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AVAILABILITY OF SCHOOL-BASED WATER, SANITATION AND HYGIENE (WASH) FACILITIES: IMPLICATIONS FOR MENSTRUAL HYGIENE MANAGEMENT, SCHOOL ATTENDANCE AND LEARNING OUTCOMES IN GHANA

BY

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DECLARATION

I, **JONES AGYAPONG FRIMPONG**, hereby declare that, except for references to other people's work, which have been duly acknowledged, this is the result of my own research conducted under the joint supervision of Prof. Samuel Nii Ardey Codjoe, Dr. Mumuni Abu and Dr. Angela Kyerewaa Ayisi-Addo. I further declare that this work has neither in part nor in whole been presented for another degree.

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DEDICATION

This thesis is dedicated to my lovely wife, Patience Oforiwaa Frimpong, my wonderful daughter, Anuonyam Adjoa Oforiwaa Frimpong, my exceptional mum, Grace Anima Kankam, to the memory of my late father, Foster Kwabena Frimpong and my siblings for all their great support throughout my PhD Programme.

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ABSTRACT

Access to Water, Sanitation, and Hygiene (WASH) facilities at all levels, especially at the school level, is deemed a right for all. While there is a growing amount of evidence on the impact of WASH facilities on educational outcomes, limited attention has been focused on studying the interlinkages. For instance, the role of WASH facilities in mediating the effect of menstrual hygiene management (MHM) and school attendance on learning outcomes has not been fully established. In Ghana, the extant studies have largely focused on assessing knowledge, attitudes and practices on menstrual hygiene management and enrolment at higher levels of education. However, similar effects at the primary and Junior High School (JHS) level have been scarcely studied. This study therefore examined the interrelationships between WASH facilities in schools in Ghana, MHM, school attendance and learning outcomes – adding the learning outcome component to the WASH discussions.

The study adopted a concurrent triangulation mixed method approach - using both quantitative and qualitative approaches. Data was collected from 24 primary and 24 Junior High schools across six districts in the three zones (Northern, Southern and Middle zones) of Ghana. In all, 875 girls across both primary and JHS were quantitatively surveyed in selected schools. With reference to the qualitative data, 43 Focus Group Discussions (FGD) with girls and 43 Key Informant Interviews (KII) with School Health and Education Programme (SHEP) Coordinators were conducted. Chi-square test was used to determine the level of association between WASH facilities, MHM, school attendance and learning outcomes. An ordered logistic regression model was also fitted to establish the predictors of learning outcomes. The qualitative data was analysed using the thematic analysis approach with the aid of the Dedoose software.

The study establishes that generally, the WASH situation across schools in Ghana has slightly improved, however, there is much more to be achieved in terms of coverage, especially in relation to hygiene facilities. On average, one out of every 10 public schools has no access to improved drinking water sources (12.5%) and a fifth (2 out of 10) of schools (20.8%) do not have sanitation (toilet) facilities or non-functional improved sources. The case of hygiene facilities is much more dire, with about four out of every 10 public schools (43.7%) having no hygiene (handwashing) facilities. Overall, the availability of WASH facilities in schools and school attendance are key predictors of learning outcomes. The findings show that there is a strong statistical association between the availability of WASH and school attendance ($p=0.000$) and learning outcomes. However, there is no association between MHM and learning outcomes ($p<0.062$). The results of the ordered logistic model further highlight the level of the association – showing that the availability of water facilities in schools increases the odds of having better learning outcomes compared no facility (water: odds ratio 3.223; [95% CI: 2.119 - 4.903], $p=0.000$). Again, the regularity of school attendance increases the odds of having better learning outcomes compared to irregular school attendance (odds ratio: 1.715 [95% CI: 1.304 - 2.257], $p=0.000$). However, the finding shows no statistically significant association between MHM and learning outcomes (odds ratio: 0.766 [95% CI: 0.576 - 1.018], $p = 0.067$).

The results establish the importance of WASH and school attendance to improving learning outcomes in schools. The study therefore recommends continuous investment in school-based WASH facilities by Government – working through the Ministry of Education and the Ghana Education Service and donor Agencies including UNICEF as a basic necessity to improving MHM, school attendance, and learning outcomes in schools.

The study also showed that learning outcome is generally poor with about a third of students (28%) having poor learning outcomes. The study therefore recommends that more effort be put in by the Ghana Education Service in strengthening classroom-level methodologies in improving teaching and learning for girls. Further, there should be more sensitisation at the school level by the Girl Child Officers in collaboration with other like-minded Civil Society Organisations (CSOs) in whipping up girls' interest in learning and education in general.

The evidence highlights that girls miss more school days as a result of factors other than access to WASH and menstruation. The study therefore recommends that a more holistic approach be adopted by Government – working through the relevant institutions in crafting interventions targeted at improving school attendance and learning outcomes of girls. Focus must be placed in addressing some of the social cultural and economic challenges that keep girls out of school and impacts on their learning.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BECE	Basic Education Certificate Examination
CAPI	Computer Assisted Personal Interviewing
CCNY	Carnegie Corporation of New York
CGS	Capitation Grant Scheme
COVID	Coronavirus Disease
CSOs	Civil Society Organisations
ECH	Ethics Committee for Humanities
EMIS	Education Management Information System
ENCAPEH	Enhancing Capacity and Postgraduate Education at the University of Ghana
FCDO	Foreign, Commonwealth and Development Office
FGD	Focus Group Discussion
GDHS	Ghana Demographic and Health Survey
GES	Ghana Education Service
G-PASS	Girls-Participatory Approaches for Student Success
GSS	Ghana Statistical Service
GWASHSDP	Ghana Water, Sanitation and Hygiene Sector Development Programme
HWFs	Handwashing facilities
IDIs	In-depth Interviews

IQR	Interquartile Range
JHS	Junior High School
JMP	Joint Monitoring Programme
KII	Key Informant Interviews
KVIP	Kumasi Ventilated-Improved Pit
LMICs	Low and Middle-Income Countries
MHM	Menstrual Hygiene Management
MICS	Multiple Indicator Cluster Survey
NaCCA	National Council for Curriculum and Assessment
NGOs	Non-governmental Organisations
NST	National Standardised Test
PAPI	Pen and Paper Personal Interview
PTAs	Parent Teacher Associations
RIPS	Regional Institute for Population Studies
SDG	Sustainable Development Goal
SHEP	School Health and Education Programme
SSA	Sub-Saharan Africa
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
WAEC	West African Examination Council

WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The availability of safe drinking water, sanitation, and hygiene (WASH) at all levels, but especially in schools, is deemed a right for all (WHO & UNICEF, 2018; Acheampong et al., 2018; McMichael, 2019). The United Nations member states acknowledge the important role of WASH in promoting learning effectiveness within the school system, featuring it prominently in Sustainable Development Goal (SDG) 6, targets 6.1 and 6.2 specifically. This is targeted at ensuring 'universal' WASH access 'for all' by 2030[1] (UNICEF/WHO, 2021; WHO, 2020). Goal 6 of the SDGs emphasises the need for the availability and sustainability of WASH in the school system, reflecting a growing awareness of the importance of proper hygienic conditions in providing a positive and productive learning environment for students (WHO & UNICEF, 2018). The World Health Organisation (WHO, 2020) emphasises that the availability of adequate clean water and hygiene in schools is essential to achieving key aspects of the SDGs. These include the achievement of quality education that hinges on inclusivity and equitability, which facilitates quality education and promotes life-long learning opportunities for all (Goal 4) as well as the attainment of gender equality and women and girls' empowerment at all levels (Goal 5).

The specific SDGs of focus are highlighted below to provide a basis for the linkage

[1] "Target 4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, nonviolent, inclusive and effective learning environments for all"
"4.a.1 Proportion of schools with access to: … (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic handwashing facilities (as per the WASH indicator definitions)"
"Target 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all
6.1.1 Proportion of population using safely managed drinking water services"
"Target 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations"
"6.2.1 Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water"

The provision of WASH facilities[2] and services in schools is seen as a key determinant that contributes to boosting educational achievement, improving reproductive health, and promoting gender equity (Acheampong et al., 2018; Ahmed et al., 2022). It has also been established that the unavailability or inadequacy of WASH facilities, especially in schools, is a major impediment to school attendance for girls during menstruation, compromising their ability to maintain proper hygiene and privacy (Chard et al., 2019; Chinyama et al., 2019; McMahon et al., 2011). The effect is poor menstrual hygiene management, which could result in a sense of shame, anxiety, and embarrassment, contributing to a high incidence of absenteeism and poor learning outcomes (Mahon & Fernandes, 2010).

Notwithstanding the benefits of WASH facilities, the stock in schools across the world depicts a rather disturbing trend. As of 2016, almost one-fifth (19%) of all schools at all levels across the world had no access to basic water services, which meant reliance on unimproved sources including unprotected dug-out wells, unprotected springs, or surface water, or had no facility at all (WHO/UNICEF Joint Monitoring Programme, 2018). In 2020, approximately 570 million students around the world were without a fundamental service, with either restricted or no access to drinking water at school. This trend, according to the WHO/UNICEF Joint Monitoring Programme (2020), shows signs of improvement with about seven out of every 10 children having access to basic drinking water in school (Edmonds et al., 2020). A more alarming scenario is observed in Sub-Saharan Africa (SSA) where over 50% of schools have no access to basic drinking water (WHO/UNICEF Joint Monitoring Programme, 2020). The Ghanaian context is very similar to the SSA situation. UNICEF reported in 2012 that only 49% of basic schools in Ghana

[2] WASH in schools according to the UNICEF/WHO Joint Monitoring Programme (JMP) comprises either improved or unimproved water, sanitation and hygiene facilities. Detailed explanations are provided under categorisation of variables under the methodology section.

(Crèche/Nursery, Kindergarten, Primary Schools, and Junior High Schools) had access to water (UNICEF, 2012). In 2016, two out of every five public basic schools in Ghana lacked proper sanitation facilities, while three out of every five basic schools lacked access to safe drinking water (UNICEF, 2016).

In terms of sanitation and hygiene facilities, roughly 23% of schools worldwide had no sanitation service and relied solely on unimproved facilities such as pit latrines without a slab or platform, hanging latrines, or bucket latrines, or had no sanitation facility at all (WHO/UNICEF Joint Monitoring Programme, 2018). Similarly, more than 620 million children lacked very basic sanitation facilities. Current trends, however, show significant improvements with approximately two out of every three students having access to basic sanitation at school (WHO/UNICEF Joint Monitoring Programme, 2020). Sanitation coverage in the context of schools in SSA shows the lowest levels/trends (Susmita et al., 2018; Edmonds et al., 2020). As of 2016, more than half of the nations in SSA had below 50% sanitation coverage in schools.

In Ghana, for example, data from the Ghana Education Management Information System (EMIS, 2019/20) show that a little over a fourth of public basic schools in Ghana (26%) have no toilet and water facilities (25%) with a slightly higher percentage (31%) not having access to urinals. The situation across private schools depicts a much worse scenario with only 22%, 25% and 20% of private basic schools having toilets, water and urinals, respectively (EMIS, 2019/20). This impacts school attendance in Ghana, resulting in loss of progression and wide educational inequality gaps.

The key question is, how does the availability or non-availability of WASH facilities impact key school-level variables including menstrual hygiene management for girls, general school attendance and its implications for learning outcomes? Several studies (Chinyama et al., 2019;

Acheampong et al., 2018; Kaur et al., 2018; Alam et al., 2017; Bethany Caruso et al., 2013) have discussed the limits menstruation puts on school attendance and attainment. For example, the study by Acheampong et al. (2018) conducted in Ghana (targeting girls at puberty from primary school stage 6 to second year Junior High School - JHS) showed that on average, menstruating girls are likely to miss school 3-days in a month, 9-days in an academic term and 27-days across an entire academic year.. A similar study conducted by Alam et al. (2017) showed that girls (11 to 17 years old who reached menarche) missed an average of 2.8 days each menstrual cycle, constituting approximately 16% of the academic year. A World Bank report conducted earlier in 2005 among girls ages 13 – 18 had similar findings. The report shows that girls could miss up to four consecutive days of school every month because of menstruation, meaning they missed 10% – 20% of school time – with a possible impact on school outcomes (Adams et al., 2009). In a similar vein, a study conducted by WaterAid in 2012 shows that 95% of girls in Ghana sometimes miss about four school days in a month as a result of menstruation. The study also revealed that 48-59% of girls in urban areas and about 90% of girls in peri-urban/rural areas in Ghana felt shame during the menstrual period and as such missed school during those times. In terms of drop-out rate among Junior High School pupils, the study established a higher percentage among girls than boys (65% for girls compared to 58% for boys by the 9th year of school).

The emerging evidence on the impact of WASH facilities on school-related activities has primarily focused on absenteeism (Chard et al., 2019; McMichael, 2019; Trinies et al., 2016). The evidence suggests that the absence of WASH facilities in schools encourages absenteeism, which could be associated with reduced academic performance (Ahmed et al., 2022; Moonie et al., 2008; Baxter et al., 2011). A study conducted by Ahmed et al. (2022) investigated the impact of clean water availability in schools on attendance rates. The findings of the research revealed a significant

positive correlation between the provision of clean water and increased attendance rates among students. This implies that when schools have access to appropriate WASH facilities, students are more likely to attend their classes regularly. The availability of WASH also plays a crucial role in promoting optimal health and well-being, which in turn facilitates a conducive learning environment. When students have convenient access to clean water, they are less likely to fall ill due to waterborne diseases, enhancing their overall attendance and participation in school activities. Similarly, Freeman et al. (2014) and Dreibelbis et al. (2013) highlight the key role access to quality sanitation and hygiene facilities in schools plays in influencing school attendance, especially for girls, and consequently affects learning outcomes.

The evidence relating to the impact of WASH on learning outcomes is quite limited. However, a few empirical studies have established the association between these variables. A study conducted by Bonu and Joshi (2014) found a positive relationship between access to clean water, adequate sanitation facilities, and improved learning outcomes in schools. The study revealed that students attending schools with better water, sanitation, and hygiene (WASH) facilities had significantly higher literacy and numeracy scores compared to students attending schools with poor WASH facilities. In a study conducted by Dreibelbis et al. (2013), a positive correlation was found between improved hygiene practices and enhanced academic performance. In more recent studies (Abanyie et al., 2021; Divyanshi, 2016), the authors assessed whether students who had greater access to usable toilets and drinking water facilities at school and home had higher test scores and found that having at least one usable toilet and a drinking water source in schools is positively associated with test scores.

The empirical evidence further emphasises that adequate WASH facilities not only contribute to the well-being of students but also have implications for keeping them consistently in school,

which, in turn, can lead to improved learning outcomes (Phillips-Howard et al., 2016, Sommer et al., 2016). In most Ghanaian public schools, students' water, sanitation and hygiene needs, particularly those of menstruating girls, are rarely addressed in terms of adequate health education and the types of sanitary facilities offered. In this regard, Ghana embraced the need for water, sanitation and hygiene improvements and adolescent girl health at educational institutions, which resulted in the establishment of the School Health Education Programme (SHEP) in 2012, under the Ghana Education Service. The programme stipulates that schools must be specifically committed to:

- facilitating the provision of a regular supply of safe water through various water arrangements;
- promoting the building of safe toilets, urinals, and waste disposal facilities that are age, gender, and disability friendly;
- providing suitable handwashing facilities and related hygiene education for effective use of water and sanitation facilities.

Despite these and many other interventions, the non-availability, the limited or poor state of WASH facilities in schools in Ghana continues to be a persisting problem, especially for girls. It is in this regard that this study seeks to investigate the interlinkages between WASH facilities and menstrual hygiene management, school attendance and learning outcomes of students in basic schools in Ghana.

1.2 Statement of the Problem

In a growing but still limited body of research evidence across different settings in low and middle-income countries (LMICs) including Ghana, researchers have documented that not only does WASH play a key role in menstrual hygiene management (MHM), but it contributes to achieving

and maintaining the well-being of students with its associated implications of always having students in school, which may contribute to achieving better learning outcomes (Phillips-Howard et al., 2016; Sommer et al., 2016; Mahon & Fernandes, 2010).

Over the years, studies have shown that the availability, non-availability or limited access to WASH facilities directly or indirectly impacts school outcomes (Gottfried, 2014). This association may be more telling within the school system where students rely on WASH facilities to keep themselves healthy. The evidence on the association between WASH facilities and menstrual management has largely focused on the impact of the relationship to school attendance (McMichael, 2019; Trinies et al., 2016). The evidence further suggests that the absence of WASH facilities in schools encourages absenteeism, which may be associated with school outcomes (Baxter et al., 2011; Moonie et al., 2008).

In the case of Ghana, the limited studies have largely focused on assessing knowledge, attitudes and practices on MHM and to some extent the role of WASH in school attendance. Therefore, understanding the interconnectedness of the availability of WASH facilities on all three key variables of the study (menstrual hygiene management, school attendance and learning outcomes) in a single study is an important contribution to the scientific academic community.

Again, a limited number of studies in the past decade have reported that the unavailability or poor WASH facilities in schools act as a challenge to MHM, school attendance and learning outcomes with a far-reaching impact on girls, especially menstruating girls (Acheampong et al., 2018; Gyabaah & Awuah, 2009; Monney, 2014). Recent studies (Ahmed et al., 2022; Kojo Abanyie et al., 2021) point to evidence supporting the positive effect of improved WASH facilities on attendance for both girls and boys with its associated impact on learning outcomes. Further, the data suggests that school absenteeism could contribute to a decrease in academic performance,

rates of dropout, especially at the upper levels of basic education, and a general rippling effect on the development of students in high and middle-income countries (Baxter et al., 2011; Kearney, 2008; Moonie et al., 2008). This scenario may present similar trends across low-and middle-income countries including Ghana. The ensuing social and economic effects of poor learning outcomes resulting from reduced contact hours due to absenteeism, or in some cases, dropout, are likely to have far-reaching consequences not only for the individual, but also at the community, region and country levels (Casely-Hayford et al., 2021). The underachievement in school can consequentially have an impact on a student's future career chances, general livelihood and well-being, as well as their social development, which can stifle economic and social progress (McMichael, 2019).

Research over the years has also shown that the availability of WASH facilities in schools contribute to achieving safe, hygienic and effective management of menstruation and its associated school-level outputs including attendance (Abanyie et al., 2021; McMahon et al., 2011; Sommer, 2010). Few studies have, however, disputed this claim that WASH facilities contribute, especially to improving school attendance levels (Willmott et al., 2015; Birdthistle et al., 2011). This notwithstanding, the argument tilts heavily in favour of the positive impact basic WASH facilities have in improving MHM and attendance, especially among female students during menstrual periods (Sommer, 2010; McMahon et al., 2011). In a large, randomised control study conducted in the western parts of Kenya, Freeman et al. (2011) demonstrated that a hygiene promotion and water treatment project significantly reduced absenteeism by about 58% among girls in selected schools. However, the addition of a sanitation component to the intervention resulted in only marginal reductions in absence among girls. Another large-scale trial in China, which compared children who received handwashing interventions in schools to controls, reported a 42–48%

decline in average incidents of absence (Bowen et al., 2007). These results are comparable to UNICEF's findings on menstrual hygiene management in Ghanaian schools, which showed that most schools in the country lack proper MHM structures for female learners. This contributed to about 95% incidence of absenteeism among girls through their menstruation period (UNICEF, 2016).

Other studies (Adams, 2009; But, 2014; Zomal, 2016) have found similar results, demonstrating that poor MHM, a lack of 'adequate, separated, and secure lavatories', and washing facilities deter parents from taking their children to school (particularly girls). This demonstrates that the supply of WASH facilities in schools is a potential input for determining educational outcomes, including school attendance and educational attainment for both girls and boys (Adukia, 2016; Alam et al., 2017). Notwithstanding the evident benefits of WASH facilities in schools, learners in low and middle-income countries face significant challenges in maintaining effective menstrual hygiene management (MHM). This is because they mostly lack access to appropriate infrastructure and are ill-informed about reproductive health issues, menstruation, and related issues, which is seen as a taboo subject that is rarely discussed. Further, menstrual material supplies are either not available or unaffordable. This not only impacts their health, well-being, and education but also reinforces gender inequities and exclusion (Chinyama et al., 2019; UNICEF, 2015).

While there is a growing amount of evidence on the impact of WASH facilities on educational outcomes, limited attention has been focused on studying the interlinkages (Esteves Mills & Cumming, 2016; Hemson, 2007). For instance, the role of WASH facilities in mediating the effect of MHM and school attendance on educational outcomes has not been fully established. In the case of Ghana, the extant studies (Acheampong et al., 2018; Gyabaah & Awuah, 2009) have largely focused on assessing knowledge, attitudes and practices on menstrual hygiene management

and school attendance at higher levels of education. However, similar effects relating to the impact on learning outcomes at the primary and JHS levels have been scarcely studied. Studying it at the lower levels may likely help address possible associated learning outcome challenges early in the life cycle. Besides, studies on the implications of WASH availability or non-availability on schooling output are limited. Further, no evidence compares the experiences of students at the upper primary level (students at the early stage of menarche) against those at the Junior High level who may have had a lot of experience in the management of menstruation. There is also very limited information relating to locality differences in terms of access to WASH facilities and how this directly or indirectly impacts/influences menstrual hygiene management, attendance and learning outcomes.

