Tanga,ili kutaarifu program na watunga sera kwa lengo lakuboresha utoaji wa huduma kwa vijana na watu wote nchini. Vijana wa shule,watoa huduma wa afya na jamii nzima ya wilaya ya Kilindi na wadau watahojiwa. Unakaribishwa kushiriki kwenye utafiti huu.Fomu hii imetengenezwa ili kukusaidia kuamua kama utapenda au hautapenda kuwa mshiriki kwenye utafiti huu. Lengo kuu la maelezo haya ni kukujulisha kuhusu mambo ambayo yatafanyika/kutokea wakati wa majadiliano/usahili na hivyo kukupa hiari ya kuchagua kushiriki au kutoshiri katika majadiliano haya.

Unaombwa kushiriki katika **mahojiano ya kina, majadiliano ya kikundi na/au dodoso la maswali** ili kutoa taarifa ambazo zitatuwezesha kujua namna umuhimu wa huduma rafiki kwa vijana katika kuboresha afya ya uzazi kwa vijana. Mahojiano haya yatafanyika kwa muda wa hadi saa moja, ikiwa hujisikii kunijibu maswali nitakayokuuliza unaweza kuniambia ili tuyaruke au tukatishe mazungumzo haya. Kwa ridhaa yako mahojiano haya yanaweza kurekodiwa kwenye kinasa sauti.

Madhara ya kushiriki. Madhara ya kushiriki katika utafiti huu ni madogo sana au hayapo kabisa. Ingawa unaweza kujisikia vibaya au aibu kutokana na baadhi ya maswali nitakayokuuliza, hata hivyo unao uamuzi wa kuchagua kuyajbu au kutojibu swali lolote utakaloona halikupendezi. Kwa mahojiano ya kina na ya dodoso popote pale tutakapotoa ripoti ya utafiti huu hatutakuja jina moja kwa moja badala yake majina ya jumla kama “Mwanafunzi wa Kilindi” alisema hivi.

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Inawezekana kusiwe na **faida ya moja kwa moja** kwa kushiriki katika utafiti huu, hata hivyo taarifa utazotupatia katika mahojiano haya ya leo zitatusaidia kujua umuhimu wa kamati za usimamizi wa vituo vya kutolea huduma za afya katika kuboresha upatikanaji na ubora wa huduma za afya nchini. Pia tutatumia taarifa hizo kuboresha namna ya kutoa huduma za afya hapa mkoani Tanga na Tanzania kwa ujumla na hata kimataifa. Pamoja na kuwa hutatozwa gharama zozote kwa kushiriki katika utafiti huu,hata hivyo utapokea kiasi cha **shilingi 1,000** kwa ajili ya kiburudisho wakati wa mazungumzo.

Taarifa zote tutakazokusanya kwenye utafiti huu tutazitunza kwa **usiri mkubwa**, kwa namna yoyote ile hatutaandika jina lako katika mkanda wa kaseti zitakazorekodi katika majadiliano haya na kaseti hizo zitaharibiwa mara baada ya zoezi la kuchambua taarifa kukamilika.Tafadhali nijulishe iwapo usingependa nirekodi mazungumzo haya ili nisirekodi. Hatutaandika jina lako katika taarifa za uchambuzi, ripoti,makala au machapisho yoyote kuhusu utafiti huu.Tutahifadhi kwa usiri mkubwa taarifa zote utakazotupa.Watu wanaoweza kuona taarifa zetu ni wafanyakazi wa utafiti huu,ingawa hili hatuwezi kukuhakikishia moja kwa moja. IJapokuwa ninakuhakikishia kuwa nitajitahidi kadri uwezo wangu wote kuhifadhi taarifa hizi zisionwe na watu wengine zaidi ya wafanyakazi wa utafiti.Kwa mfano taarifa zangu za maandishi ninazoandika na mikanda ya kaseti iliyorekodiwa hapa itafungiwa ofisini katika kabati lenye komeo.Ingawa pale itakapobidi Kamati ya Maadili ya Utafiti inaweza kuziona taarifa ya utafiti huu kwa ajili ya makusudi ya ukaguzi tu.

Ushiriki wako katika utafiti huu **wa hiari kabisa**.Una **haki ya kuamua kushiriki/kutoshiriki au kujitoa katika utafiti huu muda wowote utakapoona inafaa kufanya**. Hakuna adhabu yoyote itakayotolewa kwa wewe kutoshiriki katika utafiti huu hii ikiwa ni pamoja na kutoathiri nafasi yako ya kupata huduma mbalimbali unazostahili kuzipata zinazotolewa na Amref Health Africa, washirika wake au katika katika kituo ulichokutwa na watafiti wa mradi huu. Ukitaka kujitoa mweleze tu mtafiti na atasitisha mazungumzo muda huo huo. Kumbuka hakuna adhabu au madhara ya kujitoa katika utafiti.