This raises important questions that need to be addressed. This study therefore answers questions relating to the direct effects of WASH availability/non-availability on learning outcomes, establishing the interrelationship through MHM and school attendance.

1.3 Research Questions

The study answers four key research questions:

1. How do WASH facilities differ across basic schools in Ghana?
2. What is the association between WASH facilities in schools on one hand, and the following variables on the other hand?
    a. Menstrual hygiene management (MHM)
    b. School attendance
    c. Learning outcomes
3. How do WASH, mediated by MHM, school attendance and other socio-economic and demographic characteristics predict the learning outcomes of students in Ghana?

4. What are the lived experiences of students relating to WASH, MHM, school attendance and learning outcomes?

1.4 Rationale / Significance of the Study

The point of interest in this study is to unearth the associated core benefits students stand to gain in the phase of the availability of basic WASH facilities and vice-versa. While there is sufficient evidence relating to the effect of WASH facilities on menstrual hygiene management in Ghana, evidence from empirical studies on the effect of WASH interventions on school attendance, and especially learning outcomes, remains quite limited. In a review by Birdthistle et al. (2011), insufficient evidence was found for or against the hypothesis that separate toilets for girls in schools may increase school enrolment and attendance for girls. Willmott and colleagues conducted a more recent systematic study to assess the potential of hand hygiene programmes in schools to reduce absenteeism and sickness and found limitations with the available evidence (Willmott et al., 2015). The study also measured the effect of WASH interventions on pupil absence and diarrhoeal disease. The findings showed improved water sources and hygiene promotion interventions combined, reduced absenteeism by 39% in selected schools with the possible associated positive impact on learning outcomes, although this was not assessed. The results showed a greater impact on girls, with a reduction of 58% in girls' absenteeism, but no effect on boys (Freeman et al., 2014).

The missing gap requiring adequate investigation is to measure the impact of WASH in schools on students' learning outcomes as a key conclusion of interest through the use of primary data. The study adds to the limited body of knowledge by providing systematic evidence on the impact of WASH facilities on learning outcomes. This will help bridge the possible gap between policy

and implementation by strengthening the evidence on how relevant WASH facilities are to achieving school outcomes.

In addition, this research is significant in several ways. First, this study will be useful to policymakers, development partners and implementers in the education space by providing concrete evidence from the WASH perspective on learning outcomes by providing systematic explanations of the existing challenges. This will help to facilitate the improvement in WASH facilities, especially in basic schools. The findings will further inform the design of policies, strategies, and specific interventions to support the attainment of relevant sustainable development goals within the context of the 2030 Framework for Action. Poor menstrual management may contribute to reproductive health and related issues (fertility issues), which is a key component of population change. In line with this, the findings from this research will provide insights for population studies by providing evidence on the practices and coping strategies of menstruating girls in school, which can help to minimise future fertility-related challenges.

The findings from the study will be relevant to five key groups of people. First, this study will be useful to the scientific academic community in better understanding and appreciating the interlinkages between WASH, MHM, school attendance and learning outcomes, and how socio-demographic characteristics interact in shaping the discussions. Secondly, the findings of the study is expected to be useful to the School Health Education Programme (SHEP) Coordinators from the national through to the school-level by providing further evidence on the relevance of improving school level WASH facilities and practices as a key layer to improving menstrual hygiene management, school attendance and ultimately, learning outcomes. Specifically, this study will contribute to improving upon the programming and strategies across all school levels and may trigger the revision of national level guidelines on WASH in schools in Ghana. The

findings from the study will also provide evidence to development partners including UNICEF on the interrelationship between WASH, school attendance and learning outcomes to further strengthen their interventions in the WASH space. This study will also help students to understand and appreciate the effect of missing school and its implications on their overall learning outcomes – this may help reduce non-attendance to school. Lastly, recommendations from this study will help strengthen teacher-student relationships by providing evidence of the support needed by menstruating girls to teachers. This will help provide a more guided support system for girls. Parents, particularly parent associations, can leverage the evidence on the status and availability of WASH facilities in specific schools or districts to advocate for improved WASH infrastructure. This advocacy can be guided by the challenges identified for girls in this study.

1.5 Objectives of the Study

1.5.1 General objective

The general objective of this study is to assess how the availability or the non-availability of WASH facilities in schools influence menstrual hygiene management, school attendance and learning outcomes in selected basic schools in Ghana.

1.5.2 Specific objectives

1. Assess how WASH facilities differ across basic schools in Ghana;
2. Ascertain the association between WASH facilities and the following:
    a. Menstrual hygiene management
    b. School attendance
    c. Learning outcomes
3. Determine the meditating role of MHM, school attendance and other socioeconomic and demographic characteristics in predicting learning outcomes of students in Ghana.";

4. Examine the lived experiences of students relating to WASH, MHM, school attendance and learning outcomes.

1.6 Study Organisation

This study is divided into nine chapters. Chapter one focuses on the introduction of the study. This includes background of the study, statement of the problem, research questions, rationale/significance of the study and objectives. Chapter two focuses on the literature review of empirical studies as well as the grey literature on WASH facilities in schools, menstrual hygiene management, school attendance and learning outcomes. This chapter additionally presents the theoretical and conceptual frameworks employed in the study. In the third chapter, a comprehensive account of the study methodology is presented. Chapter four describes the socio-demographic characteristics and other key study variables. Chapter five explores the association between WASH, MHM, school attendance, socio-demographic characteristics and learning outcomes. Chapters six and seven provide evidence on the predictors of learning outcomes and on the lived experiences of girls (from the perspectives of both the SHEP Coordinators and students), respectively. Chapter eight discusses the results of the study while chapter nine provides a summary and conclusions of the study and recommendations.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORKS

2.1 Literature Review

This section of the study focuses on the review of literature on the key variables of the study and identifies gaps in literature. The review focuses on four broad sections: 1) availability and status of WASH facilities in schools – global, Africa and Ghana; 2) implications of the availability of WASH facilities on menstrual hygiene management; 3) implications of WASH facilities on school attendance; and 4) impact of WASH facilities on learning outcomes. In addition, based on a synthesis of empirical ideas and concepts, this chapter establishes the theoretical and conceptual underpinnings of the study.

2.1.1 Water, Sanitation and Hygiene (WASH) Facilities in Schools - Availability and Status

2.1.1.1 Global trends and dynamics

The inclusion of WASH in schools in the SDGs (targets 4.a, 6.1, 6.2) reflects a growing understanding of its importance as a key component to creating a conducive and effective learning environment for students (WHO/UNICEF Joint Monitoring Programme, 2020). According to the WHO/UNICEF Joint Monitoring Programme (2020), over two-thirds (69%) of schools around the world have a basic drinking water service. Another 12% of schools had a better supply, but because water was unavailable at the time of the collection of monitoring data, they were listed as offering a restricted service. Around 19% of schools in the globe have no service, which means these schools rely on unimproved sources like an unprotected dug well, unprotected spring, or surface water, or had no facility at all (WHO/UNICEF Joint Monitoring Programme, 2018).

Approximately 570 million students around the world are with either restricted or no access to drinking water at the school level – with its associated challenges. Data from the UN monitoring of WASH statistics in schools showed fewer than half of schools in Oceania and only two-thirds of schools in Central and Southern Asia had basic water services, while there was insufficient data to estimate basic services in Sub-Saharan Africa, Latin America and the Caribbean, and Eastern and South-Eastern Asia (WHO/UNICEF Joint Monitoring Programme, 2018). Analysis of data from the same report indicated that around seven out of 10 children have access to basic drinking water at school. Access to basic water, especially in school is seen to be very important because reduced student dehydration in schools has been linked to increased cognitive ability, in addition to the importance of water for personal and environmental hygiene (World Bank Group, 2018; Edmonds et al., 2020).

Similarly, between 2015 and 2019, the global coverage of basic drinking water services in schools increased by 0.4 percentage points per year. To achieve universal access by 2030 (SDG end of project target), present rates of progress would have to be multiplied seven times. In terms of the locality variations, access to basic drinking water service coverage is lower in rural schools (61% vs. 69% generally) and elementary schools (66%) vs. secondary schools (74%) (WHO/UNICEF Joint Monitoring Programme, 2020).

A synthesis of the data on sanitation trends across the world showed that as at 2016, about two-thirds (66%) of schools had improved single-sex sanitation facilities that were usable. This shows that a third (34%) of schools had no access to very ‘basic’ sanitation services (WHO/UNICEF Joint Monitoring Programme, 2018). A further 12% of schools had facilities that were either not single-sex or unsuitable. In aggregate terms, approximately 23% of schools worldwide have no sanitation service and relied only on unimproved facilities, such as pit latrines without a slab or

platform, or bucket latrines, or had no sanitation facility at all (WHO/UNICEF Joint Monitoring Programme, 2018). The breakdown by continent showed that four out of five schools in Northern Africa and Western Asia, as well as Latin America and the Caribbean, and less than half of schools in Oceania, had access to basic sanitation services. The context across the Least Developed Countries depicted a more precarious situation with a little over half of schools receiving basic sanitation services. The availability of functioning and private school washrooms has been established to have a positive impact on the health and learning outcomes of students, especially girls (Lopez-Quintero et al., 2009). However, current data shows that almost 698 million students (37%) in the world lack access to basic sanitation at school with a further 367 million students (19%) not even having access to toilet facilities. This presents a very serious concern – considering its importance to achieving universal basic education.

The importance of having access to handwashing facilities has been further illuminated by the emergence of the Covid-19 virus. Despite the significance of handwashing with soap, the current UN data (2020) shows that only 53% of schools around the world have a sort of handwashing facility with soap and water available. A further 36% of schools had no handwashing facilities available. In terms of the aggregate figures, over 850 million children lacked a basic service and had either restricted or no access to handwashing at all at the school level – showing that out of every five school-going children, only three have access to basic hygiene services at school (WHO/UNICEF Joint Monitoring Programme, 2020). The locality analysis shows rural schools had a lower rate of basic hygiene service coverage (34%) compared to urban schools (58%) (WHO/UNICEF Joint Monitoring Programme, 2020).

2.1.2 Trends in Africa/Sub-Saharan Africa on the availability and status of school-based WASH facilities

The statistics on WASH facilities in Africa presents quite worrying trends. The current UN Monitoring data (2020) shows that Sub-Saharan Africa has the highest number of schools with no improved water supply – with about eight countries having below 50% coverage of basic water services in schools. In 2019, fewer than half of schools in Sub-Saharan Africa had access to basic drinking water. In terms of school drinking water service coverage, Sub-Saharan Africa accounted for two-thirds of the nations with less than 50% coverage. Thirty-one countries in Sub-Saharan Africa had data on the percentage of schools without access to drinking water, but not enough to identify how many of the schools had access satisfied basic service (WHO/UNICEF Joint Monitoring Programme, 2020). The aggregate numbers, according to the WHO/UNICEF Joint Monitoring Programme (2020), show approximately 298 million school-aged children in Africa were affected by a lack of drinking water. For instance, two-thirds of Libyan schools (67%) had an upgraded supply but no water at the time of the study, while at least 30% of schools in Benin, Cameroon, and Senegal had a limited service.

According to Susmita et al. (2018a), sanitation coverage in schools is the lowest in the region. Tanzania has the lowest toilet coverage in schools, with only one out of every 10 schools having adequate toilets. Other countries including Rwanda, Zimbabwe, and South Sudan are among the nations that saw a decrease in school toilet coverage between 2008 and 2013. This is, however, attributable to political instability within those countries. On the other hand, South Africa has a toilet coverage rate of 100% in schools – setting the pace for other African countries to follow.

In a 2012 research in Sierra Leone, it was discovered that the majority of schools lacked toilets. Separate bathroom facilities for females and boys were not available in certain schools, making it difficult for girls to attend school (Susmita et al., 2018).

In the most recent WASH report on schools, which analyses data from 2015 to 2019, the implications for protecting the safety of learners and school employees during the COVID-19 epidemic are discussed. Sub-Saharan Africa accounts for two-thirds of the nations with less than 50% coverage of drinking water in schools as at 2019. In Nigeria, for example, only 36% of schools have basic water services, which is lower than the Sub-Saharan African average of 44%. In Benin, Cameroon, and Senegal, at least 30% of schools did not have access to safe drinking water (WHO/UNICEF Joint Monitoring Programme, 2018). In Namibia, boarding schools were more likely than other schools in 2014 to have water and soap for handwashing as well as separate and lockable girls' toilets, and they were less likely to exceed the national guideline of no more than 30 boys or 30 girls per toilet (WHO/UNICEF Joint Monitoring Programme, 2018).

In Sub-Saharan Africa, just around half of the schools had basic sanitation, compared to four out of five in Northern Africa. Togo, for example, has reached 65% coverage of basic sanitation facilities in schools and has improved coverage by 7.3% points per year since 2015, putting it on course to reach universal access of more than 99% by 2030 (WHO/UNICEF Joint Monitoring Programme, 2020).

Malawi has 65% coverage in 2019, but only by 0.4 percentage points per year, which will not be enough to attain universal access by 2030 (WHO/UNICEF Joint Monitoring Programme, 2020). In Sub-Saharan Africa, more than a quarter of schools had limited sanitation in 2019. In Sierra Leone, Liberia, Mali, South Sudan, Burundi, Gambia, and Libya, at least 30% of schools have limited access to electricity. Nearly a third (107 million) of people in Sub-Saharan Africa (WHO/UNICEF Joint Monitoring Programme, 2020) did not have access to sanitation services.

In terms of having soap and water handwashing facilities at the time of the survey, the biggest diversity is observed in Sub-Saharan Africa, where coverage spans from 100% to only 6% in

Ethiopia (WHO/UNICEF Joint Monitoring Programme, 2018). On this premise, it is projected that in 2016, 37 million of Ethiopia's 39 million school-aged children would not have access to basic sanitary services at their school. Ethiopia had 8.4 million children in primary education in 2016 (WHO/UNICEF Joint Monitoring Programme, 2018). Handwashing facilities were available in one out of every five primary schools, but only one out of every 10 were accessible to young children (WHO/UNICEF Joint Monitoring Programme, 2018). Sub-Saharan Africa was home to the majority of the countries with more than 50% of schools without electricity. More than half (244 million) of the 462 million students who did not have access to hygiene services at school in 2019 were from Sub-Saharan Africa, despite the fact that there is still inadequate data to estimate the specific number of schools affected in many countries in that region. In Mali, in the year 2019, two out of every five rural schools (38%) and three quarters of urban schools (74%) had basic handwashing facilities (WHO/UNICEF Joint Monitoring Programme, 2020).

In 2019, 31 African countries had basic WASH estimates in rural schools and 30 had basic WASH estimates in urban schools. In rural areas, it was projected that 61% of schools had a basic water service, 44% had a basic sanitation service, and just 34% had a basic hygiene service. Urban coverage was nine percentage points higher for basic water, 19 points higher for basic sanitation, and 38 points higher for basic hygiene in Sub-Saharan Africa (WHO/UNICEF Joint Monitoring Programme, 2020). Only one out of every nine schools in rural Sub-Saharan Africa (11%) lacked a basic sanitary service. In Uganda, for example, only one out of every 10 rural schools (12%) had a minimum hygiene service, compared to half of metropolitan schools (52%). Two out of every five rural schools (38%) and three quarters of urban schools (74%) in Mali had a basic service (WHO/UNICEF Joint Monitoring Programme, 2020). Single-sex bathrooms were accessible in 64% of senior schools in Ethiopia, but just 41% of primary schools. Toilets in secondary schools

were also more likely to be accessible (WHO/UNICEF Joint Monitoring Programme, 2020). Similarly, Tunisia's Ministry of Education recently tested water quality in primary schools, finding that while 87% of them had piped water, 13% did not have access at all. Djibouti's Ministry of Education gathered data on WASH services in all primary schools. The data showed that as at 2019, the average ratio of females per toilet was 51, with private schools (36) having a lower ratio than public schools (55) (WHO/UNICEF Joint Monitoring Programme, 2020).

2.1.3 Trends on the availability of school WASH facilities across schools in Ghana

According to a report by the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF) in 2012, over 56% of educational institutions in Ghana, including Crèche/Nursery, Kindergarten, Primary Schools, and Junior High Schools, were equipped with toilet facilities within their premises. Additionally, the report indicated that around 49% of these schools had access to water. An assessment conducted by UNICEF (2016) showed that two out of every five public basic schools in Ghana lack sanitation, and three out of every five basic schools lack access to safe drinking water. In addition, 3,600 Ghanaian infants die each year from diarrhoea and dysentery due to a lack of decent toilets, and five million Ghanaians defecate in the open due to a lack of bathroom facilities.

Similar empirical studies highlight the WASH situation across schools in Ghana. Gyabaah et al. (2009) investigated sanitation in Ghanaian Basic Schools in the Tano South District. Structured questionnaires were given to students in the schools to gather information on the existing solid waste and human excreta facilities, as well as the water supply in terms of quality, quantity, appropriateness, and sanitation operations and maintenance. The survey included 30 elementary schools (primary and JHS).

According to the findings of the study, 47% of the schools had bathroom facilities, while 53% did not. There were 17% two-seater KVIP toilets, 17% six-seater KVIP toilets, and 13% pit latrines in the restrooms. The remaining 53% relied on public restrooms located between 250 and 400 meters from the schools. Five schools with enrollment ranging from 200 to 260 students employed the two-seater and six-seater KVIP. The two-seater and six-seater KVIPs had the fewest pupils per squatting hole at 100 and 82, respectively. The pit latrines were in bad shape, unsanitary, and dangerous for the students, particularly those in Lower Primary. Old/used exercise books were the most prevalent anal cleansing materials utilised by students. This has major consequences since the students lose materials that could have functioned as reference materials. The anal cleansing materials, on the other hand, were burned on a daily basis. Except for one JHS, which had no urinal at all, all of the schools visited had urinals for both boys and girls. Approximately 70% of the schools had urinals without appropriate drains, whereas just 27% had drains. According to an indicator weighting method for sanitary facilities based on hygiene, convenience, adequacy, and technology type, 15 schools had total ratings for availability of human excreta facilities ranging from 10 to 14 points out of a possible 15 points. These were the schools with clean and appropriate toilet and urinal facilities for both boys and females that were conveniently located near the students.

The study indicated that 17% of the schools had on-campus water facilities. There were four automated boreholes and four hand dug wells with manual pumps. Only about 3% had a rainwater collection system, while the other 80% got their water from public standpipes, boreholes, or mission buildings. Despite the fact that none of the schools visited had sufficient handwashing facilities as specified by the Ghana Education Service (GES), 60% of the schools inspected did have handwashing facilities and 40% did not. These included things like a communal washing

bowl, towels or napkins, and soaps, where each child washed his or her hands in the same bowl and wiped them with the same towel.

According to the findings, 30% of the students washed their hands with soap before eating, whereas 70% washed their hands without soap before eating. Similarly, 44% of students used soap to wash their hands after eating, whereas 56% did not. Furthermore, 61% and 29% of the students cleansed their hands with soap and without soap after using the restroom, respectively, whereas 10% did not wash their hands at all. Handwashing after garbage pickup was the least hygienic procedure used. After collecting trash, just 24% and 54% cleansed their hands with soap and 54% did not. The remaining 22% did not wash their hands at all (Gyabaah et al., 2009).

Dajaan et al. (2018) conducted a cross-sectional study to examine the level of knowledge and adherence to handwashing practices among students in public elementary schools located in the Kintampo Municipality of Ghana. The research was conducted in Kintampo with the aim of determining the presence of handwashing amenities accessible to school kids, as well as assessing the level of handwashing knowledge and behaviour exhibited by primary school pupils.

The findings of the investigation indicated that a majority of schools, specifically 60%, possessed handwashing stations. Among these schools, around 66.7% had positioned these stations at a considerable distance from the school's restroom facilities. During the researchers' visit to the six schools, it was observed that a mere two schools, accounting for 33.3% of the total, possessed soap and water at their handwashing stations. Furthermore, a significant proportion of headmasters (83.3%) reported a deficiency in the provision of towels or paper tissues for students to effectively cleanse their hands. Fifty percent of the headmasters said that their schools sourced water from a public well, whereas 30% indicated that their schools obtained water from a school faucet.

According to the survey, about a third of headmasters (30%), said that their respective educational institutions consistently maintained access to clean and uncontaminated running water. Out all the schools that were surveyed, only two establishments, accounting for 20% of the total, were found to possess tippy taps[3], communal bowls, towels, or paper tissues for the purpose of handwashing. The results indicated that a mere 33.3% of the six schools included in the study had handwashing stations equipped with soap and water. However, only 20% of the headmasters said that their respective schools possess one or more tippy taps. This is noteworthy considering the potential of tippy taps to encourage school-aged children to engage in regular handwashing, as they are perceived as more enjoyable compared to alternative methods.

In a similar study, Appiah-Brempong et al. (2018) investigated school-based sanitary facilities: a quantitative assessment in a Ghanaian Municipality. A cross-sectional design was used to assess the study variables across all basic schools in the Ejisu-Juaben Municipal Education Directorate. According to the study report, most schools (68%) had soap available to students. On the contrary, just a few schools possessed a functioning water system (16%). Similarly, only 16% of schools had a working handwashing station – which is lower than the developing country average of 21%. In addition, a large proportion of the students used communal sink and a common towel for washing and drying their hands.

Moreover, the worrying observation that only a fifth (19%) of schools possess a handwashing facility that is connected to or located within a toilet facility is in direct contradiction to the established guidelines for establishing water, sanitation, and hygiene (WASH) facilities in

[3] A tippy tap is a simple, low-cost handwashing device often used in areas with limited access to running water. It typically consists of a container (like a plastic bottle or jerry can) filled with water and mounted on a frame. The container is tipped to release water when a user presses a foot-operated lever (often a stick or rope attached to the container), allowing for hands-free handwashing. Tippy taps are widely used in rural communities, schools, and low-resource settings to promote hygiene and prevent the spread of diseases.

educational institutions. Many educational institutions employ a common receptacle for students handwashing and a shared cotton towel for hand-drying, which may be considered suboptimal.

The study further revealed that many schools are lacking fundamental amenities, including access to potable water, provision of handwashing facilities, and availability of hand-cleaning papers/towels. Further, Monney and colleagues (2014) conducted a study on hand hygiene practices in schools having the School Feeding Programme in Ghana. The study primarily used a descriptive technique based on data collected using structured questionnaires that included both closed- and open-ended questions. This was supported by detailed observation of handwashing practices among students in the selected schools. The results showed that about two-thirds of schools surveyed (79%) had handwashing facilities (HWFs), presumably indicating that measures had been made to guarantee that students in these schools wash their hands at least once a day. However, 17% of these schools lacked soap in their HWFs, especially in Bolgatanga, which has one of the highest average numbers of kids on the Ghana School Feeding Programme. HWFs at schools are mostly funded by the Capitation Grant Scheme (CGS), although other non-governmental organisations (NGOs), parent teacher associations (PTAs), and private individuals also contribute through philanthropic activities. In the research schools with HWFs, three basic types of HWFs were found: Veronica buckets, communal/shared basins, and standpipes. However, at a few of the schools, more than one form of HWF was in use. In some schools, communal basins were utilised in addition to standpipes, while others used both communal basins and Veronica buckets.

Approximately half of the schools with HWFs (48%) used solely Veronica buckets for handwashing, whereas 39% used only communal/shared basins. Because handwashing is normally recommended to be done under running water, the fact that roughly half of the schools rely on

Veronica buckets for handwashing is positive. However, comprehensive monitoring revealed that the volume of water kept in certain schools' Veronica buckets was insufficient to meet the needs of all students. This resulted in several students eating without washing their hands. Shared basins were particularly popular in Bolgatanga, where they were used by more than half of the schools (57%).

2.1.4 Determinants of Menstrual Hygiene Management (DMHM)

The acknowledgment of the significance of menstrual hygiene management (MHM) practices in relation to the health, education, and psychosocial outcomes of women and girls in low and middle-income countries is progressively becoming more prominent. There are various obstacles that women and girls encounter in these environments, including constraints in the dissemination of information, inadequate resources for addressing menstrual bleeding, limited availability of WASH facilities, and the presence of detrimental socio-cultural attitudes and taboos (Chinyama et al., 2019). Several reasons are responsible for the erosion of dignity, restrictions on behaviour, and risks to reproductive health. The significance of adolescence stems from its unique role within the framework of socio-cultural norms, which might impede the acquisition of accurate knowledge and suitable practices about menstruation and menstrual hygiene among adolescent girls, especially at the beginning of menarche (Crofts & Fisher, 2012; Edmonds et al., 2020).

The phenomenon of menstruation and the lack of proper management of menstrual hygiene have been recognised as significant factors leading to the discontinuation of schooling, frequent absences, and a range of sexual and reproductive health issues in adolescent girls (Fakhri et al., 2012; Phillips-Howard et al., 2016). The aforementioned concerns can exert substantial and enduring effects on individuals' health and socio-economic standing. Due to the established knowledge of the characteristics and outcomes associated with menstrual hygiene management

(MHM) in girls, coupled with the lack of evidence-based programmes and interventions aimed at enhancing MHM, a comprehensive review of the literature was undertaken to identify crucial variables and concerns relevant to this study.

2.1.4.1 Socio-economic factors

Socio-economic factors are seen to be central to achieving effective menstrual hygiene management. According to a study by Assefa and Kumie (2014), adequate MHM is associated with the socioeconomic factors influencing adolescent girls. This is demonstrated in their hygiene behaviour, particularly in relation to handwashing practices. Ribeiro (2015) supports the claim that socio-economic factors play a significant role in determining menstrual hygiene management. Specifically, the use of unsanitary or substandard menstrual absorbent materials is prevalent among adolescent girls from impoverished or low-income backgrounds. Consequently, these girls face a greater risk of infection exposure compared to their counterparts from middle-class or high socio-economic backgrounds. Wearing damaged or blood-stained garments during menstruation can heighten a girl's susceptibility and discomfort. Poverty and financial hardship thus have an effect in deciding the sort of sanitary products used by a girl. Consequently, there is a need for enhanced availability of menstrual resources, specifically pertaining to menstruation education prior to the onset of menarche (Omidvar & Begum, 2010). Adolescent females hailing from low socioeconomic backgrounds exhibit a greater burden of sickness associated with inadequate MHM, hence potentially heightening their vulnerability to HIV, human papillomavirus infection, and adverse pregnancy outcomes (Sumpter & Torondel, 2013).

2.1.4.2 Limited knowledge, awareness, and information

Knowledge and awareness levels as well as access to information on menstruation have been cited to be key variables in determining menstrual hygiene management practices. According to

multiple research studies, it has been observed that a significant proportion of girls have knowledge about menstruation prior to experiencing their first menstrual period, a substantial percentage is not, and the majority of girls are unaware of the definite process of menstruation. In a study by Dasgupta and Sarkar (2008), the findings showed that over two-thirds of the 160 girls sampled in West Bengal were aware of menstruation prior to menarche. However, almost all (97.5%) of the respondents were unaware of the cause of menstrual flow. A similar study conducted in Nepal found similar outcomes with about 92% of the 204 adolescent girls studied having basic knowledge and were aware about menstruation, yet the majority of those polled said they were unprepared (WaterAid in Nepal, 2009a). In relation to the source of information on menstruation and related issues, the findings showed that mothers, sisters, and companions were the main sources of information (WaterAid, 2009a; Dhingra, Kumar & Kour, 2009; Dasguptar & Sarkar 2008). In the Nepal study of girls in the formal school system, only a fifth of the respondents mentioned teachers as a source of information regarding menstruation - teachers generally avoided addressing reproductive health, according to focus group conversations with girls (WaterAid in Nepal, 2009a). The girls in this survey stated that the majority of the materials they got were focused more on the scope and impact of cultural taboos surrounding menstruation and in some instances on the usage of cloth, rituals, the concept of (cultural) pollution, and warnings about how to treat men and boys. There was very little information released about menstruation. The conclusion from these studies showed that the knowledge and awareness levels of girls within the formal education system in South Asia were quite limited.

2.1.4.3 Limited access to menstrual materials

The lack of insufficient access to menstrual hygiene supplies and facilities, particularly within educational institutions, is widely recognised as a significant barrier to effective menstrual hygiene

management. The primary menstruation material used, particularly among rural women, in a comprehensive cross-country study done in Bangladesh, India, and Nepal, was found to be reusable cloths for absorbing menstrual blood (Ahmed & Yesmin, 2008; Ahmed & Yesmin, 2008; Dasgupta & Sarkar 2009; Dhingra, Kumar & Kour, 2009).

The findings of a study conducted in West Bengal, India, focused on the availability and accessibility of menstrual management materials among school-aged girls. The results indicated that only 11.3% of girls utilised disposable sanitary pads, with limited availability and affordability identified as the primary obstacles hindering broader usage (Dasgupta & Sarkar, 2008). A comparative investigation conducted in Nepal revealed that female students attending urban schools exhibited a higher propensity to utilise sanitary pads, with a prevalence rate of 50%, as opposed to their counterparts at rural schools, where the rate stood at 19%. Based on the survey findings, it was observed that girls cited various factors as reasons for their non-utilisation of sanitary pads. These factors encompassed a lack of awareness (41%), the financial burden associated with their purchase (39%), limited accessibility (33%), and inadequate disposal facilities (33%). During a focus group discussion, it was found that female participants expressed a preference for disposable pads due to its perceived advantages in terms of comfort, odour control, and ease of use.

2.1.4.4 Limited participation of women in MHM programming

The topic of menstrual hygiene is often considered a sensitive matter in numerous regions worldwide, particularly in Africa, where it remains a subject of taboo. Consequently, many women express discomfort while engaging in public discourse surrounding this issue. Gender inequality exacerbates the issue by systematically marginalising women and girls, thereby barring them from participating in decision-making processes. The findings of a study done by WaterAid in Nepal

(2009) indicate that despite significant efforts to facilitate the meaningful involvement of women in the management of community WASH initiatives, this has not translated into genuine participation in decision-making procedures. Low literacy and numeracy abilities, as well as a lack of confidence and societal standards, have been identified as major hurdles to women's participation in discussions around menstrual hygiene management, especially in relation to the expansion of WASH facilities (WaterAid in Nepal, 2009b). There exists a cyclical causal relationship that necessitates intervention in order to disrupt the neglect of menstrual hygiene within WASH development programmes, as well as address the limited understanding among communities, practitioners, and policymakers.

2.1.4.5 Role of Culture and societal norms

The understanding of menstrual management is shaped by diverse cultural beliefs and customs pertaining to menstruation. The majority of societal norms and cultural practices effectively suspend the activities of women during their menstrual cycle, including restrictions on cooking, bathing, and staying at home (Chin, 2014). Despite the fact that these limits have been in place for a long time, they nevertheless have a significant impact on adolescent behaviour when it comes to menstruation (Yagnik, 2015). Research has shown that adolescent females have challenges in acquiring knowledge about menstrual hygiene due to harmful and incorrect practices associated with menstruation, with some considering it a taboo and private topic (Fakhri et al., 2012). According to a study by Tania et al. (2013) conducted in Lebanon, 89.5% of adolescent girls follow cultural beliefs that prevent them from taking their bath during the first three days of menstruation, or even for as long as the period lasts, rather than following standard menstrual hygiene practices.

2.1.4.6 Social exclusion: taboos and rituals

Taboos and rituals pertaining to menstruation are prevalent in several regions across the globe, with a particular emphasis on Africa (Joshi & Fawcett, 2001). These cultural practices and beliefs often result in the exclusion of women and girls from participating in social and cultural activities. The concepts of purity and contamination hold significant importance in Hindu society, particularly in relation to gender interactions, and serve as foundational elements of the class structure. As to the system's classification, human excretions, including the biological processes of menstruation and delivery, are deemed to possess polluting properties. Consequently, these activities are believed to render all women, irrespective of their social standing, subject to pollution. According to a research conducted by Joshi and Fawcett (2001) on the Hindu civilisation, the attainment of purity can be accomplished through two distinct approaches: either by abstaining from contact with pollutants or by engaging in self-purification practices aimed at eliminating or assimilating impurities. The primary medium employed for purification purposes is water, which is widely recognised as the most prevalent means of achieving purification. Safeguarding water supplies against pollution, with a specific focus on mitigating the impact on running water, which holds significant cultural and religious significance as the embodiment of Hindu deities, is a key concern.

In a separate investigation carried out by WaterAid (2009) in Nepal, it was found that 89% of the participants reported engaging in various practices of limitation or segregation during menstruation. These practices encompassed refraining from observing one's reflection in a mirror when menstruating (WaterAid, 2009; Dhingra, Kumar & Kour, 2009). In the aforementioned study, it was found that 98% of female participants reported refraining from taking regular baths during menstruation, while an additional 91% expressed their avoidance of running water. A

further investigation carried out in India by WaterAid revealed that a significant proportion of women, approximately 20%, who had access to toilet facilities, chose to refrain from utilising them during their menstrual cycles. This behaviour was attributed, at least in part, to their apprehension regarding the possibility of staining the toilet (Fernandes, 2008). The findings of these research indicate that the management of menstruation requires access to water and sanitary facilities. However, it is noteworthy that the cultural stigma and humiliation associated with menstruation may lead to a paradoxical situation where individuals who possess such access are occasionally denied admittance.

2.1.5 Implications of the availability of WASH facilities for MHM

Menstruation is a physiological process that is considered a natural and regular occurrence in the life of a woman. The initiation of menstruation often takes place within the age range of 11 to 16 years, with an average age of 13 years (Guya, 2014). During the onset of menstruation, a range of interconnected concerns pertaining to personal hygiene, sanitation, access to water, and health education emerge as prominent considerations (Ahed et al., 2022; Chinyama et al., 2019; Water Supply and Sanitation Collaborative Council, 2014). According to research findings, schoolgirls have a range of challenges during menstruation, including menstrual mishaps, feelings of unease and anxiety, experiences of embarrassment, uncertainty, and dread. These difficulties often arise from a dearth of information and an inability to effectively manage menstrual flow, as well as from instances of teasing or bullying by peers (Dhingra et al., 2009; Dasgupta & Sarkar, 2008). Furthermore, limited understanding of menstruation, insufficient availability of menstrual hygiene products, and inadequate school infrastructure for personal hygiene, including water and sanitation, might have detrimental effects on the educational experiences of girls. The aforementioned circumstances may lead to increased rates of absenteeism, diminished

concentration within educational settings, decreased levels of school involvement, and compromised academic performance (Sommer et al., 2016).

The study conducted by Acheampong et al. (2018) examined WASH infrastructure, as well as MHM practices, in primary schools located in Kumasi, Ghana. The research employed a qualitative methodology, utilising convenience sampling as the chosen sampling technique. The selection of schools in the Weweso circuit was based on their administrative classification, specifically whether they were privately or publicly managed. Adolescent females in the transitional period between elementary school stage 6 and second year of Junior High School (JHS) 2 were selected using purposeful sampling techniques. A cohort of 154 female students from seven primary schools were selected to partake in FGDs.

In the schools surveyed, piped water was supplied by Ghana Water Company Limited or automated boreholes. However, handwashing soap was not consistently available, and clean towels were lacking at handwashing stations. About two-thirds (67%) of students used school uniforms, hair, handkerchiefs, or face towels to dry hands, raising infection concerns. Public educational institutions were equipped with pit latrines as well as pour-flush systems, but 66% of girls didn't use them due to unsanitary conditions, odours, lack of water, and other issues. In private schools, 7% of pupils avoided water closets.

In summary, the data reveals that a majority of schoolgirls in both public (81%) and private institutions (91%) exclusively rely on sanitary pads for menstrual hygiene management. The participants expressed concerns with the insufficient level of privacy afforded by the school restroom, which hindered their ability to change menstrual products as frequently as requested. Furthermore, participants said that they resorted to use the urinal facilities at the educational

institution as a substitute for managing their menstrual hygiene needs during school hours. Despite its insufficient provision of privacy, it remained a superior alternative. Consequently, it is observed that a majority of 67% of female students in public and 40% of female students in private schools refrain from replacing their utilised sanitary pads during their time at school. Based on the findings of Sommer (2012), it was observed that students at both public and private schools failed to adhere to the recommended practice of washing their genitalia after changing sanitary supplies, as outlined by the WASH guidelines.

Based on the findings of the survey, it was observed that female students commonly employ either toilet paper/tissue or plastic bags as a means to contain their utilised menstruation materials before disposing of them. This practice mitigates the potential spread of infections to others by minimising direct contact with spent menstrual material. In certain situations, it was observed that female individuals exhibited a preference for enclosing their utilised sanitary pads within polythene bags, then placing them within their school bags, prior to disposing of them at their respective households. The findings of the study revealed that a significant proportion of girls attending public schools (58%) and a significant proportion of girls attending private schools (47%) reported disposing of their spent materials at home following the conclusion of the school day. According to the schoolgirls, there exist myths of individuals scavenging for abandoned menstrual pads in dumpsters located near schools, purportedly for ritualistic purposes. Consequently, this has influenced the decision to dispose of used menstruation items within the confines of one's own residence.

Insufficient management of discarded menstrual products remains a prevalent issue in numerous countries globally. Many nations have implemented protocols for the management of faecal and urinary waste. However, there exists a worldwide deficiency in menstrual management practices,

resulting in a higher proportion of girls discarding their sanitary pads and other menstrual products in household solid waste or trash receptacles. Consequently, these items contribute to the accumulation of solid waste (Garg et al., 2012). In the context of India, it is observed that there is a deficiency in the provision of sanitary pad disposal bins and handwashing facilities within bathrooms, which poses challenges for women during menstruation in effectively managing their menstrual hygiene. In urban settings where disposable menstrual products are employed, they are often discarded through flushing in toilets, depositing in trash receptacles, or other solid waste management methods (Ashley et al., 2005). In rural regions, a range of options exists for the disposal of menstrual material, such as burial, incineration, discarding in waste receptacles, or utilizing pit latrines. In rural regions, women predominantly utilise reusable and non-commercial sanitary products, such as reusable pads or cloths. Consequently, women residing in rural settings generate a lower quantity of menstrual waste compared to their counterparts in urban regions who depend on commercially available disposable pads. The disposal of menstrual waste was determined by factors such as the specific type of menstrual product utilised, prevailing cultural views, and the designated site for disposal. According to Jasper et al. (2012), the disposal of menstrual waste by women in slum neighbourhoods was facilitated through the utilisation of pit latrines, while burning and burial were not feasible options due to limited privacy space. The rationale behind this phenomenon is attributed to its observation by individuals or its historical association with witchcraft practices. Due to a scarcity of sanitary facilities, female students resort to disposing of their menstrual pads in school restrooms. A significant number of children were found to be absent from school due to the absence of a waste disposal system, malfunctioning toilet locks/doors, an inadequate water tap, a lack of buckets, and a limited water supply. In several educational institutions, incinerators or receptacles commonly referred to as “feminine hygiene

bins" are utilised for the purpose of disposing of menstrual waste material. However, students tend to refrain from using these facilities due to feelings of embarrassment or concerns about potential visibility to others (Crofts & Fisher, 2012).

Kaur et al. (2018) found that the disposal behaviour of women varies depending on their location, specifically whether they are at home or away from home. The individuals discard the utilised menstruation materials within their residence by securely enveloping them and thereafter disposing of them in the household waste bin alongside other domestic refuse. Before acquiring knowledge about the consequences associated with the act of disposing of sanitary pads, individuals in communal settings would either flush them down toilets or encase them in wrapping materials before discarding them in waste receptacles (George, 2014). The individuals in question deposit the dirty pads in the corners of the lavatory, either wrapped or unwrapped, in instances when there are no receptacles designated for waste disposal. This condition results in the toilets being unhygienic for both subsequent users and sanitation workers, while also serving as a favourable environment for the proliferation of flies and mosquitoes. The issue of sewage system clogs resulting from the improper disposal of sanitary pads or rags in public restrooms has been a recurring concern for those responsible for their maintenance (Kaur et al., 2018).

Chinyama et al. (2019) did a study that investigated the subject of menstrual hygiene management in rural schools within the context of Zambia. The study employed a qualitative exploratory approach, focusing on six rural schools located in the Mumbwa and Rufunsa Districts of Zambia. A total of twelve in-depth interviews (IDIs) and six focus group discussions (FGDs) were conducted, specifically targeting females between the ages of 14 and 18 who had initiated menstruation. Two focus groups were conducted with male adolescents aged 14-18, alongside 25 key informant interviews involving teachers, female guardians, and traditional leaders. The

purpose of these activities was to gain a deeper understanding of the context in which schoolgirls engage in MHM. The study indicated that most girls heard about menstruation just during menarche and had no awareness of the physiological foundations of menstruation.

The individuals discussed many difficulties linked to Menstrual Hygiene Management (MHM), including the utilisation of menstrual cloths that lack absorbency and are inconvenient, the inadequate provision of sanitary supplies, and WASH in educational institutions. The toilets, for instance, exhibited deficiencies such as the absence of soap and water, inadequate privacy measures such as doors and locks, and emitted an unpleasant odour. The presence of teasing, particularly from males, and the potential shame resulting from menstrual leaks were significant obstacles for girls in their pursuit of education and engagement in physical activities during menstruation. According to the observations made by boys, they claimed to possess the ability to discern when girls were experiencing menstruation based on olfactory cues and behavioural indicators, such as reduced physical activity and social withdrawal.

Girls have reported instances of friction burns on their inner thighs during their prolonged commute to educational institutions due to the chafing caused by the utilisation of damp non-absorbent fabric in the manufacturing process of menstrual pads. Young females opt to dispose of their used menstrual products in pit latrines instead of traditional waste containers due to their fear of being stigmatised as practitioners of witchcraft. Despite the significant contributions of traditional leaders and female guardians in educating girls about MHM, there are ongoing issues in promoting adequate MHM practices among schoolgirls.