Utafiti huu umehakikiwa na kupitishwa na Kamati ya Maadili ya Utafiti ya Amref Health Africa. Kamati ya maadili ya Utafiti hupitia na kuhakiki tafiti mbalimbali ili kuwalinda haki za washiriki wa utafiti.Iwapo utakuwa na swali lolote kuhusu haki zako kama mshiriki wa utafiti unaweza kuwasiliana na;

Katibu,
Kamati ya Maadili ya Utafiti,
Amref Health Africa- Tanzania
Simu:: +255-22-2131981/ 2116610/ 2136731
Barua pepe: info.tanzania@amref.org

Je,una swali lolote ambalo ungependa kuniuliza?

Uthibitisho wa Kutoa Idhini ya Kushiriki Utafiti

Ningependa kukumbusha tena kuwa ushiriki wako katika utafiti huu ni wa hiari kabisa. Unayo haki na uamuzi wa kukubali au kukataa kushiriki. Pia unaweza kuamua kujitoa au kukatiza ushiriki wako saa yoyote utakapoona inafaa kufanya hivyo. Utakapo kuamua kujitoa hakutakuwa na adhabu yoyote au kuhatarisha kupata huduma unazostahili kuzipata zinazotolewa na Amref Health Africa au kituo cha huduma za afya unakopata huduma mbalimbali.

Ikiwa unakubali kushiriki, basi jaza kisanduku kinachohusika:

☐ Ningependa utambulisho wangu usijulikane:

☐ Sijali hata kama jina langu la kwanza/pili au yote mawili yataoanishwa na majibu yangu:

Kwa kuweka saini yako hapa chini inadhihirisha kuwa umekubali kwa hiari yako kushiriki katika utafiti huu, na pia umesoma na kuelewa taarifa zote zilitolewa hapo juu. Tafadhali rudisha nakala moja ya fomu hii na nyingine unaweza kuchukua kwa ajili kumbukumbuku zako.

Jina (Si lazima):_____

_____ _____ _____

Saini ya mshiriki/alama ya dole gumba Jina Tarehe

_____ _____ _____

Saini ya shahidi wa mshiriki* Jina Tarehe

_____ _____ _____

Saini ya Mtafiti Jina Tarehe

Tarehe ya utafiti kupitishwa na Kamati ya Maadili:

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* *Ikiwa mshiriki hawezi kusoma wala kuandika*

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(c)

Assent Form

The impact of Integrating Sexual and Reproductive Health Rights; and Water, Sanitation and Hygiene interventions to adolescent schoolgirls health in rural Tanzania

My name is…… I work Amref Health Africa Tanzania. I am asking you to take part in a research study because I want to learn more about understand the impact of integrating the Water, Hygiene and Sanitation with Sexual and Reproductive Health Rights interventions in improving the health of school girls in Kilindi district,

If you agree, you will be asked few questions. You will be asked about relationships, menstruations and sexual life. Answering these questions will take about 30 minutes.

You do not have to be in this study. No one will beat you if you decide not to answer my questions. Even if you start, you can stop later if you want to do so. You can ask me questions if you want.

If you decide to be in the study, I will not tell anyone else what you say about your father or other children's father. Even if your father, mother or your teacher asks, I will not tell them.

By signing here means that you have read this form or I have read it to and you accept to answer my questions.

Signature of participant: ----------

Participant's printed name: ----------

Signature of interviewer: ----------

Date: ----------

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(d)

Fomu ya Kutoa Idhini ya Kushiriki katika Utafiti kwa mtoto

(Assent form)

Tathmini ya Ujumuishaji wa Huduma za Haki ya Afya ya Uzazi pamoja na Maji, Usafi wa Mazingira Katika Kuboresha Afya ya *Wasichana* walio katika *rika balehe* Walio Shuleni Katika maeneo ya Vijijini nchini Tanzania.

Habari ya asubuhi/alasiri. Jina langu ni----------(**your name**). Ninafanya kazi na Amref Health Africa hapa Tanzania.
Ningependa kukuomba ushiriki katika utafiti huu ili niweze kujifunza mambo mbalimbali kutoka kwako hasa kuhusu kujua athari za kuunganisha maji, usafi na usafi wa mazingira kwenye kuboresha haki afya ya uzazi ya wasichana shuleni katika wilaya ya Kilindi,mkoa wa Tanga.

Iwapo utakubali kushiriki nitakuuliza maswali machache. Nitakuuliza kuhusu namna ya kujitunza wakati wa hedhi na namna miundo mbinu ya shuleni inavyoruhusu. Mazungumzo yetu haya yatachukua muda wa dakika thelathini.

Hakuna atakayekupigia au kukuadhibu kama utaamua kutokujibu maswali yangu ambayo nitakayokuuliza. Hata kama utakuwa umeanza, uko huru kunieleza niache kukuliza maswali usiyoyapendelea ama kutojibu maswali usiyoyapendelea kama utajisikia kufanya hivyo. Unaweza kuniuliza maswali yoyote kama unataka.

Iwapo utaamua kushiriki katika mazungumzo haya nami sitamwambia/sitamwelezea mtu yeyote kuhusu mambo utayonielezea kuhusu baba yako au baba wa rafiki zako. Hata baba yako, mama yako au mwalimu wako wakiniuliza sitawaambia.