2.1.5.1 The availability of WASH facilities and sanitary products

One of the key variables that impacts on the ability of girls to practice proper MHM is the absence or limited access to sanitary products and materials of all kinds, water and soap. Access to clean water and proper sanitation facilities are crucial for the management of menstrual hygiene, particularly in educational settings (Parker et al., 2014). The provision of menstrual hygiene products, dedicated facilities for personal hygiene, and availability of soap and water are factors that contribute to the promotion of sanitary practices and overall well-being. Conversely, inadequate or limited access to menstrual resources is identified as a contributing factor to the suboptimal hand hygiene practices and inadequate management of menstrual hygiene among adolescent girls attending government-operated primary schools (Vivas et al., 2010; Ribeiro, 2015).

The aforementioned scenario is illustrated in a research conducted by Ribeiro (2015), where it was revealed that out of the 20 schools that were sampled, a mere one school possessed a designated private area exclusively for girls to change sanitary products during menstruation, and only two schools had access to local water facilities. The study's findings indicate that restricted availability of water, sanitation, and hygiene (WASH) facilities led to substandard menstrual hygiene habits, ultimately leading to school absenteeism among menstruation students. Although there may be instances where sanitary resources seem accessible, it is important to note that adolescent girls may face obstacles in obtaining hygienic and functional sanitary facilities, leading to difficulties in effectively managing menstrual flow. One possible explanation for this phenomenon is that the facilities in question might be secured and restricted from public access, or they may not provide a sufficient level of privacy (Chin, 2014).

2.1.5.2 Health Implications of Poor Menstrual Hygiene Management

In a study by Kirk and Sommer (2006), adolescent girls were found to be prone to health hazards due to inadequate adherence to hygienic standards during the menstrual cycle, which might subsequently result in social stigmatisation. The occurrence of an unpleasant scent emanating from menstruation blood might lead to its dispersion throughout the body if proper hygiene practices are not adhered to by adolescent females. These outcomes often arise due to unhygienic practices, including the use of unsanitary sanitary facilities, inadequate handwashing techniques, improper genital hygiene during menstruation, and cultural practices such as female genital cutting, also known as female circumcision. The experience of pain during menstruation (dysmenorrhea) contributes to discomfort and raises the risk of developing further health complications. The risk of infection during menstruation is notably heightened due to the dilation of the cervix, which permits unimpeded blood flow from the uterus into the vaginal canal and subsequently out of the body (Abajobir & Seme, 2014; Kirk & Sommer, 2006). This procedure facilitates the re-entry of microorganisms into the uterus and pelvic cavity. There is a correlation between inadequate menstrual hygiene and a rise in female infertility and morbidity resulting from diseases of the reproductive system (Ramaswamy, 2011).

Numerous studies have established unequivocal correlations between inadequate menstrual hygiene practices, such as the reuse of improperly washed and dried cloths, and the inability to maintain regular washing routines, with the occurrence of urinary or reproductive tract infections and several other health conditions (McMahon et al., 2011; Tania et al., 2013; Nyothach et al., 2016). Nevertheless, the presence of robust medical evidence to support this claim remains uncertain. Consequently, establishing causation in the bulk of research studies that demonstrate an association poses significant difficulties. Conversely, anecdotal evidence does indicate a

correlation. The survey conducted by Ahmed and Yesmin (2008) in Bangladesh revealed that participants identified many health concerns, such as vaginal scabies, irregular discharge, and urinary infections, which were attributed to inadequate menstrual hygiene practices. This underscores the significance of performing meticulous scientific research to enhance comprehension of the impacts of inadequate menstrual hygiene on health and associated matters.

2.1.6 Implications of the availability of WASH facilities for school attendance, particularly for female students

Schools that possess adequate WASH facilities are characterised by the presence of a dependable water system that ensures the provision of safe and ample water. Additionally, these schools are equipped with an adequate number of private, clean, and culturally and gender-appropriate toilets for both students and teachers. They further offer water-use and hand-washing facilities, some of which are conveniently located near the toilets and these schools prioritise sustained hygiene promotion efforts (Adams et al., 2009). It is imperative that all children, particularly females who have reached the age of menstruation and children with disabilities, are provided with sufficient access to appropriate WASH facilities. In numerous low-income countries, the conditions of WASH in schools are substandard, leading to worse health outcomes and decreased school attendance rates (Jasper et al., 2012).

Based on a survey conducted by UNICEF in 2012, it was found that about 51% of educational institutions in low-income nations possessed access to water sources that met acceptable standards, while a little over 45% had sufficient sanitary facilities. School-based WASH programmes have a global objective of diminishing the occurrence of diarrhoea and other diseases associated with cleanliness. Additionally, these programmes strive to improve school enrollment, academic performance, and attendance rates. Furthermore, they seek to influence the hygiene practices of

parents and siblings, utilising children as catalysts for change within their households and communities. Research has been conducted to examine the effects of school-based WASH efforts on student absenteeism and enrollment rates in low-income nations. Previous studies have demonstrated that the implementation of enhanced handwashing practices involving the use of soap in educational institutions has been effective in reducing the incidence of illness among school-aged children, hence leading to a decrease in the number of absences (Freeman et al., 2014; Patel et al., 2012; Pickering et al., 2013; Saboori et al., 2013). Handwashing promotion and point-of-use water treatment interventions have been reported to reduce student absence by 21% to 61%, with one study finding lower absence among females (for example, a 58% reduction in the probabilities of absence for girls) (Freeman et al., 2012). According to Patel et al. (2012), the implementation of a water and hygiene intervention within schools in Kenya led to a significant decrease of 35% in student absenteeism when compared to the initial baseline. In contrast, neighbouring schools had a modest increase of 5% in student absenteeism.

In a study conducted by Talaat et al. (2011) in Egypt, the implementation of a comprehensive handwashing campaign yielded significant outcomes. The researchers observed a noteworthy decrease of 21% in school absenteeism attributed to various illnesses, including but not limited to diarrhoea, conjunctivitis, and influenza. Furthermore, the campaign resulted in a reduction of 40% in absences related to influenza-like illness, 33% in absences due to diarrhoea, 67% in absences caused by conjunctivitis, and 50% in absences associated with laboratory-confirmed influenza. In a small-scale pilot study conducted in Ghana, Montgomery et al. (2012) discovered that the provision of sanitary pads and puberty education to adolescent females in both intervention and control schools had a notable impact on attendance rates. The findings of a comprehensive evaluation of a WASH intervention in schools in Bangladesh indicated a reduction in female

school absenteeism ranging from 9% to 12%, with variations observed across different schools. The study conducted by Dreibelbis et al. (2013) in Kenya found a significant correlation between the level of cleanliness in latrines and the recent absence of students in school-based WASH programmes. According to a study conducted in a Chinese primary school, the implementation of an expanded intervention, which included standard government education along with a handwashing programme, provision of soap for sinks, and the appointment of peer hygiene monitors, resulted in a reduction of 42% in absence episodes and 54% in days of absence. In comparison, the standard intervention, which solely consisted of a handwashing programme, led to a decrease of 44% in absence episodes and 27% in days of absence (Bowen et al., 2007).

Nevertheless, some intervention trials have yielded limited evidence suggesting any impact on attendance. In a study conducted by Oster and Thornton (2009) in the Chitwan Region of Nepal, a limited cohort of female students were provided with menstrual cups, which are silicone devices used internally for the regulation of menstrual flow. The findings of the study indicate that the implementation of technology did not provide any significant impact on school attendance or test performance. The authors of the study put forth a hypothesis suggesting that this lack of effect could be attributed to the technology's focus on blood management rather than addressing cramps, which were identified as the primary cause of non-attendance. According to the hypothesis proposed by Bowen et al. (2007), it was suggested that the potential impact of cleaning might not have been significant enough to further decrease absenteeism beyond the reductions already achieved by the initial WASH intervention. The study conducted in Kenya aimed to evaluate the effects of a cost-effective and scalable intervention for cleaning latrines at the school level on pupil absenteeism. However, the results of the trial did not demonstrate a decrease in absenteeism. The authors of the study proposed a hypothesis that the cleaning intervention may not have had a

significant additional impact in reducing absenteeism beyond the reductions already achieved through the original WASH intervention (Bowen et al., 2007).

Trinies et al. (2016) observed reduced instances of self-reported absenteeism due to diarrhoea in their research. Nevertheless, despite the positive impacts observed, there was no discernible reduction in self-reported student absenteeism. Interestingly, the analysis revealed that schools experiencing benefits also exhibited higher rates of roll call absence, which is an objective and non-self-reported measure, in comparison to comparable schools. The research findings revealed a notable disparity in self-reported rates of absenteeism between recipients and schools used for comparison. Prior studies have demonstrated a decrease in overall absenteeism following the implementation of school WASH programmes (Freeman et al., 2014; Bowen et al., 2007).

The absence of sex-based effect modification precludes the existence of differential effects among females, as documented in the study conducted in Kenya (Rosen et al., 2006). While there is a possibility that the higher rate of absence observed in recipient schools could be attributed to some aspects of the intervention's execution. Trinies et al. (2016) argue that the discrepancy is more likely a result of inadequate matching of comparison schools. It is probable that, at the commencement of the study, the schools receiving benefits had higher rates of absenteeism compared to the schools serving as comparators. The study lacked evidence on baseline absenteeism and health measures for most schools due to a failure to follow up on schools that took part in the initial assessment. This failure was primarily attributed to the ongoing conflict. Additionally, their matching criteria were inadequate in accounting for these unobserved confounding factors. Similar to resource-limited environments, students in such contexts often encounter many factors that contribute to their absence from educational institutions. It is plausible

to suggest that enhancements in school WASH facilities can potentially result in increased school attendance, as indicated by Trinies et al. (2016).

2.1.7 Implications of the availability of WASH facilities on learning outcomes

The enhancement of WASH facilities within educational institutions has the potential to exert a substantial influence on the global standard of education (Adukia, 2016). Schools that have functioning WASH systems experience enhanced outcomes in various areas, including school attendance, academic achievement, health, nutrition, hydration, and gender equity. Improved outcomes, thus, have an indirect impact on subsequent educational attainment, financial earnings, and overall well-being. The implications of staying in school longer have far-reaching consequences. The retention of female students in school leads to the raising of women who possess higher levels of education. Consequently, these women are more inclined to engage in family planning, raise healthier and more educated offspring, and attain higher income levels (Naidoo, 2013).

Enhanced WASH practices have been found to be associated with cleaner environments, which in turn have been correlated with decreased incidence of diarrhoea, enhanced overall health, and improved child growth both within households and educational institutions. The initial 1,000 days of an individual's existence are primarily accountable for the bulk of stunting, a condition that impacts not only physical growth but also cognitive and emotional development, even prior to a youngster reaching school age. The absence of adequate WASH facilities in households hinders the active engagement of school-aged children in educational settings. This is mostly attributed to the prevalence of water- and faeces-related diseases, such as diarrhoea and parasitic infections, as well as the time allocated to fetching water instead of attending school or completing academic tasks.

At the school level, the availability of WASH facilities play a crucial role in shaping learning outcomes by promoting student health through the prevention of waterborne diseases and hygiene-related illnesses, thereby reducing absenteeism and ensuring consistent attendance (Alam et al., 2017; Acheampong et al. 2018). These facilities provide a safe, clean, and dignified environment, particularly benefiting adolescent girls by addressing menstruation-related challenges and fostering inclusivity (UNICEF, 2018). Additionally, WASH facilities instil essential hygiene practices, creating lifelong habits that extend to students' homes and communities. A hygienic and comfortable school environment enhances students' ability to focus, participate actively, and perform academically, contributing to better cognitive development, higher retention rates, and an overall positive educational experience. In specific terms, the availability of WASH facilities in schools has a significant and multi-faceted impact on learning outcomes:

1. Reduced absenteeism - access to clean water, proper sanitation, and hygiene facilities reduces the incidence of waterborne diseases and infections, leading to fewer sick days and more consistent school attendance, especially for girls who are more likely to miss school during menstruation without proper facilities.
2. Improved health and concentration - when students are healthy and not battling preventable illnesses caused by poor hygiene or contaminated water, they are better able to focus on learning, retain information, and actively participate in classroom activities.
3. Enhanced dignity and comfort - WASH facilities provide students with privacy and a sense of dignity, particularly for adolescent girls during menstruation. This fosters confidence and reduces discomfort, enabling them to engage more fully in their education.

4. Conducive learning environment - a clean, hygienic school environment contributes to an atmosphere that is welcoming and safe for learning, reducing distractions and stress caused by unsanitary conditions.

According to UNICEF (2011), the provision of a hygienic, comfortable, and secure environment, along with sufficient resources, contributes to the improvement of educational outcomes, fosters a sense of self-worth, and promotes student enrollment in educational institutions. The implementation of adequately managed and superior WASH services and initiatives in educational institutions has the potential to reduce student absence rates and enhance the attendance and retention of female teachers (Adukia, 2016). According to a study conducted by UNICEF in 2011, parents exhibit a preference for enrolling their children, regardless of gender, in educational institutions that maintain a satisfactory level of cleanliness. According to UNICEF (2012), worm infestations have been found to cause a mean reduction of 3.75 Intelligence Quotient (IQ) points in affected persons. Consequently, this has resulted in a cumulative decline of 633 million IQ points among populations residing in low-income countries. There exists a correlation between the cognitive functioning of a child's brain and their hydration status (Edmonds & Burford, 2009).

The presence of WASH facilities in schools has a significant influence on the health and academic outcomes of students. Based on the findings of the National Hygiene Baseline Survey conducted in Bangladesh in 2014, it was revealed that a significant proportion of schools, specifically 57%, do not possess dedicated sanitation facilities for their students (Alam et al., 2017). Individuals who are provided with separate toilet facilities face practical difficulties, such as non-functional toilets or unsanitary circumstances, as a result of inadequate operation and maintenance of these facilities. The absence of adequate facilities and support for menstrual hygiene management (MHM) among schoolgirls and female teachers is impeding their complete engagement in educational activities,

hence hindering their ability to attain a quality education. The findings of a survey conducted by Alam et al. (2017) in Bangladesh indicate that a significant proportion of girls, specifically 40%, experience a three-day absence from school as a result of menstruation. Furthermore, almost one-third of these girls hold the belief that their academic performance is negatively impacted by menstrual troubles.

2.1.7.1 Assessing the impact of cultural practices and absence of facilities on girls' education

The issue of girls' access to education is a significant concern, particularly in relation to the impact of cultural practices and inadequate facilities for managing menstrual hygiene. Based on a survey conducted by Ten (2007) in South India, it was found that a significant proportion of female students were withdrawn from school by their parents upon reaching menarche, predominantly with the intention of facilitating early marriages. The reasons for this phenomenon might be attributed to the social stigma and potential consequences faced by unmarried adolescent girls, as well as the perception of menstruation as a symbolic indication of readiness for marriage.

Moreover, the research indicated that menstruation has a detrimental effect on the attendance of numerous female students, even if they are not entirely absent from school. These findings have significant implications for their educational progress. In a separate research carried out in Nepal by WaterAid (2009), a majority of the participants reported instances of school absenteeism attributed to menstruation. The predominant factor cited (41%) was an insufficient level of privacy for cleaning and washing, while other significant concerns encompassed the absence of an adequate disposal system and water supply. According to WaterAid (2009), during focus group talks, numerous female participants expressed that their academic performance was negatively affected when they attended school while menstruating. This was attributed to their fear of being seen by male peers over their menstrual state. The research findings also indicate that a significant

proportion of students, specifically 28%, refrained from attending school during menstruation due to inadequate facilities. This lack of facilities caused considerable distress among these students, as they expressed anxiety and discontent stemming from concerns over garment discolouration (Fernandes, 2008).

2.1.8 Implications of WASH facilities on the achievement of SDGs in Ghana

The failure to prioritise WASH in schools as a predictor of Menstrual Hygiene Management (MHM), school attendance, and learning outcomes can have a cumulative impact on the attainment of development goals. This includes the goals that governments, like the government of Ghana, donors, and organisations have pledged to achieve through the SDGs (Ten, 2017). In light of the potential impact of prioritising WASH and menstrual hygiene on the attainment of global targets, it is imperative for development professionals and their respective agencies to include this matter in their endeavours. Furthermore, it is imperative to cultivate stronger connections among the pertinent sectors, such as water, sanitation, and hygiene (WASH), healthcare, and education. The educational system in Ghana demonstrates an understanding of the correlation between resources and menstrual hygiene management (MHM). The aforementioned statement is posited within the context of the Secondary Education Improvement Project (SEIP) conducted by the Ministry of Education. The first component of the SEIP's Pillar 1 endeavours to enhance accessibility and fairness in 15 senior secondary schools through the granting of scholarships to female students, which also include the distribution of sanitary resources.

2.1.9 Gaps in Knowledge/Literature

The comprehensive literature review revealed two key gaps. First, there is limited evidence on the link between learning outcomes and WASH, MHM, and school attendance - a connection that is, in some cases (particularly at the primary and JHS levels), non-existent. Second, while studies

have explored the relationships between WASH, MHM, and, to some extent, school attendance, no research has established the interconnections among all four variables (WASH, MHM, school attendance, and learning outcomes). The existing discourse has largely been limited to the links between WASH and school attendance or WASH and MHM, without assessing their combined impact on school performance and learning outcomes.

2.2 Theoretical Framework

2.2.1 Introduction

The study draws on three key theories/models: 1) the Ecological Systems Theory; 2) the Chronic absenteeism model; and 3) the WASH and child growth model. These three theories/models interact to establish the possible linkages and pathways of WASH related outcomes on schooling and learning outcomes. These theories provide the basis for understanding the key variables in the study – WASH variables, determinants of menstrual hygiene management, school attendance and learning outcomes. The ecological systems model considers the different and multifaceted dimensions to menstrual hygiene management in schools. The chronic absenteeism model provides variables for understanding the different contributing factors and explanations to school attendance and absenteeism. Finally, the WASH and child growth model provides details on the background/demographic and WASH characteristics and how these interact to influence child outcomes, including learning outcomes.

2.2.2 The ecological systems theory

The ecological systems theory proposes that various social and structural factors combine to shape the behaviour and practices of people over time (Fatusi & Bloom, 2008). The ecological systems theory (Figure 2.1) is pivoted on the perspective of multifaceted interactions and interdependence of factors within and across all levels of a human system. It highlights people's interactions with

their physical and sociocultural environments. The theory comprises six key stages/levels with the individual (first level) situated at the centre of the model. The second level pertains to the microsystem, encompassing the immediate settings surrounding the individual, such as the availability of WASH facilities, as well as the individuals with whom the person interacts, such as family members, schoolmates, and classmates. The mesosystem, situated at the third level, encompasses the interactions that take place within the microsystem. These interactions encompass various factors such as interpersonal connections, the community context (including urban or rural settings), social networks, and support systems within both the home and school environments. The exosystem, as the fourth system, encompasses structures that have an indirect impact on individuals but exert influence through many means such as laws, policies, economic structures, and educational systems. The macrosystem encompasses the broader socio-cultural context within which all systems operate. The factors encompassed in this category consist of norms, beliefs, gender role socialisation, and the societal structure. The chronosystem, situated at the outermost layer, represents the temporal dimension and the possible impact that previous experiences at the preceding levels may exert on a particular outcome throughout time.

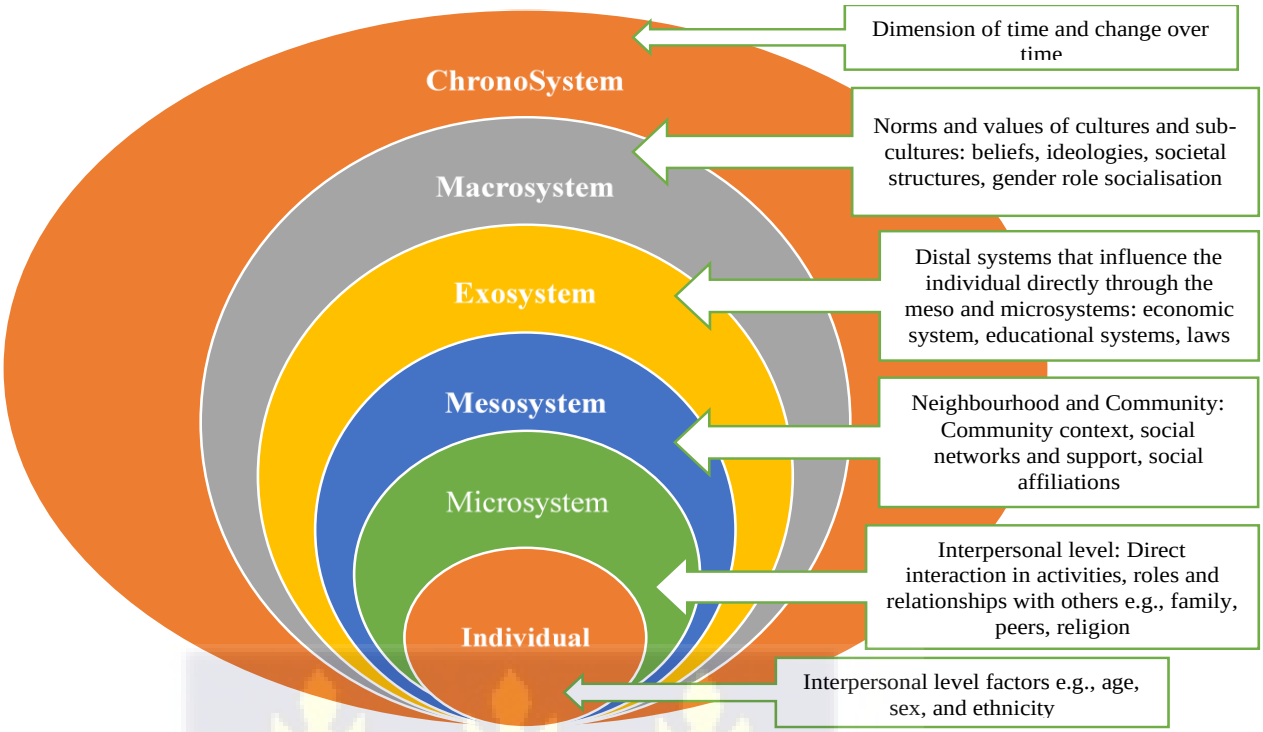


Figure 2.1: The Ecological Systems Theory
Source: Bronfenbrenner Ecological Systems Theory, 1979.

The examination of social and ecological phenomena suggests that in order to comprehend the interplay between social and structural elements that shape a particular result, it is imperative to adopt an ecological framework (Mmari & Sabherwal, 2013). Bronfenbrenner's ecological systems theory of development acknowledges the inherent variability in individual functioning, as well as the complex interplay between various contextual factors such as the individual, family, peer group, community, and broader social and cultural environments. These contextual factors have the potential to shape an individual's knowledge and practices (Bronfenbrenner, 1986; Mmari & Sabherwal, 2013). The social and cultural surroundings play a crucial role in connecting environmental circumstances and behaviours (Taylor et al., 2000).

2.2.2.1 Application of the ecological systems theory to this study:

The core concept of the model is that human practices have multiple levels of influencers, often including intrapersonal (biological, psychological), interpersonal (social, cultural), organisational (school level), community, physical environmental, and strategic guidelines (policy). The use of this model provided the basis for comprehensively understanding the different elements that influence adequate or inadequate menstrual hygiene management and practices - from the individual, school, community and family contexts. The use of this theory also allowed for the unpacking of the multifaceted levels of the society within which young adolescents live, how these students interact with their environment within a social system and how these impacts on their MHM practices. Applying this model in studying the interactions that exist between WASH and menstrual hygiene and its associated impact on school attendance and learning outcomes suggests that school attendance and learning outcomes could be the result of the complex interactions between factors at the individual, family, community, socio-demographic and school levels. Therefore, to understand the interrelationships, these different factors are explored in terms of their existence at each level, as well as their interaction across all levels. In line with this, the study draws on the different contexts of the theory in guiding the conceptualisation of the various study variables, targeting of respondents, the type of data collected from the various respondents, the key stakeholders that were engaged, and the experiences of girls across the different contexts - physical and social environment.

2.2.2.2 Limitation of the ecological systems theory

The social ecology model, as conceptualised by Bronfenbrenner, proves to be valuable due to its ability to elucidate the interrelationships between WASH and socio-demographic factors, as well as its connection to MHM. Nevertheless, the framework fails to explicitly indicate the relative

importance or weight assigned to any individual piece. For instance, students belonging to the lowest wealth quintile may nevertheless get improved outcomes in managing menstruation. The impact of poverty can be mitigated by other factors, such as the quality of parenting. While the ecological approach offers a conceptual framework for understanding the development of children's lives, it does not inherently establish a moral judgment of what is considered positive or negative. The approach primarily offers a static representation and does not readily capture temporal dynamics. The study, however, addressed this challenge by using additional models such as the WASH and child growth model to enhance the understanding of the relationships among the several factors of interest.

- **Critique of the ecological systems theory:**

The chronosystem and macrosystem dimensions of the model are generally difficult variables to measure and as such could not be entirely applied in the study. The chronosystem dimension, which focuses on the element of time and change over time, could not be fully measured because the study participants were not tracked over time and, as such, changes in MHM practices over time could not be determined. The macrosystem level, which focuses on assessing norms, values of cultures, beliefs and ideologies, could not be measured in its entirety – only ethnicity was included as part of the socio-demographic variables. This is because measuring norms and beliefs can be challenging - they are often abstract and subjective constructs, having elements of social desirability bias (Calatrava et al., 2021).

In addressing this challenge, the study used a mixed methods approach - qualitative and quantitative methods. The qualitative data addressed some elements of beliefs and norms relating to menstrual hygiene management and related issues.

2.2.3 Chronic absenteeism framework

The chronic absenteeism framework was developed by Sarah Winchell Lenhoff and Ben Pogodzinski in 2018 to assess the direct and indirect associations among various factors, such as environmental, family/individual, and school factors, that may influence the probability of a student's regular school attendance. The framework highlights absenteeism as a crucial factor that deeply impedes the school outcomes of students. The model further elucidates the complex nature of the factors that contribute to student absenteeism, which comprise direct and indirect factors. The framework conceptualises that student attendance is the result of environmental, family/individual, and school factors (Figure 2.2) with each of the different levels of the variables able to independently influence and contribute to student attendance or moderate other factors' association with attendance. For example, school safety (access to WASH facilities) may impact the health of students (menstrual hygiene management), which in turn may influence school attendance. Additionally, a robust school transport system could fill in the gaps of distance to school, which could also impact on attendance (Gottfried, 2017).

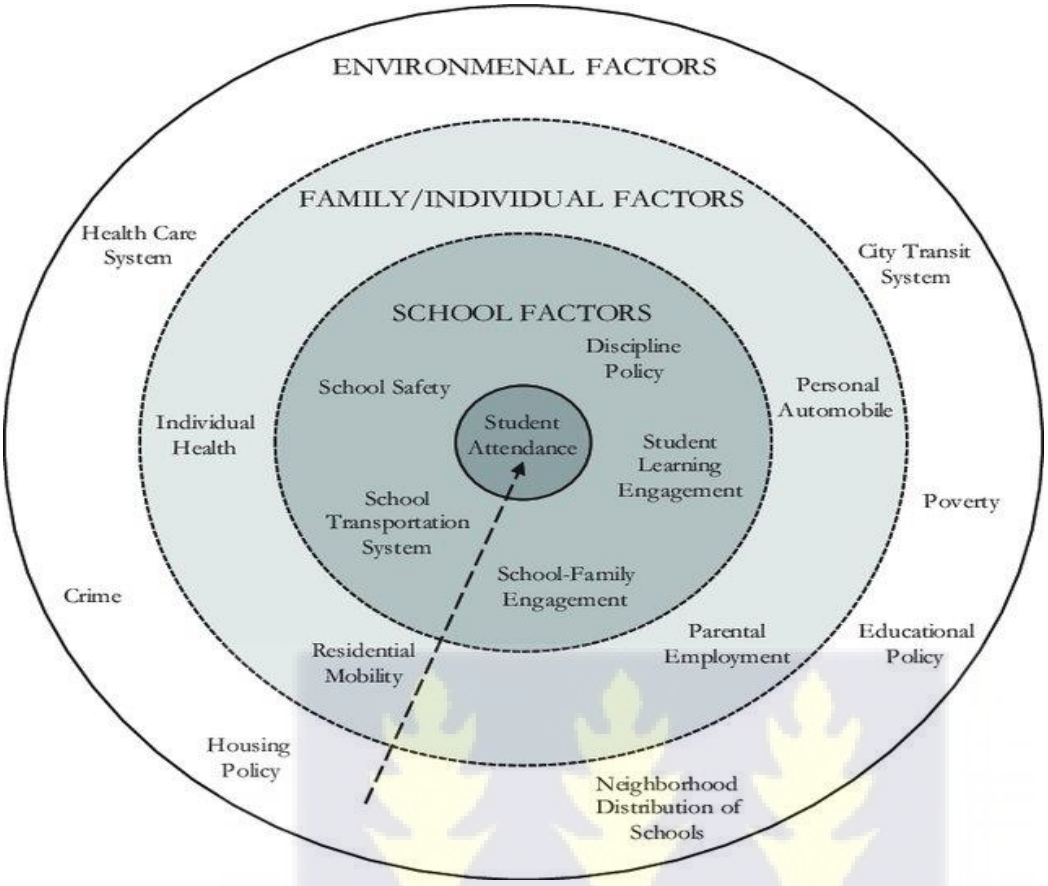


Figure 2.2: Framework of factors influencing chronic absenteeism
Source: Sarah Winchell Lenhoff & Ben Pogodzinski (2018)

2.2.3.1 Application of the chronic absenteeism model to this study

The layered structure of the chronic absenteeism model mirrors the first framework (Bronfenbrenner, 1977) i.e., the ecological systems theory, wherein actions and practices of individuals are shaped by the interaction between different factors across different levels - personal, social, and environmental factors that change over time. These different contexts/levels provide a base for the study to explore the different factors that contribute to absenteeism – ranging from environmental, family, individual to school level influences.

Environmental factors:

According to the model, there are many environmental factors that can contribute to school absenteeism, including public health systems - including the availability and functionality of WASH facilities, means of transport (distance to school), and poverty levels (Epstein & Sheldon, 2002). The study measured how the environmental factors influence school attendance primarily linking it through family and school-level factors. For example, students from poor backgrounds may not have the resources to access good health (menstrual hygiene materials), which may lead to discomfort at the school level and may ultimately contribute directly to school absenteeism – with a possible impact on learning outcomes. In most school communities with large concentrations of low-income households in Ghana, individual family poverty is heightened by a lack of adequate services related to individual factors that could impact on school attendance (including access to transportation and distance to school).

Family/individual factors:

Family and individual student characteristics can influence school attendance both directly and indirectly. Directly, family characteristics such as parental employment, lineage (ethnicity), and single parent households have been found to be associated with school attendance (Dahl, 2016). Additionally, student poverty (employment of parents) has been found to have a relationship with school absenteeism (Ready, 2010). The study explored and assessed school attendance levels across the family and individual trajectories and their interconnectedness.

School factors:

Several school-level factors have the potential to influence school attendance of students. These comprise school safety, access to WASH and health facilities and student learning engagement

(Bryk et al., 2010). The study therefore explored how school factors interact with family and community factors to influence school attendance.

2.2.3.2 Limitations/critique of the chronic absenteeism model

The chronic absenteeism model provides the framework for understanding the complex nature of school attendance and absenteeism – highlighting the role of environmental, family and school level factors. The limitation with the model is the difficulty in measuring some of the model factors in the context of developing countries including Ghana. With reference to environmental factors, variables including city transit system, crime and housing policy are largely difficult to measure; and school level factors, including school transportation system and school safety, are equally difficult to measure. These variables were therefore not included in establishing the predictors of school attendance. The exclusion of these variables may have limited the measurement of absenteeism. This was, however, mediated with the inclusion of local context variables including distance to school.

2.2.4 WASH and child growth model

The WASH and child growth model was developed by Dearden et al. (2017) to measure the impact of WASH facilities on child growth and development (Figure 2.3). This was used to establish the relationship between access to WASH facilities and child-level outcomes (learning outcomes) and was adapted to determine the relationship between WASH facilities and learning outcomes. Key WASH variables including access to improved toilets, water systems and sanitation facilities were used as intermediary variables to establish the relationship between selected background characteristics interacting with the usage of these WASH facilities to impact on child outcomes.

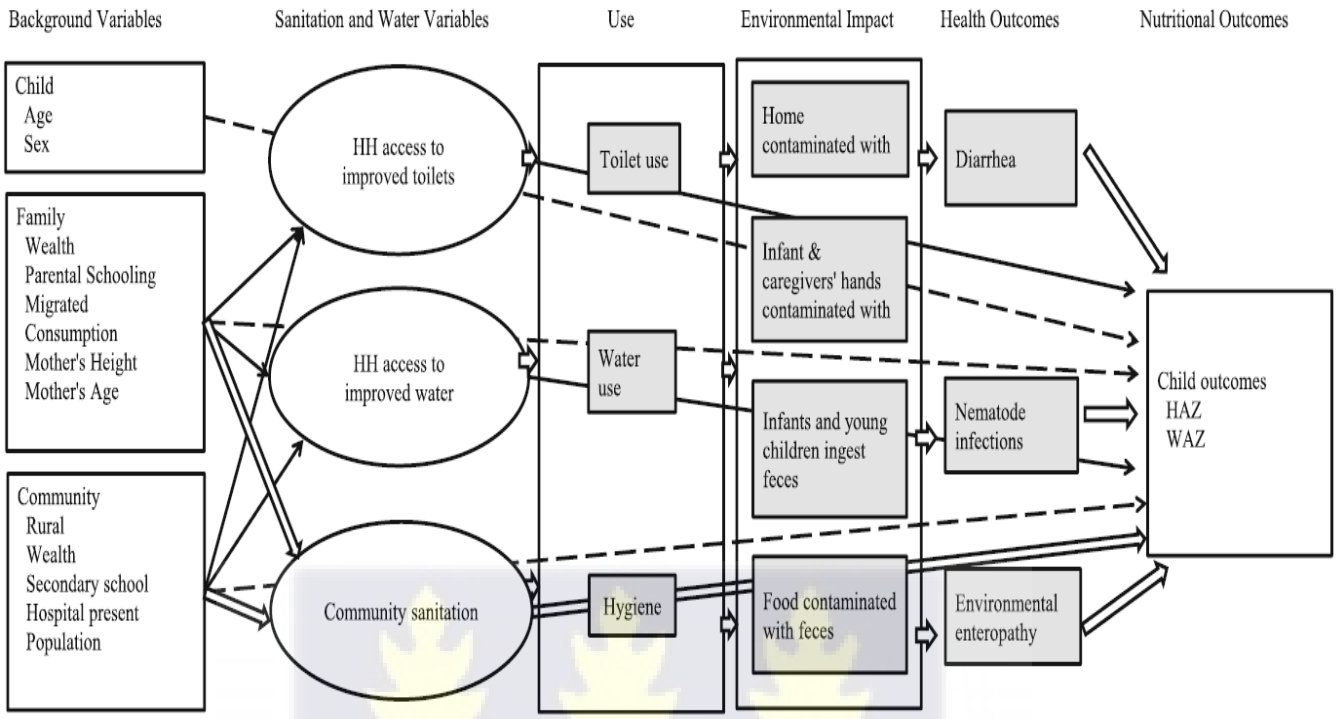


Figure 2.3: Framework for assessing WASH and child growth model
Source: Dearden et al. (2017)

2.2.4.1 Application of the WASH and child growth model to this study

In a study by Dearden et al. (2017) on WASH and child development, the results showed that WASH facilities interact to impact on different life outcomes of children. In line with this, the study adapted these background/demographic and WASH facilities to establish the relationship between these factors and learning outcomes of students at the basic level of education in Ghana. The background variables comprise - age, wealth status, employment of parents, locality (urban/rural) and educational level of parents, with the WASH related variables covering toilet facilities, water and sanitation facilities.

2.2.4.2 Limitations/critique of the WASH and child growth model

The model provides key variables for measuring both WASH and socio-demographic outcomes. However, the major limitation of the model is that although it establishes direct interrelationships between the key variables of interest, it does not include measures of child hygiene or actual use of improved water and toilets. Further, the model focuses largely on toilet and water facilities at home, but children who go to school or work are also potentially exposed to additional school level factors. The study therefore adapted the variables of interest on WASH and child outcomes to test for possible outcomes at the school level.

2.2.5 Conceptual Framework

Figure 2.4 illustrates the potential pathways of interaction between selected background variables, which are hypothesised to impact menstrual hygiene management, school attendance, and learning outcomes. These pathways are derived from the synthesis of various models and frameworks discussed. Key variables from the three theories/frameworks were integrated to form a model showing the interlinkages between WASH, MHM, school attendance and socio-demographic factors as predictors of learning outcome. Several variables have been shown to interact in determining learning outcomes. The variables examined in this thesis include: 1) WASH facilities – drinking water, sanitation (toilet facilities), hygiene (handwashing facilities), 2) community – access to WASH facilities, distance to school, region and district of residence and locality (urban/rural); 3) Family factors – employment type of parents, access to WASH facilities at the household level, educational level of parents, and wealth status; 4) School factor – school level (primary, JHS); 5) Individual factors – age, class level, religious affiliation and ethnicity; 6) menstrual hygiene management – adequate and inadequate management practices; 7) School attendance – regular and irregular; 8) Learning outcomes – very good, good and poor.

The availability of WASH facilities has been established to determine a number of school level outcomes – MHM, school attendance, health of students, and learning outcomes. The association between WASH and MHM practices have been largely studied (Asimah et al., 2017; Acheampong et al., 2018; Tiswin et al., 2019). The evidence in literature, however, is not conclusive. Some research works concluded that the availability of WASH facilities at the school level contributes significantly to the management of menstrual processes (Acheampong et al., 2018; Ahmed et al., 2022; McMichael, 2019) while others concluded that no such association exists (Tiswin et al., 2019). For example, a study conducted by Acheampong et al. (2018) in selected schools in Kumasi, Ghana, did show that schools that had poor WASH facilities had students having very poor MHM outcomes while those that had better WASH infrastructure and provided better environment for MHM had better outcomes.

The association between WASH and school attendance is also mixed. However, the empirical evidence is more tilted towards a strong association/impact of WASH on regularity of school attendance. Evidence from a systematic review of empirical literature by McMichael (2019) on WASH interventions in schools in low-income countries (impact of school-based WASH programmes in reducing student absence) showed mixed outcomes. The findings of the study indicated that the provision of safe and adequate WASH promotion in educational institutions holds significant promise in enhancing health and education outcomes, as well as promoting inclusivity and fairness. However, it is important to note that the implementation of school-based WASH interventions does not automatically guarantee favourable results. Furthermore, a research conducted by Garn et al. (2017) in educational institutions in Mali, where control and intervention schools were carefully selected, yielded findings suggesting that the implementation of Water,

Sanitation, and Hygiene (WASH) initiatives alone may not be adequate in reducing students' rates of non-attendance.

On the other hand, several studies have highlighted the importance of WASH to keeping students, especially girls in school. For example, a study by Alam et al. (2017) in basic schools in Bangladesh asserted that close to half of female students missed at least three days of school during their menstruation. This trend was however, slightly reversed as a result of a WASH intervention. Further, a cross-sectional study conducted by UNICEF across 228 schools in Bangladesh showed that girls' school attendance rate was found to have increased following a WASH intervention. Hunter et al. (2014) showed a strong association between providing free safe drinking water and reduced absenteeism, although only in the dry season; and a study by Bowen et al. (2007) in China highlighted the importance of WASH to school attendance. The findings indicated that the implementation of a hand-washing promotion programme, both in its standard and expanded forms, along with the distribution of soap in educational institutions, resulted in a notable decrease in the number of days and instances of student absenteeism.

The existing empirical literature examining the association between MHM, and school attendance has yielded inconclusive findings. An empirical investigation conducted by Oster and Thornton (2009) in Nepal examined the relationship between menstruation technology and school attendance, revealing no discernible impact of menstruation technology on either school attendance or test scores. In a study conducted by Montgomery et al. (2012), it was found that the implementation of menstrual hygiene management (MHM) intervention, specifically the provision of pads along with puberty education, resulted in a noteworthy improvement in school attendance after a period of 3 and 5 months. The provision of puberty education in isolation had comparable rates of attendance.

Further, the interactions between other socio-demographic characteristics, MHM and school attendance presents some level of associations. In a study conducted by Davis et al. (2018) across basic schools in Indonesia, the evidence showed less than 20% of girls who are menstruating do not report to school throughout their period. The study further discovered that absenteeism was strongly connected with the type of location, the class level, menstrual difficulties, parental occupation and education and a lack of awareness, and may be influenced by the school's WASH facilities. The empirical evidence on the interactions between WASH and learning outcomes is scanty. However, the few available studies show a level of association between WASH and learning outcomes. In a 2016 study conducted by Divyanshi Wadhwa in India, the researcher examined the potential correlation between students' access to adequate toilet and drinking water facilities at both school and home, and their academic performance in Mathematics, English, and Telugu. The findings of the study indicate a positive correlation between the presence of at least one functional toilet and a reliable source of drinking water in educational institutions, and the performance of students in English examinations.

In conclusion, the interactions between the various variables of this study are largely inconclusive. The study therefore provided empirical evidence to add on in addressing some of the inconclusiveness. This was done by establishing clear interactions between WASH, MHM, school attendance and learning outcomes.