Kwa kutia sahihi fomu hii inaonesha kuwa umesoma au nimekusomea maelezo haya na umekubali kujibu maswali yangu.

Sahihi ya Mshiriki: ----------

Jina la Mshiriki: ----------

Sahihi ya Mhojaji: ----------

Tarehe: ----------

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APPENDIX I.

a) Request for Data use permission

b) Amref Health Africa Data use permission

c) Confirmation of the Involvement in Research

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(a)

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21 959 2809 Fax: 27 21 959 2872

E-mail: soph-comm@uwc.ac.za

7th May 2021

Dr Florence Temu,
Country Director,
Amref Health Africa
P.O Box 2773,
Dar es Salaam, Tanzania.

Dear Dr Temu,

Request for Permission to Use Amref Health Africa Data My PhD Studies

I am writing this letter to request the permission to use and analyze the data collected from the project titled "***The Impact of Integrating Sexual and Reproductive Health Rights; and Water, Hygiene and Sanitation Interventions to Improve Adolescents' Health and Education in Rural Tanzania"*** conducted in August 2018 in Kilindi district Tanzania of which I served as Principal Investigator.

The requested data to will be used exclusively for academic purposes i.e. to write my PhD thesis project titled, "***The effects of Poor Menstrual Hygiene Management on Sexual and Reproductive Health and education outcomes of adolescent schoolgirls in rural Tanzania***." Upon graduation I will share with Amref Health Africa the final version of my thesis. Later, the findings will be extracted from the thesis and published in peer-reviewed journals with authorship shared between me and other designated Amref Health Africa staff. Also, Amref Health Africa will be acknowledged in thesis and subsequent publications.

I promise to adhere to all research ethics principles while handling the data and presenting the study findings, particularly ensuring anonymity of study participants.

I would be grateful for this opportunity. In case of any questions, I can be reached by email: dngilangwa@yahoo.com or mobile phone +255 756 997676.

I look forward to receiving your positive response.

Your sincerely,

David P. Ngilangwa
PhD student.

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amref health africa

Amref Health Africa Tanzania

Our Ref: ACD.T/151/05/2021

Thursday, May 27, 2021

David P. Ngilangwa,
University of the Western Cape
Robert Sobukwe Road, P/Bag X17
Bellville 7535.
Cape Town, RSA

Dear Mr Ngilangwa,

Re: Permission to Use Amref Health Africa Tanzania Project Data for Your PhD Studies

I am pleased to grant you permission to use and analyze the data collected on the project titled "***The Impact of Integrating Sexual and Reproductive Health Rights; and Water, Hygiene and Sanitation Interventions to Improve Adolescents' Health and Education in Rural Tanzania"*** conducted in August 2018 in Kilindi District Tanzania of which you served as Principal Investigator.

The data should be expressly used for academic purposes i.e. your PhD thesis project titled, "***The Effects of Poor Menstrual Hygiene Management on Sexual and Reproductive Health Rights (SRHR) Health and Education Outcomes of Adolescent Schoolgirls in Rural Tanzania***."

Please ensure you adhere to all the conditions underlined in Data Use Agreement while handling the data and presenting the study findings.

Amref Health Africa Tanzania will require a copy of your final PhD thesis immediately after your graduation for the Organization's future reference.

I wish you all the best with your PhD studies. If there are any questions, please contact my office.

Yours sincerely,

Dr. Florence Temu
Country Director
Amref Health Africa in Tanzania

UNIVERSITY of the WESTERN CAPE
http://etd.uwc.ac.za/

Our Ref: ACD.T/287/09/2021

September 28, 2021

Chairperson,
Higher Degrees Committee,
University of Western Cape,
Private Bag X 17,
Bellville 7535, South Africa

Re: Confirmation of the Involvement of Mr. David Paul Ngilangwa in Research

Amref Health Africa in Tanzania in its noble cause of creating lasting health change in Africa strives to conduct quality and scientifically sound research to inform and improve the communities' wellbeing. Robust researches conducted by Amref Health Africa feed the advocacy to influence the health policies at local, national and regional and international levels. In the same light, Amref Health Africa is committed to protecting the rights of research participants in all studies which it undertakes.

This letter serves to confirm that Mr. David Paul Ngilangwa served as the Principal Investigator for the study titled "***The Impact of Integrating Sexual and Reproductive Health Rights; and Water, Hygiene and Sanitation Interventions to Improve Adolescents' Health and Education in Rural Tanzania"*** conducted in August 2018 in Kilindi District Tanzania of which had the component of the Menstrual Hygiene Management of which he has been permitted by Amref Health Africa to use in his PhD thesis. In this study Mr. Ngilangwa was responsible for the conceptualization, study design, data collection, supervision, quality control and report writing for the donor.

Apart from the internal use of the study findings to inform the project donor and stakeholders at the local government level, the study findings have never been analyzed or published anywhere.

I hope that the findings from Mr. Ngilangwa's thesis will add to the knowledge to field and influence the policy and programs in Tanzania and Africa in general. If there are any questions, please contact my office.

Yours sincerely,

Dr. Florence Temu
Country Director
Amref Health Africa in Tanzania

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