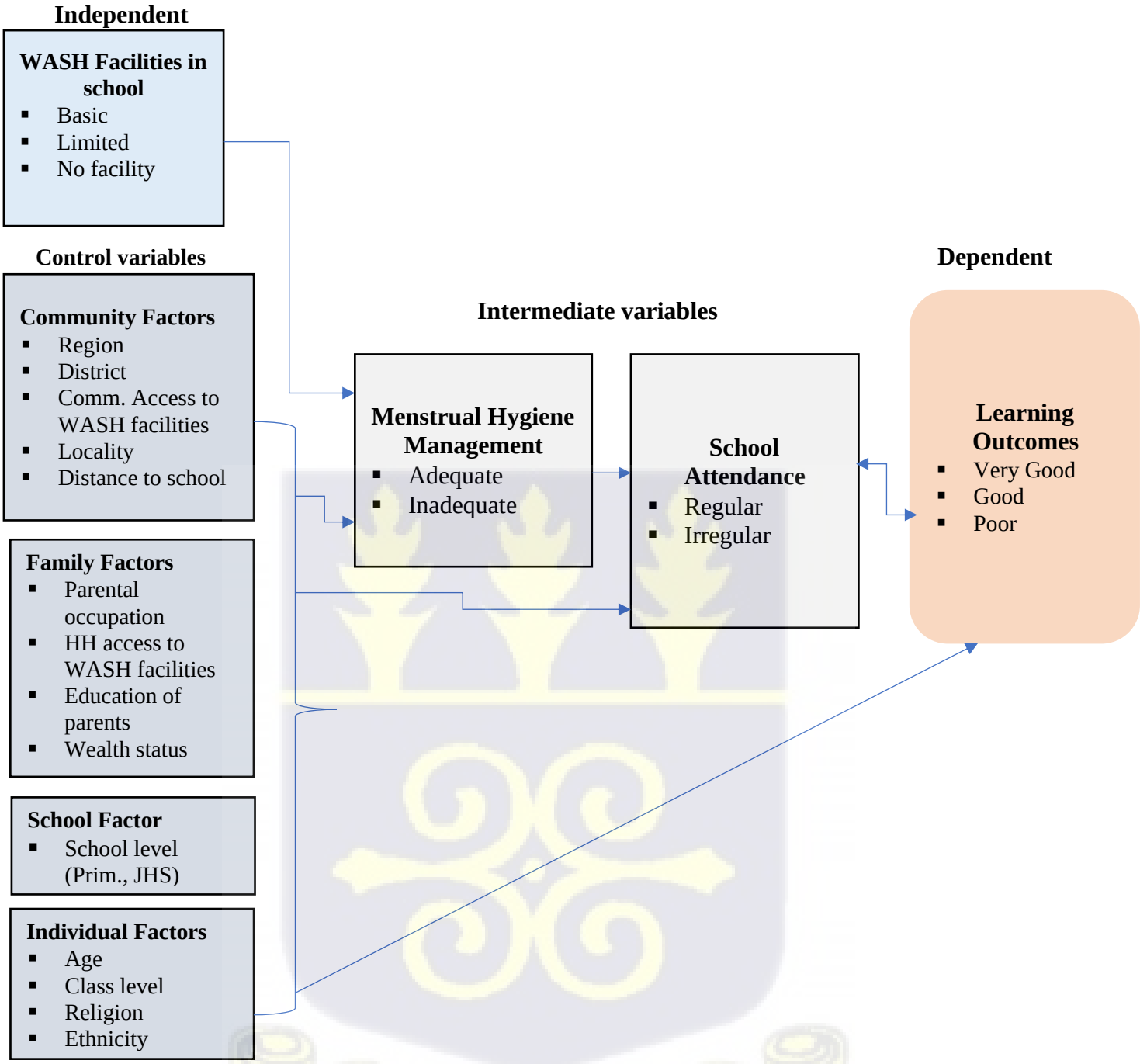


Figure 2.4: Conceptual Framework – showing the interlinkages between WASH, MHM and socio-demographic factors and learning outcomes

Source: Author's construct (2022)

2.2.6 Hypotheses

Based on the discussion and synthesis of the theories and the conceptual framework, the following hypotheses were formulated:

1. Students in schools with no access to WASH facilities ('no service') are more likely to have poor learning outcomes compared to those in schools with access to basic WASH facilities.
2. Learning outcomes are likely to be lower among students who miss more school days than those who do not.
3. Students practising adequate MHM are more likely to have better learning outcomes compared to those with inadequate MHM practices.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides details on the methodology of the study – covering the study design, study areas, data and methods, and methods of data analysis. First, a general overview of the study design and context is presented – providing details on the survey approach, study sites, sampling processes and size, instrumentation and measurements. The chapter also depicts in detail data collection processes, data quality assurance and management, study ethics and the methods of data analysis used at various stages of the study. Finally, the chapter highlights a few limitations to the study.

3.2 Study Design

The study adopted a concurrent triangulation mixed method approach involving the simultaneous collection and analysis of both quantitative and qualitative data to cross-validate findings. This approach offered a unique but complementary opportunity to understand the different predictors of learning outcomes from both quantitative and qualitative dimensions. The choice of this approach was informed by the study's philosophical foundation in pragmatism, which emphasises that knowledge is derived from multiple sources and aligns with a mixed-methods approach. By integrating the strengths of both methods, this approach provided a more comprehensive understanding of the research problem. A survey approach was used in gathering primary data at the school and student levels – providing different layers of the interrelationships between WASH, menstrual hygiene management, school attendance and other control variables (community/environmental factors, family, school and individual factors) that account for

differences in learning outcomes among different students from different contexts. Following the collection, cleaning, and analysis of both quantitative and qualitative data, evidence from the two data sets was compared to identify similarities, differences, and contradictions. The convergence or divergence of the findings was used to strengthen the overall interpretation of the results.

- **Philosophical underpinning:**

The study was underpinned by the 'Pragmatism' philosophy, which is rooted in American pragmatism, especially the works of John Dewey, Charles Saunders Pierce, and Richard Rorty (Felzer, 2010; Johnson & Onwuegbuzie, 2004; Tebe, 2012). The pragmatist position indicates that reality is shaped by practical consequences and actions and knowledge is gained through a variety of methods, depending on the research question. This approach, therefore, leans more towards a multiplicity of methods (mixed methods) in unearthing reality and knowledge – a flexible approach that combines quantitative and qualitative methods. The focus of this philosophy is to solve practical problems and improve the human condition. This philosophical position, therefore, informed the choice of a mixed method approach to unearth the lived experiences of girls relating to WASH, menstrual hygiene management, school attendance and learning outcomes from both the quantitative and qualitative perspectives.

3.2.1 Survey approach (Quantitative)

The survey collected school level data using questionnaires and checklists to explore the various variables of study and to further establish the interrelationships between the variables of interest - menstrual hygiene management, school attendance and other socio-environmental factors.

3.2.2 Description of study sites, sampling processes and sample size

The study was conducted across regions, districts and schools generated with the support of the Ministry of Education through the Ghana Education Service (GES). The data collection exercise was done in three regions[4], six districts[5] and selected schools at both the primary and JHS levels (See Appendix 1 for full list of schools covered).

3.2.2.1 Sampling of study regions and districts:

a. Sampling of study regions

The selection of regions for the study was done using the Ghana Statistical Services' approach of grouping all regions in the country into three zones:

i. **The Northern Zone** - Northern, Upper East, Upper West, Savannah and North East Regions.

ii. **The Middle Zone** - Ashanti, Brong Ahafo, Bono East, Ahafo, Ashanti, and Eastern Regions; and

iii. **The Southern Zone** - Greater Accra, Central, Volta, Oti, Western and Western North Regions.

The selection was done based on the principle of representativeness and based on the number of schools within the region and district and levels of deprivation. Based on these principles, the Northern, Ashanti and Greater Accra Regions were sampled from each of the three zones (Table 3.1). These regions were also selected on the evidence of having high number of schools and higher number of districts and provided the most robust and representative estimates as well as information on geographical diversity.

[4] Greater Accra, Ashanti and Northern
[5] Accra Metropolitan Assembly, Shai Osudoku, Kumasi Metro, Sekyere South, Tamale Metro and Nanton

b. Selection of study districts

The selection of the study districts was done based on the following criteria (See Figure 3.1 showing the map of study districts and schools covered):

i. Districts with a high number of schools;

ii. Proximity of districts to each other;

iii. One rural and one urban district;

iv. Security stability – districts with relatively stable environments in terms of peace and security that allowed for the data collection to be conducted with minimum risk.

Using these criteria, two districts each were selected for the study as outlined in Table 3.1.

Table 3.1: Sampled regions and districts

S/N	Study regions	No. of districts sampled	Study districts
1.	Greater Accra	2 - districts	Accra Metropolitan Assembly
			Shai Osudoku
2.	Ashanti	2 - districts	Kumasi Metro
			Sekyere South
3.	Northern	2 - districts	Tamale Metro
			Nanton
Total		**6-districts**	

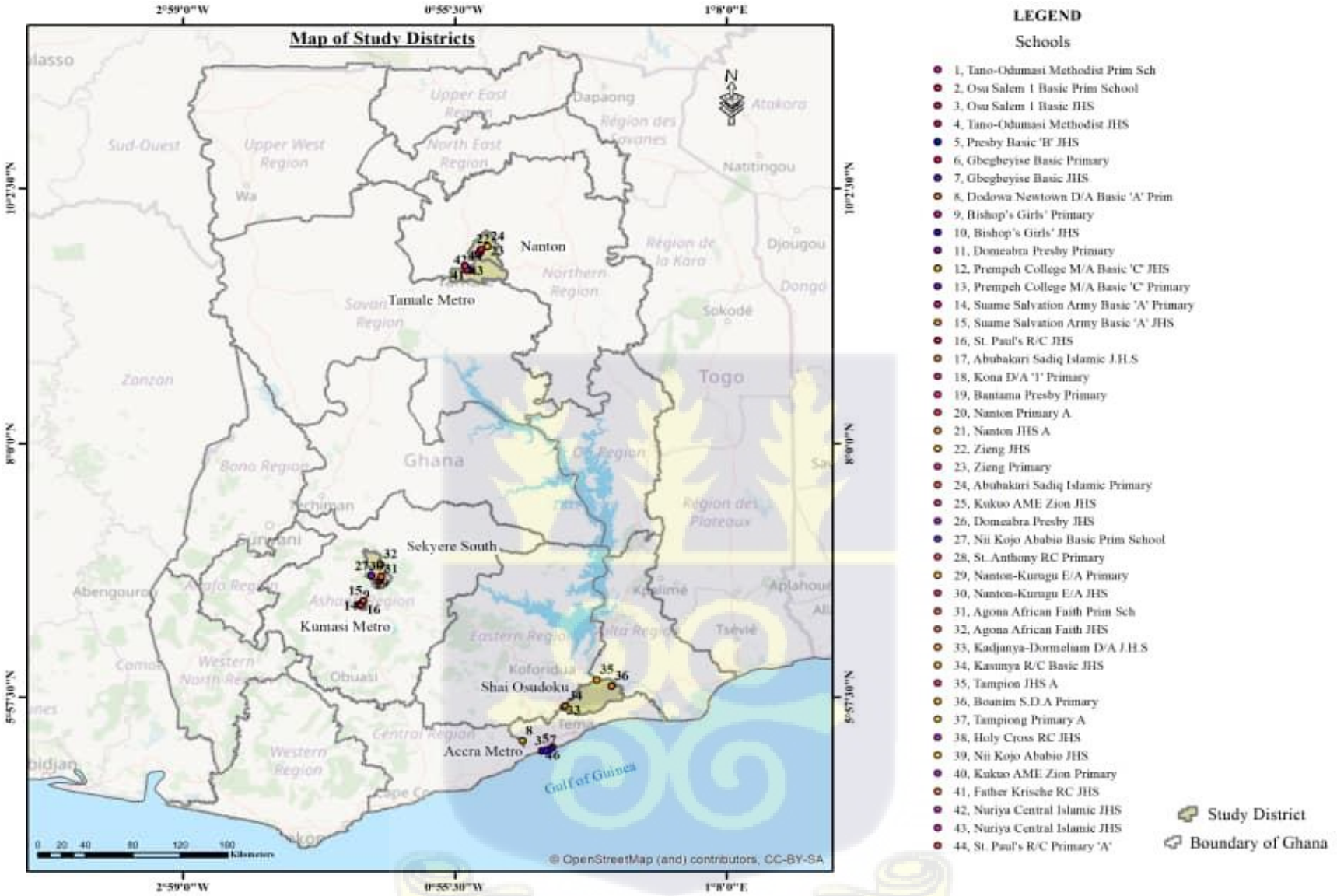


Figure 3.1: Map showing the study districts
Source: Author's construct – ArcGIS

c. Selection of schools

The school selection was done purposively using the following criteria:

1. Schools having both primary and Junior High within the same physical location – but operating as separate schools with different headteachers;
2. Equal split between urban/rural schools.

In all, 48 schools comprising 24 primary schools and 24 Junior High Schools (JHS) were sampled for the study (Table 3.2).

Table 3.2: Number of sampled schools by locality

S/N	Study regions	Study districts	No. of schools	No. of schools
1.	Greater Accra	Accra Metro	8-schools	4-prim. & 4-JHS
		Shai Osudoku	8-schools	"
2.	Ashanti	Kumasi Metro	8-schools	"
		Sekyere South	8-schools	"
3.	Northern	Tamale Metro	8-schools	"
		Nanton	8-schools	"
Total			**48-schools**	**24-primary schs. & 24-JHS**

d. Study population

The study targeted only girls in primary 5 and 6 and JHS 1 and 2. In generating robust data to respond to the research questions, students (girls only) were randomly sampled from the selected schools stratified by grade (primary 5 and 6 and JHS 1 and 2). It is established in literature (Ghana Education Service, 2014; Morgan et al., 2017) that averagely, menstruation usually starts as early as 11 years depending on the physiological make-up of the child at which time the child should either be in primary 5 or 6 – this accounted for the targeting of students in classes 5 and 6. The focus at the Junior High level focused only on JHS 1 and 2 because JHS 3 students had just completed their Basic Education Certificate Examination (BECE) and were out of the school

system. Class registers from the head teachers/teachers were used as the base for selecting students. Ten students (girls only) who had attained menarche were randomly selected from each of the targeted classes. In all, the study targeted about 950 students across the sampled schools.

The study estimates (sample size of 950) were achieved based on the following assumptions:

According to the 2019/2020 Education Management Information System (EMIS) data, there are about 4,584,792 students across both the primary and Junior High Schools in Ghana. Given this estimated target population of 4,584,792 students, the study arrived at a statistically representative sample size using the following formula:

$$n = \frac{z^2 p(1-p)N}{e^2(N-1)+z^2\ p\ (1-p)}$$

where n = sample size;

z = standard variate at a given confidence level, i.e., 95%;

p = 0.5;

N = population of students; and

e = Margin of error set at 5%.

With a target total population of *N* = 4,584,792, the study applied the above equation to determine the sample size by inputting the respective values as follows:

$$n = \frac{(1.95)^2 0.5(1-0.5)4{,}584{,}792}{(0.05)^2(4{,}584{,}792-1)+(1.95)^2\ 0.5\ (1-0.5)} = \frac{4{,}358{,}417.895}{11{,}462.928} = \mathbf{380}$$

Since the study targeted to achieve a higher level of variation across the different zones, the generated sample of 380 was doubled to achieve a more robust sample size of 760 students.

The above sample, however, did not account for non-response rate, which is usually estimated at about 20-25% (Meterko et al., 2015). In making-up for the possible non-response rate (students

who may not have achieved menarche), a higher sample size needed to be achieved by adding a 25% mark-up: 760*1.25 = **950 students.**

3.3 Achieved Sample - regional and district distribution and context

The study was conducted across three regions in Ghana and across six Municipals/Districts (Table 3.3). Overall, the study estimated to engage 950 students across 48-schools in 6-districts. However, at the end of data collection, 875 girls were reached, accounting for about 92% of the targeted sample. The analysis in relation to the number of girls surveyed shows a slightly higher proportion of girls were reached across the three Metropolitan Areas (Accra, Kumasi, and Tamale Metros), which are more urbanised compared to the other largely rural districts. The Nanton and Sekyere South Districts account for the least number of achieved sample. This could be attributable to the rural nature of the districts, the comparatively lower enrollment numbers, and the late attainment of menarche in these areas. In terms of locality differences, although the study set out to achieve an equal number of students across both urban and rural areas/schools, the results shows a little above a third (36.2%) of the students enumerated were in rural schools as against 63.8% in urban schools. This is also attributable to low enrollment numbers, especially across primaries 5 and 6 in rural areas/schools.

In relation to the qualitative data, 43 FGDs were conducted with girls across the study schools: 22 at the primary level and 21 at the JHS level; and 43 KIIs were conducted with the School Health and Environment Programme (SHEP) coordinators. The study was conducted across 48 schools and ideally, all 48 SHEP Coordinators should have been interviewed. However, adopting the principle of saturation in qualitative research, Saturation was reached after the 22nd interview at

the primary level and the 21st interview at the JHS level, which determined the total number of SHEP Coordinators engaged in the study.

Table 3.3: Study districts and achieved sample

Districts	Rural (n=317)		Urban (n=558)		Total (n=875)	
	Freq.	%	Freq.	%	Freq.	%
Accra Metro	-	-	159	28.6	159	18.2
Shai Osudoku	66	20.7	80	14.4	146	16.7
Kumasi Metro	-	-	159	28.6	159	18.2
Sekyere South	118	37.0	1	0.2	119	13.6
Tamale Metro	-	-	159	28.6	159	18.2
Nanton	133	41.7	-	-	133	15.2
Total	**319**	**100.0**	**556**	**100.0**	**875**	**100.0**

Source: Field work, October, 2022

3.4 Study Instruments

In all, five instruments were developed to generate primary data to answer the research questions of the study. These comprised the following:

- **Quantitative instruments** – three instruments were used to gather quantitative data to respond to research questions one, two and three
  - **Survey questionnaire** – a school-level questionnaire - targeted only girls across the sampled schools (primary 5 and 6 and JHS 1 and 2). The questionnaire was used to gather data on a wide range of issues including family and individual characteristics, community and school-level contexts, knowledge, attitudes and practices towards menstrual hygiene management, access to menstrual materials, issues around school attendance and learning;

- **WASH checklist** – this checklist was used to take inventory of all WASH facilities in the school. This provided evidence to respond to the WASH component of the study;
- **School attendance and learning outcome/exams results template** – this template was used to capture termly results – end of term results and school attendance records for terms 1 and 2 of the 2022 academic calendar. This data was collected for only sampled students who responded to the survey questionnaire.

- **Qualitative instruments** – two instruments were used to gather qualitative data to respond to research question four on the lived experiences of students – from the perspectives of the students and the SHEP Coordinators.
  - **FGD Guide for girls** – an FGD guide was used to engage girls who had attained menarche across the selected classes to gauge their collective ideas about all the key variables of interest.
  - **KII with SHEP Teachers/Coordinators**[6] – this instrument was used to engage teachers that were responsible for health education and related issues at the school level. This instrument assessed the WASH situation, MHM practices, school attendance and learning outcomes from the perspectives of the SHEP Coordinators (teachers – responsible for school health and education).

3.5 Measures

3.5.1 Water, Sanitation and Hygiene (WASH)

The independent variable (WASH facilities in schools) comprises three key variables (water, sanitation and hygiene facilities – re-categorised into three key categories – 'Basic', 'Limited' and

[6] The SHEP Coordinators are teachers in the schools with either backgrounds in health, environment etc. who are selected to coordinate health and environment issues in the schools.

'No facility'). These were selected as key variables of focus based on UNICEF/WHO's Joint Monitoring Programme's (JMP, 2020) focus indicators for data collection on WASH in schools (Table 3.4).

Table 3.4: JMP categorisation of Water, Sanitation and Hygiene

	Drinking Water	Sanitation (Toilet)	Hygiene (Handwashing)
Improved	**Basic:** Drinking water from an improved source and water is available at the school at the time of the survey	**Basic:** Improved sanitation facilities at the school that are single-sex and usable (available, functional and private) at the time of the survey	**Basic:** Handwashing facilities with water and soap available at the school at the time of the survey
	Limited: Drinking water from an improved source but water is unavailable at the school at the time of the survey	**Limited:** Improved sanitation facilities at the school that are either not single-sex or not usable at the time of the survey	**Limited:** Handwashing facilities with water but no soap available at the school at the time of the survey
Unimproved	**No service:** Drinking water from an unimproved source or no water source at the school	**No service:** Unimproved sanitation facilities or no sanitation facilities at the school	**No service:** No handwashing facilities available or no water available at the school
Notes	**Improved sources** include piped water, boreholes or tube wells, protected dug wells, protected springs and packaged or delivered water. **Unimproved sources** include unprotected wells, unprotected springs and surface water.	**Improved facilities** include flush/pour-flush toilets, ventilated improved pit latrines, composting toilets and pit latrines with a slab or platform. **Unimproved facilities** include pit latrines without a slab or platform, hanging latrines and bucket latrines.	Handwashing facilities may be fixed or mobile, and include a sink with tap water, buckets with taps, tippy-taps and jugs or basins designated for handwashing. Soap includes bar soap, liquid soap, powder detergent and soapy water but does not include ash, soil, sand or other handwashing agents.

Source: JMP service ladders for monitoring WASH in schools (2020)

- **Gaps in the JMP standard definitions of WASH in school:**

The definitions of all 3-levels of WHO/UNICEF's Joint Monitoring Programme (JMP's) classification of WASH into basic, limited and no service rely primarily on the time element (… at the time of the survey) as a distinguishing factor. This approach may not always accurately reflect the actual availability of WASH facilities in schools. For instance, a school could be classified as having limited WASH services if their drinking water source malfunctioned just a day before the survey, even if they typically have good facilities. To address this issue and provide more realistic estimates, this study suggests including a specific time limit.

The study therefore proposes, for example, using a cutoff point **of one month prior to the survey** as a reference point. This modification is likely to offer a more accurate picture of the actual WASH conditions in schools.

3.5.2 Menstrual Hygiene Management (MHM)

The study adapted the UNICEF, and the WHO definitions of menstrual hygiene management (WHO & UNICEF, 2012) as follows:

a. Women and adolescent girls are using a clean menstrual management material to absorb or collect menstrual blood,
b. Using soap and water for washing the body as required
c. Having access to safe and convenient facilities to dispose of used menstrual management materials, and
d. They understand the basic facts linked to the menstrual cycle and how to manage it with dignity and without discomfort or fear

For better understanding of menstrual hygiene management from the global perspective, MHM practices were re-categorised into two standard measures: adequate and inadequate MHM practices, using the UNICEF MICS menstrual hygiene management methodological approach (Evidence from the 6th round of MICS, 2021) and the WHO and UNICEF Joint Monitoring Programme (JMP, 2020). This was done using the 3-key criteria:

a. Schoolgirls are using a clean menstrual management material to absorb or collect menstrual blood,
b. Access to changing rooms – changing frequently in privacy
c. Having access to safe and convenient facilities to dispose of used menstrual management materials.

Any student that met all three criteria was classified as having adequate MHM and below three was classified as having inadequate MHM. The WASH variable was not applied in the definition of the adequacy/inadequacy of MHM practices because of issues of collinearity – because the independent variable is WASH.

- **Gaps in the definition and classification of menstrual hygiene management:**

The definition and classification of menstrual hygiene management (MHM) provided by UNICEF and the WHO is comprehensive. However, there are still some potential limitations highlighted as follows:

1. *Cultural variations* - the definition does not fully account for cultural variations in menstrual practices and beliefs. What is considered clean or dignified can vary significantly across different cultures and may not align with this universal definition.

2. *Age and developmental stages* - the definition refers to both women and adolescent girls, but it does not fully consider the different needs and challenges faced by girls at various developmental stages, such as puberty.
3. *Intersectionality* - the definition does not explicitly consider the intersectionality of gender, socioeconomic status, disability, and other factors that can influence a person's ability to manage menstruation with dignity and comfort.

In addressing some of the limitations, the study adopted a context-specific approach – introducing the locality and ethnic dynamics to the variables of measurement. Secondly, the addition of the qualitative data helped to address some of the cultural differentials and the intersectionality and related issues including socio-economic status.

3.5.3 School attendance

School attendance was defined as 'a measure of the number of children who attend school and the amount of time they are present' (UNESCO, 2002). Per the Ghana Education Service Standards, a student is expected to be in school at least four out of five days in a school week to be regarded as a regular attendee. Further, a study by Lenhoff and Pogodzinski (2018) in basic schools in Michigan classified chronic absenteeism as missing 10 or more days of school. This culminates into about 20% of a 56-day academic term in Ghana. This definition and that of the GES standards culminated into the classification of school attendance into regular (referring to students attending 80% or more of school days in an academic term) and irregular (attendance less than 80% of an academic term).

Gaps in the definition and classification of school attendance:

The classification of school attendance into regular and irregular attendance based on the criteria of attending 80% or more of school days in an academic term, or being in school at least four out of five days in a school week, has some potential gaps and critiques:

1. *One-size-fits-all approach* - this classification assumes that the same attendance criteria are applicable to all students across different regions, grade levels, and socioeconomic backgrounds. However, these may vary depending on contextual factors.
2. *Reasons for absence* - the definition and classification does not consider the reasons behind the absences. Absenteeism can be due to various factors, including health issues, family circumstances, transportation problems, or disengagement with school.
3. *Age and grade considerations* - attendance expectations can vary based on the age of the students and their grade level. Younger students may have different needs and challenges compared to older ones.
4. *Evolution of education* - as educational practices and technology evolve, traditional measures of attendance may need to be reevaluated. For instance, virtual learning and blended learning models have introduced new challenges and opportunities for measuring attendance.

The study addressed the identified limitations in the following ways: the qualitative, in-depth interviews and focus group discussions addressed the issues around the reasons for school absenteeism by highlighting all the possible drivers of school absenteeism. The quantitative data also addressed issues around the location, the age and grade (class level) dynamics by providing

disaggregated data across all these levels. However, the issue around the evolution of education (the digital angle) to the debate was not addressed in this study.

3.5.4 Learning outcome

The dependent variable, learning outcome, was defined as measurable achievements that the learner will be able to understand after the learning is complete, which learners are able to express in examination outputs (performance) (UNESCO, 2002). The learning outcome is based on examination results for terms one and two of the 2022 academic year (January – August 2022) for all core subjects (English, Mathematics, Science, Social Studies and Our World, Our People). Learning outcomes was initially categorised into four groups – excellent, very good, good and poor - adapting the West African Examination Council's (WAEC) classification of exams outcomes as follows: Excellent: 80 – 100; Very good: 60 – 79; Good: 50 – 59, Poor: below 50. However, the excellent and very good categories were subsequently merged into one category, very good, because the number of students who scored excellent were very few.

3.5.5 Other independent variables (control variables)

In accounting for all other possible pathways for learning outcomes, key 'control variables' comprising community factors, family factors, school and individual factors were identified. These constitute the likely indicators that may account for some level of variation in learning outcomes among different learners (Table 3.5). Standard approaches were adopted in classifying these variables. Age was re-categorised using the 5-year standard age categorisation (10-14, 15-24), class level (Primary 5, Primary 6, JHS 1, JHS 2), and school level (Primary, JHS). Locality (urban, rural) and ethnicity (Akan, Ewe, Ga/Adangme, Mole Dagbani, Grusi, other local and foreign groups) were classified per GSS standards. Parental/guardian characteristics included education level (no education, primary, secondary/technical/vocational, tertiary, other) and occupation

(agriculture, sales/services, professional/technical/managerial, skilled/unskilled manual, others) also based on GSS and GDHS classifications. Wealth status (poorest to richest) was also considered, with geographic coverage spanning Greater Accra, Ashanti, and Northern regions, and districts including Accra Metro, Shai Osudoku, Kumasi Metro, Sekyere South, Tamale Metro, and Nanton.

Wealth status was calculated using access to basic assets – television, radio, clock etc as a basis. Dummy responses were solicited from students (either a yes or no) and a 'wealth index' was calculated by summing the scores for each household (based on student report). Scores were then subsequently broken down into wealth categories (Poorest, Poorer, Middle, Richer, Richest) based on their wealth index scores.

Table 3.5: Other independent (controlled) variables

Variable	Description & Measurements	Source
Age	10-14, 15-24	
Class level	Primary 5, Primary 6, JHS 1, JHS 2	
School level	Primary, JHS	
Locality	Urban, rural	GSS classification
Ethnicity	Akan, Ewe, Ga/Adangme, Mole Dagbani, Grusi, others (local), others (foreign)	GSS classification
Education of parent/ guardian	No education, Primary, Secondary/Technical/Vocational, Tertiary, Other	GSS, Author
Occupation of parent/guardian	Agriculture, Sales and services, Professionals/technical/managerial, Skilled manual, Unskilled manual, Others	GDHS
Wealth status	Poorest, Poorer, Middle, Richer, Richest	GSS
Region	Greater Accra, Ashanti and Northern	

Variable	Description & Measurements	Source
District	Accra Metro, Shai Osudoku, Kumasi Metro, Sekyere South, Tamale Metro, Nanton	

3.6 Data Quality Assurance and Management

3.6.1 Pre-testing of study instruments

The draft research instruments were successfully pre-tested on Monday, 19th September, 2022 at Amanhyia Basic School (Primary and JHS) in Suhum, Eastern Region, Ghana. The pre-testing school was homogeneous to the selected schools for the main data collection exercise and shared similar characteristics with the selected study locations. Three research assistants supported the piloting exercise. The result of the pilot study was used to determine the validity and reliability of the instruments. In all, 40-student pilot interviews were done. The pre-test helped to identify and correct inconsistencies and ambiguities in instrumentation, and made it possible to estimate the needed time for the administration of each instrument and the number of field/research assistants that were needed for the actual data collection exercise. Some of the issues identified through the pre-testing included the omission of the second column for the recording of second term examination results, wrong question numbers, omission of key options in multiple option questions, wrong placement of instructions and some of the entry sections allowing for the entry of only figures instead of both figures and letters. The lessons from the piloting also helped to slightly refine the examination and enrollment template/instrument.

3.6.1.1 Testing for Validity and Reliability of Research Instruments

Testing for the validity and reliability of field instruments is considered one of the most central steps in achieving quality data (Fraenkel & Wallen, 2003). In lieu of this, a number of steps were done. First, the researcher worked at achieving face validity of the instruments by ensuring the

instruments were standardised and actually responded to the research objectives and questions. This was achieved by subjecting the draft instruments to the review of colleague PhD students both internal and external. Their comments helped in rewording and adjusting ambiguities in the instruments. The second phase of the review was done by the supervisory team – checking for the quality of questions/instruments at addressing the study objectives – the comments helped to fine-tune the draft instruments. The subsequent stage in the process of assessing validity involved conducting pre-tests on the instruments to ascertain the presence of consistent questioning, language, question sequence, estimated interview duration, and clarity of instructions. These approaches were important in directing the instruments towards eliciting the desired answers, hence facilitating the accurate measurement of the variables of interest.

In ensuring the reliability of the instrument, standardised questions were used, especially in the measurement of WASH facilities and menstrual management indicators. Further, very simple wording was used in the framing of the questions to ensure easy administration. The pre-testing also helped to achieve instrument reliability by helping to identify and modify questions that were redundant. The data obtained from pretesting underwent a comprehensive editing process to eliminate any discrepancies, mistakes, and inconsistencies prior to analysis. To ensure the instrument's dependability, a straightforward and easily comprehensible language was employed to facilitate understanding among respondents. The Cronbach Alpha reliability test was employed to assess internal consistency, revealing a good level of reliability for the instrument ($\alpha = 0.827$).

3.7 Data Collection Procedures

3.7.1 Selection of Field Team

Qualified and experienced researchers with relevant experiences in similar assignments were identified to serve as research assistants. The research assistants were drawn from the target

districts - the rationale for this was to have people with a better understanding of the geographical, linguistic and socio-cultural differences of the study areas. The field researchers were individuals who could speak and understand the local language of the respondents fluently so they could use the local language for explanation and emphasis when it became necessary. Due to the focus of the study on girls only, twelve out of the eighteen research assistants were female.

3.7.2 Training of Field Researchers

As is standard practice, all research assistants were trained for the fieldwork despite their experiences. A week prior to the training, all the training materials including the field guide, training manual and all instruments were shared with the research assistants to familiarise themselves with these documents. As a result of having three different study regions, one all-team virtual training (Zoom) session was conducted for all research assistants over a 1-day period. Subsequently, the researcher conducted detailed 1-day face-to-face training for each regional team prior to fieldwork. The content of the training included: purpose, objectives and process of the study; the role of the research assistants; approach and importance of data collection and gender considerations; discussion of questionnaires, interview schedules and focus group guide; and discussion of instrumentation and templates for reporting.

3.7.3 Data collection using digital platforms

Field data (quantitative data – including the WASH checklist and the examination template) was collected using Computer Assisted Personal Interviewing (CAPI) through the KoboCollect software on tablets. The researcher leveraged on existing relationships with some research organisations to get tablets for the fieldwork. The CAPI tool ensured survey responses were pre-coded, with real-time logic checks and automated skip patterns, which helped minimise data entry

errors. However, the qualitative part of the study was done using semi-structured interview guides - utilising both voice recorders as well as paper and pen (PAPI) to record responses..

3.7.4 Qualitative research design

The study adopted a phenomenological research design to collect data on the lived experiences of girls who had attained menarche as well as SHEP Coordinators/teachers. According to Donalek (2004), phenomenological studies are used to examine human experiences through the descriptions provided by the research subjects. This research approach allowed the girls to describe their experiences in relation to access to WASH and how that has influenced their menstrual hygiene management, school attendance and learning outcomes. Qualitative data was collected using Focus Group Discussions (FGDs) Guide with students and in-depth interviews with School Health Education Programme (SHEP) teachers.

The selection of students for the FGDs followed a systematic approach, focusing exclusively on girls who had reached menarche and were not part of the main survey sample. In each classroom, the class register served as the reference point, with every other student being selected based on the total number of eligible girls. In cases where fewer girls remained after selecting the ten for the main interviews, all the remaining girls were included in the FGD. On average, the FGDs lasted 45 to 60 minutes and were conducted in private classrooms or, in some cases, under trees to ensure minimal disruption from other students.

3.7.5 Data collection exercise

The data collection exercise was done over a three-week period from Monday, 3rd through Thursday, 20th October, 2022 across all the six study districts. The timing of the data collection exercise was to coincide with the third-term academic calendar so two data points could be collected in relation to the examination and attendance records for terms 1 and 2. The student

researcher conducted all the qualitative data with the SHEP Coordinators. As a result of the sensitive nature of the topic, the survey and FGDs with the girls was conducted by female research assistants.

3.8 Research Ethics

The research was conducted in accordance with ethical standards for research in line with current best practices and requirements at the University of Ghana.

3.8.1 Ethical Review Board Clearance

The researcher complied with all procedures relating to ethical standards for conducting research at the University of Ghana, which requires studies of this nature to obtain ethical clearance. In line with this, the researcher applied for and received ethical clearance from the Ethics Committee for Humanities (ECH): **Ethical clearance no. (ECH 045/ 22-23).**

3.8.2 Access and Entry Protocols

Studies of this nature did not only involve some intrusion into the school system but also into the lives of students. Therefore, request for permission to undertake research at the school level was sought from the Ghana Education Service (GES) – applied for and received approval letter from the Ghana Education Service (GES) to enter the schools (letter attached as an annex). On arrival in the district, the research team paid courtesy calls on the education directorates – who had already received the introductory letter from the Ghana Education Service. Further, the study complied with the following ethics:

- ***Confidentiality of respondents' information***

An ethical protocol was designed as part of the instrumentation to protect the confidentiality of survey respondents/ research participants at all levels. The protocol helped to protect the

confidentiality of survey respondents (students). The researcher and the research assistants conducted interviews with respondents in private, with no other individuals present, unless specifically requested by the respondent. Interviews with students were done in separate rooms/open spaces to protect the privacy of the respondents. A high level of confidentiality was strictly adhered to in handling the data from the study. Names of individual respondents were anonymised, and unique identification numbers were assigned to each participant for use in the analysis. All responses elicited from the study have been kept in a confidential manner and have not been shared with anybody.

- ***Voluntary participation/withdrawal***

At any time in the selection process for the focus groups or individual interviews, participants were made to understand that they had the choice to opt-out and not participate. Participants likewise had the right to stop taking part in the interview session or stop participating in the focus group at any time during the process. This was stated to participants before selecting focus groups and general study participants.

- ***Assent and informed consent procedures***

Written consent was sought from respondents participating in the study. A separate, written consent was sought from parents/guardians before conducting interviews with their children/wards (students). In instances where this was not possible, permission was sought from school authorities on behalf of parents/guardians before conducting interviews with students. Consent statements entailed all of the information the students needed to make an informed decision. Consent forms were available in English and were translated verbally/onsite into the relevant local languages where necessary.

- ***Anonymity***

Data collected from the respective students have been anonymised and given unique identifiers. Names of students are not directly on any data gathered, and the study has not lined individual responses with participants' identities. In order not to reveal the identity of students but at the same time to earmark them for inclusion in possible follow-up resulting from possible missing data, each sampled student was assigned an identifier that is unique.

3.9 Methods of data analysis

3.9.1 Survey data analysis – quantitative

The quantitative data was analysed using descriptive statistics (frequencies, means) using statistical packages including Stata (version 14) and Excel. Detailed data cleaning was conducted before analysis. The quantitative data is presented in tables and charts to give a visual impression of the findings. These descriptive statistics are used to describe the different types and characteristics of the WASH facilities and the different social characteristics of schools and students. This was disaggregated by locality (urban/rural), school level (primary/JHS) and district.

At the bivariate level, cross tabulations and Chi-Square tests were used to determine the variations and associations between WASH facilities and all the variables of focus. This was used because all the variables of focus are categorical in nature. At the multivariate level, an ordered logistic regression model is used to establish the predictors of learning outcomes. This model is adopted because of the ordered/ranked nature of the independent variable, learning outcomes. A number of good fit tests were performed to satisfy the assumptions underlying the conduct of the ordered logistic model. These comprised the following:

Testing the Proportional Odds Assumption:

- Brant Test was conducted to test statistical validity of the proportional odds assumption.
- A visual inspection was also done by plotting the log-odds of each category against the independent variables to provide visual clues about the assumption's validity.

Assumption of No Perfect Multicollinearity:

- Independent variables were tested/run using the chi-square test to ensure the variables were not perfectly correlated with each other.

3.9.2 Qualitative data analysis

The qualitative data were examined using the thematic approach (Attride-Stirling, 2001). The unprocessed interview transcripts underwent the processes of transcription[7], editing, coding, and thematic grouping. The qualitative data underwent analysis through a two-step coding procedure. Initially, a process of open coding was conducted, resulting in the comprehensive and meticulous labelling of words, phrases, sentences, and paragraphs that convey an idea, opinion, or experience within a varied subset of the interview transcripts. Subsequently, the initial compilation of labels was organised and refined in order to generate a concise inventory of targeted codes that precisely corresponded to the research inquiries. Subsequently, these codes were employed to analyse all transcripts.

The thematic analysis was conducted as follows: the data was carefully read and re-read to gain an overall understanding of its content. Initial codes, representing key concepts or ideas within the data, were then assigned, and related codes were grouped to form preliminary themes. These initial themes were reviewed and refined by identifying patterns and connections. The final themes were

[7] The transcription was done by the student with support from the Research Assistants.

clearly defined and given descriptive names. A thematic network was created to visually represent the themes and their relationships.

The thematic analysis was done using Dedoose software[8] to identify key themes and patterns across views in a manner that was systematic and contributes to reliable generalisable findings. Where relevant, findings from qualitative approaches were used to support the quantitative survey findings. Content analysis approach was also used to bring out the threads across the responses in the groups across various variables of interest. Findings were generally synthesised as aggregates of statements that were majority views.

After collecting, cleaning, and analysing both quantitative and qualitative data, the evidence from the two datasets was compared to identify areas of similarity, difference, and contradiction. The alignment or disparity between the findings was used to enhance the overall interpretation of the results. This process also involved the simultaneous analysis of both quantitative and qualitative data to cross-validate findings.

3.10 Study Limitations

First, the examinations scores used for determining learning outcomes were not from standardised examinations across all the study schools. These were school specific examinations and may not be comparable across schools. However, using two-date points (examination results for terms one and two) contributed to reducing the potential biases.

Second, the measure of menstrual hygiene management was self-reported and could have been subjected to social desirability bias, which is a tendency of the individual to respond in a manner

[8] A cross-platform application for analysing qualitative and mixed methods research with text, photos, audio, videos, spreadsheet data and more.

perceived favourably by others (Singleton & Straits, 2005). It is possible that the students may have given socially desirable answers about the menstrual hygiene materials they use and whether they clean themselves or not. However, the involvement of highly skilled and experienced research assistants helped to mitigate this bias in the responses.

CHAPTER FOUR

CHARACTERISTICS AND MENSTURAL HYGIENE MANAGEMENT OF RESPONDENTS, WASH FACILITITES IN SCHOOLS, SCHOOL ATTENDANCE AND LEARNING OUTCOMES

4.1 Introduction

This chapter uses descriptive statistics – including simple frequencies and cross-tabulations to present the socio-demographic characteristics of respondents (region, district age, locality/place of residence, school/class levels, religion, ethnicity, education of parents, occupation of parents, and wealth status); the differences in the availability of WASH facilities across basic schools and households; general overview of menstrual hygiene management (MHM) among girls (average age of menarche, duration of flow, usage of MHM materials and types); trends in school attendance; and a synopsis on learning outcomes. The analysis were disaggregated by both district and locality and in some instances, school level (primary/JHS). This was done to provide a more nuanced understanding of the data. This approach allowed for the identification of patterns, trends, and disparities specific to each context. It also facilitated targeted insights, enabling more informed decision-making and the development of context-specific interventions or policies.

4.2 Socio-demographic characteristics of students

Table 4.1 provides details of the socio-demographic characteristics of the study respondents. The regional distribution of respondents shows the highest numbers in the Greater Accra Region (305) with the least in the Ashanti Region (278). The district distribution also shows higher proportions across the urban districts (Accra, Kumasi and Tamale Metros) with each Metro accounting for close to a fifth (18.2%) of the total number of girls interviewed. Slightly more than a third (36.2%) of the students are in schools located in rural areas with the remaining 63.8% in schools located in

urban areas. The age of the students ranged between 10 to 24-years with the average inter-quartile range being 14-years (13, 15). Over two-thirds of the girls (79.5%) are within ages 10-15 years. There are slightly more girls enumerated at the junior high school level (27.3%) with the lowest proportion recorded at the primary 5 level (22.5%). Further, about two-thirds (61.8%) of the students are Christians and 38.2% are Muslims. Over two-thirds of the students are either Mole-Dagbani or Akan (34.2% and 33.7%, respectively). Less than a percent (0.6%) are students with foreign nationality.

The educational level of parents is generally low, with the results showing higher levels of educational attainment amongst fathers compared to mothers. Almost a quarter (24.5%) of fathers and over a third of mothers (35%) have no education. Further, there are more fathers with senior secondary school education or higher (23.7%) compared to mothers (13.2%). The highest proportion of fathers and mothers work in the agriculture sector (29.9%), and the sales and services sector (57.1%), respectively. Close to a third (27.2%) of fathers are skilled manual workers. With regards to wealth status, equal proportions of parents are in the poorest and middle wealth categories (20.3%) with almost equal proportions across the other three wealth categories. A little over half of the students (51.2%) spend between 30-60 minutes to walk to their schools and a further 46.4% spend less than 30-minutes.

In terms of access to basic water and sanitation facilities at home, the results show that almost half (43.2%) of the students do not have access to any form of toilet facility in their homes. A little over a third of the students (35.8%) use flush or pour-flush toilet and a further 19.7% use 'Kumasi Ventilated-Improved Pit' (KVIP). Additionally, almost half of the students (48.6%) have no direct source of drinking water in their homes and 38.5% use pipe-borne water fixed in their homes as the main source of drinking water.

Table 4.1: Socio-demographic characteristics of students

Student Characteristics	Frequency (n=875)	Percentage
Region		
Greater Accra	305	34.9
Ashanti	278	31.8
Northern	292	33.4
District		
Accra Metro	159	18.2
Shai Osudoku	146	16.7
Kumasi Metro	159	18.2
Sekyere South	119	13.6
Tamale Metro	159	18.2
Nanton	133	15.2
Locality		
Rural	317	36.2
Urban	558	63.8
Age, in years, Median (IQR)	14.0	(13, 15)
Age, in years		
10-14	696	79.5
15-24	179	20.5
Current grade		
Primary 5	197	22.5
Primary 6	222	25.4
JHS 1	217	24.8
JHS 2	239	27.3
Religion		
Christian	541	61.8
Muslim	334	38.2
Ethnicity		
Akan	295	33.7
Mole Dagbani	299	34.2
Ga-Adangme	129	14.7
Ewe	83	9.5
Grusi	20	2.3
Others (local)	44	5.0
Others (Foreign)	5	0.6
Father's education		
No formal education	214	24.5
Primary	193	22.1
Secondary/Technical/Vocational	135	15.4
Tertiary	73	8.3
Other	260	29.7

Table 4.1 continued

Student Characteristics	Frequency (n=875)	Percentage
Mother's education		
No formal education	306	35.0
Primary	295	33.7
Secondary/Technical/Vocational	78	8.9
Tertiary	38	4.3
Other	158	18.1
Father's occupation		
Agriculture	262	29.9
Sales and services	102	11.7
Professionals/technical/managerial	85	9.7
Skilled manual	238	27.2
Unskilled manual	51	5.8
Others	137	15.7
Mother's occupation		
Agriculture	118	13.5
Sales and services	499	57.1
Professionals/technical/managerial	43	4.9
Skilled manual	72	8.2
Unskilled manual	75	8.6
Others	67	7.7
Wealth Quintile		
Poorest	178	20.3
Poorer	172	19.7
Middle	178	20.3
Richer	174	19.9
Richest	173	19.8
Distance to school (In minutes)		
<30	406	46.4
30-60	448	51.2
> 60	21	2.4
Household toilet facility		
Composting toilet	12	1.4
Flush or pour-flush toilet	313	35.8
KVIP	172	19.7
No toilet facility	378	43.2
Main source of water inside house/at home		
Bore hole/well/ spring	77	8.8
Pipe borne water	337	38.5
Rain water	10	1.2
Sachet/bottled water	15	1.7
Surface water (pond/river/stream)	7	0.8
Tanker supply	4	0.5

No water	425	48.6

Source: Field work, October, 2022

4.3 Differences in the availability of WASH facilities across basic schools in Ghana (Research Question 1)

This section of the study provides evidence on the availability and distribution of Water, Sanitation and Hygiene (WASH) facilities across the study schools in Ghana. The first section describes the general types of WASH facilities in schools while the second section presents a standard classification of WASH facilities: basic, limited and no service (UNICEF/WHO Joint Monitoring criteria, 2020). The analysis was disaggregated by both district, locality and school level (primary/JHS). This was done to provide a more nuanced understanding of the data and to identify differences across these different levels of assessment.

4.3.1 WASH facilities by district and school level

Generally, the results show some level of disparity in the availability of WASH facilities across the study schools. Table 4.2 shows that almost half (47.9%) of the schools use treated water sold in sachets as their main source of drinking water and a fourth (25%) use pipe-borne water. In all, four out of the 48 schools have no source of drinking water, and these schools are within the Nanton District. All the study schools have a form of sanitation facility - about two-thirds of schools (66.7%) use pit latrines with slab/KVIP as their toilet facility, and about 17% of these facilities are not functioning. Further, about a third of schools (31.3%) use flush/pour-flush toilets with only one school using a pit latrine without slab. Almost all the study schools (91.7%) have urinals that are separate from the toilet facilities. Furthermore, over two-thirds of the schools (79.2%) have changing rooms for girls to use during menstruation – although some of these changing rooms are not in good condition. These changing rooms are make-shift structures that

do not generally provide the needed privacy for girls to change their MHM materials. Almost all the schools have handwashing facilities of different types with most schools (58.3%) using running water from a piped system/tank and a further 27.1% using veronica buckets (a water holding container with a pipe system for dispensing water). Four of the schools did not have any form of handwashing facility.

The district level analysis shows that schools in the urban areas (Accra, Kumasi and Tamale Metro) generally use improved drinking water sources (sachet water and pipe-borne water). All schools in the Accra and Kumasi Metros use sachet water as their main source of drinking water with all eight schools in the Tamale Metro using pipe-borne water. There are no water sources in three of the schools in the Nanton District. This condition in the Nanton District is corroborated by responses from the FGD sessions as follows:

> *"We have no water in the school. Our pipe is spoilt, and we fetch water from a pond near the school when we have to use the water for cleaning"* (FGD with girls, Primary school, Nanton District)
>
> *"We don't have water in the school, we go to fetch water from the community to use in school"* (FGD with girls, JHS, Nanton District)

In relation to sanitation facilities, almost all the schools across the study districts have access to improved toilet facilities (flush/pour - flush toilets, pit latrines with slab/KVIP) with only one school in the Kumasi Metro using an unimproved toilet facility (pit latrine without slab). All schools in Kumasi Metro and seven out of eight schools in the Accra Metro and Sekyere South District use running water from a piped system or tank as their main hygiene facility with a further 50% of schools (four schools) in the Nanton District using the same hygiene facility type. The use of the veronica bucket, which became quite popular during the height of the Covid-19 pandemic,

is the main hygiene facility in the Shai Osudoku District and Tamale Metro (six schools each). However, three schools in the Nanton District had no form of hygiene facility.

The analysis relating to school level shows that there are more junior high schools with no source of drinking water (three schools) compared to primary schools (one school). Sachet water serves as the main source of drinking water across both school levels and a slightly higher number of junior high schools (13 schools) use this water source compared to primary schools (10 schools). Further, all the 24 primary schools use improved sanitation facilities (flush/pour - flush toilets, Pit latrines with slab/KVIP). In addition, all the schools at the JHS level use improved sanitation facilities except one school that uses a pit latrine without a slab.

There are slightly better hygiene facilities at the primary level compared to the JHS level. For example, slightly more schools use running water from a piped system or tank at the primary level (16 schools) compared to 12 schools (42.9%) at the JHS level. In all, four schools (8.3%) have no handwashing facility with a higher proportion (75.0%) at the JHS level compared to 25.0% at the primary level.

Table 4.2: General water, sanitation and hygiene facilities by district and school level

WASH facilities	Districts						School level		Total
	Accra Metro (n=8)	Shai Osudoku (n=8)	Kumasi Metro (n=8)	Sekyere South (n=8)	Tamale metro (n=8)	Nanton (n=8)	Primary (n=24)	JHS (n=24)	(n=48)
Water facilities									
Borehole	0 (0.0)	0 (0.0)	0 (0.0)	4 (57.1)	0 (0.0)	3 (42.9)	5 (71.4)	2 (28.6)	7 (14.6)
Lake/river/stream	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	2 (4.2)
Pipe-borne	0 (0.0)	2 (16.7)	0 (0.0)	1 (8.3)	8 (66.7)	1 (8.3)	7 (58.3)	5 (41.7)	12 (25.0)
Sachet	8 (34.8)	4 (17.4)	8 (34.8)	3 (13.0)	0 (0.0)	0 (0.0)	10 (43.5)	13 (56.5)	23 (47.9)
No water source	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (100.0)	1 (25.0)	3 (75.0)	4 (8.3)
Sanitation facilities									
Flush/Pour - flush toilets	8 (53.3)	2 (13.3)	5 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	7 (46.7)	8 (53.3)	15 (31.3)
Pit latrines with slab/KVIP	0 (0.0)	6 (18.8)	2 (6.3)	8 (25.0)	8 (25.0)	8 (25.0)	17 (53.1)	15 (46.9)	32 (66.7)

Table 4.2 continued

WASH facilities	Districts					School level		Total
	Accra Metro (n=8)	Shai Osudoku (n=8)	Kumasi Metro (n=8)	Sekyere South (n=8)	Tamale metro (n=8)	Nanton (n=8)	Primary (n=24)	JHS (n=24)	(n=48)
Pit latrines without slab	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (2.1)
Hygiene facilities									
Running water from a piped system or tank	7 (25.0)	2 (7.1)	8 (28.6)	7 (25.0)	0 (0.0)	4 (14.3)	16 (57.1)	12 (42.9)	28 (58.3)
Basin/ bucket	1 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (2.1)
Hand-poured water	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)	1 (2.1)
Veronica bucket	0 (0.0)	6 (46.2)	0 (0.0)	1 (7.7)	6 (46.2)	0 (0.0)	6 (46.2)	7 (53.8)	13 (27.1)
Tippy tap	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (2.1)
No handwashing facility	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)	3 (75.0)	1 (25.0)	3 (75.0)	4 (8.3)

Source: Field work, October, 2022
Note: percentages in parentheses

4.3.2 WASH facilities at the school level by district and school level - using standard JMP categories

The statistics show that, generally, most of the schools have basic water (87.5%), sanitation (79.2%) and hygiene (56.3%) facilities (Table 4.3). Over two-thirds (87.5%) of the schools have basic water facilities, and 12.5% have no water service. None of the schools fall within the limited category. Similar trends are observed at the sanitation level, where one in every 10 schools has basic sanitation facilities - 16.7% and 4.2% have limited and no service, respectively. In relation to hygiene (handwashing) facilities, a little over half (56.3%) of the schools have basic facilities and a further third (35.4%) have limited facilities.

The district level analysis of WASH distribution indicates that all schools from four out of the six study districts (Accra Metro, Kumasi and Tamale Metros, and Sekyere South District) have access to basic water facilities (Table 4.3). However, in the other two districts, six schools (14.3%) in Shai Osudoku and four schools (9.5%) in Nanton District have no service at all. All schools in the

Shai Osudoku District have basic sanitation facilities while six out of eight schools in the Accra and Tamale Metros, and the Nanton District have basic sanitation facilities. Interestingly, two schools in the Kumasi Metro have no sanitation service. The hygiene situation follows a similar trend; thus, eight (29.6%) and six schools (22.2%) each in the Sekyere South District and Accra Metro, respectively, have basic handwashing facilities. Further, six schools (35.3%) in the Tamale Metro have limited handwashing facilities while three schools (75.0%) in the Nanton District have no access to hygiene facilities.

The analysis by school level shows that a slightly higher number of primary schools (52.4%) have access to basic water facilities compared to the junior high schools (47.6%). Further, four (66.7%) junior high schools have no access to water compared to only two primary schools (33.3%). An equal number of primary and junior high schools have access to basic sanitation facilities (19 each) and limited facilities (four schools each), respectively. A little above half (55.6%) of the primary schools have basic handwashing facilities in comparison to the junior high schools (44.4%). In all, four schools have no handwashing facilities with a higher proportion (75.0%) in junior high schools compared to the primary schools (25.0%).

Table 4.3: JMP categorisation of WASH facilities by district and school level

WASH facilities	Districts						School level		Total
	Accra Metro	Shai Osudoku	Kumasi Metro	Sekyere South	Tamale Metro	Nanton	Primary	JHS	
	(n=8)	(n=8)	(n=8)	(n=8)	(n=8)	(n=8)	(n=24)	(n=24)	**(n=48)**
Water facilities									
Basic	8 (19.0)	6 (14.3)	8 (19.0)	8 (19.0)	8 (19.0)	4 (9.5)	22 (52.4)	20 (47.6)	42 (87.5)
No service	0 (0.0)	2 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	4 (66.7)	2 (33.3)	4 (66.7)	6 (12.5)
Sanitation facilities									
Basic	6 (15.8)	8 (21.1)	5 (13.2)	7 (18.4)	6 (15.8)	6 (15.8)	19 (50.0)	19 (50.0)	38 (79.2)
Limited	2 (25.0)	0 (0.0)	1 (12.5)	1 (12.5)	2 (25.0)	2 (25.0)	4 (50.0)	4 (50.0)	8 (16.7)
No service	0 (0.0)	0 (0.0)	2 (100)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	2 (4.2)
Hygiene facilities									
Basic	6 (22.2)	5 (18.5)	4 (14.8)	8 (29.6)	1 (3.7)	3 (11.1)	15 (55.6)	12 (44.4)	27 (56.3)
Limited	2 (11.8)	3 (17.6)	4 (23.5)	0 (0.0)	6 (35.3)	2 (11.8)	8 (47.1)	9 (52.9)	17 (35.4)
No service	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)	3 (75.0)	1 (25.0)	3 (75.0)	4 (8.3)

Source: Field work, October, 2022
Note: percentages in parentheses

4.3.3 WASH facilities at the school level by locality (urban/rural) – using standard JMP categories

The locality dynamics presents an interesting pattern/trend where there are slightly better WASH facilities across rural schools with the exception of water facilities. While all schools in urban areas have basic (improved and available) water facilities, only 42.9% of schools in rural areas have basic water facilities. Furthermore, six schools in rural areas (100%) have no water service. The reverse holds for sanitation facilities where there is a higher proportion of rural schools (55.3%) having basic facilities compared to urban schools (44.7%). In addition, there are two schools (8%) in the urban areas that have no toilet facilities. The availability of hygiene facilities also follows a similar trend and about two-thirds (61.5%) of schools in rural areas have basic handwashing facilities compared to 38.5% of schools in urban areas. However, there are more schools in the urban areas (72.2%) with limited facilities compared to schools in the rural areas.

Further, there are more schools (three schools) with no handwashing facilities in rural areas compared to only one school in the urban areas (Table 4.4).

Table 4.4: WASH facilities using JMP categories by locality – rural/urban

WASH facilities	Locality				Total	
	Rural		Urban			
	Freq	%	Freq	%	Freq	%
Water						
Basic	18	42.9	24	57.1	42	87.5
No service	6	100.0	0	0.0	6	12.5
Sanitation (toilet)						
Basic	21	55.3	17	44.7	38	79.2
Limited	3	37.5	5	62.5	8	16.7
No service	0	0.0	2	100.0	2	4.2
Hygiene (handwashing)						
Basic	16	61.5	10	38.5	26	56.3
Limited	5	27.8	13	72.2	18	35.4
No service	3	75.0	1	25.0	4	8.3

Source: Field work, October, 2022

4.4 Menstrual Hygiene Management (MHM)

A key intermediary variable in this study is Menstrual Hygiene Management (MHM), which could contribute to the learning outcomes of girls. This section presents evidence on the general menstrual hygiene management practices among girls in basic schools in Ghana. The first part highlights basic MHM characteristics among girls in school while the second part re-categorises the MHM practices using the Multiple Indicator Cluster Survey (MICS, 2021) classification of MHM into two categories: adequate MHM and inadequate MHM practices.

4.4.1 Basic MHM characteristics

4.4.1.1 Average age at menarche

Table 4.5 presents findings relating to the average age at menarche across the different class levels. The mean age at menarche for girls in the study sample was 12.63 years (SD=1.29) with a minimum of nine years and a maximum of 18 years. This result is consistent with the evidence in

literature, including the grey literature (Ghana Education Service, 2014; Morgan et al., 2017). The school level dynamics show very minimal differences in mean age at menarche with slight increases in age at menarche across higher class levels. Similar minimum and maximum values are observed among girls in primaries 5 and 6 with slight differences at JHS 1 (min.=9; max.=18) and 2 (min.=10; max.=16) levels.

Table 4.5: Average age at menarche by class level

School level	Descriptive Statistics			
	Mean	Std. Deviation	Minimum	Maximum
Primary 5	12.38	1.39	9	16
Primary 6	12.47	1.37	9	16
JHS 1	12.67	1.36	9	18
JHS 2	12.96	1.29	10	16
Total	**12.63**	**1.37**	**9**	**18**

Source: Field work, October, 2022

4.4.1.2 Usage of MHM materials

Table 4.6 shows that almost all students (98.9%) use a form of absorbent material during menstruation, and the highest proportion of girls use disposable sanitary pads (94.7%). A further 12.6% and 4.8% of the girls use reusable clean dry cloth and disposable clean dry cloth, respectively. In addition, girls use multiple forms of MHM materials depending on the prevailing situation. The following quotes from FGDs and individual interviews with girls corroborate this finding:

> *"We use sanitary pads. Some also use toilet roll but only as substitute before they get sanitary pads and its mostly when their period comes and they don't have money for a sanitary pad"* (FGD with JHS girls, Kumasi Metro, Ashanti Region)
>
> *"Sanitary pads mainly, sometimes disposable cloth and toilet roll"* (FGD with JHS girls, Shai Osudoku District, Greater Accra Region)
>
> *"Most of us use sanitary pads while few use toilet rolls and cloth in addition to the sanitary pad"* (FGD with primary girls, Kumasi Metro, Ashanti Region)
>
> *"I couldn't afford to buy, and my grandmother sometimes can't afford to buy for me, so I use other things"* (Interview with primary school girl, Accra Metro, Greater Accra Region)

A higher proportion of girls in schools in rural areas (96.8%) use disposable sanitary pads compared to girls in schools in urban areas (93.5%). This could be attributable to the focus of menstrual hygiene interventions in more schools in rural area than in urban areas. A key deviation in the finding from what is generally known is having more girls in schools in urban areas (16.3%) using reusable clean dry cloth compared to those in schools in rural areas (6.0%) (see Kaur et al., 2018). This is due to the fact that the reusable dry cloth was generally an intervention targeted at rural schools.

Table 4.6 also examines MHM materials by school level (primary/JHS). Slightly more students at the primary level use disposal sanitary pads (95.2%) compared to those in the JHS (94.3%). More girls at the JHS level use unimproved MHM materials comprising toilet roll (5.5%) and paper (0.2%). The 'other' category comprises panty liners, tissue paper, cotton, adult diapers, reusable 'Be a girl panties' and some wear multiple panties. The use of other unimproved MHMs were expressed in the following quotes:

> *"I wear many panties because sanitary pad is expensive and I don't have money to buy"* (Interview with primary girl, Sekyere South District, Ashanti Region)
>
> *"I wear about 3 to 4 shorts under my skirt, but I don't put any cloth or pad"* (Interview with JHS girl, Shai Osudoku, Greater Accra Region)

Table 4.6: MHM Materials by locality and school level

Type of MHM Material	Locality		School level		Total
	Rural	Urban	Primary	JHS	
Disposable sanitary pad	307 (37.0)	522 (63.0)	399 (48.1)	430 (51.9)	829 (94.7)
Toilet rolls	19 (50.0)	19 (50.0)	13 (34.2)	25 (65.8)	38 (4.3)
Reusable clean dry cloth	19 (17.3)	91 (82.7)	40 (36.4)	70 (63.6)	110 (12.6)
Disposable clean dry cloth	15 (35.7)	27 (64.3)	22 (52.4)	20 (47.6)	42 (4.8)
Paper	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)	1 (0.1)
Others	6 (23.1)	20 (76.9)	7 (26.9)	19 (73.1)	26 (3.0)
Total	**317 (**36.2)	**558 (**63.8)	**419 (**47.9)	**456 (**52.1)	**875 (100.0)**

Source: Field work, October, 2022
Note: percentages in parentheses

4.4.2 Adequacy of MHM

Table 4.7 shows that a little over two-thirds of the girls (71.3%) adequately manage their menstrual flow in a hygienic manner, and the other third inadequately manage their menstrual flow in a hygienic manner. The age dynamics shows that more students (72%) in the lower age bracket (10-15 years) adequately manage their menstrual flow in a hygienic manner compared to those in the upper age group (68.7%). Furthermore, a slightly higher proportion (31.3%) of JHS students inadequately manage their menstrual flow in a hygienic manner compared to those at the primary level (25.5%). The locality dynamics shows that a higher proportion of students in rural areas (77.6%) adequately manage their menstrual flow hygienically compared to about two-thirds (67.7%) in schools in urban areas. The Shai Osudoku District (34.9%) and Tamale Metro (34.6%) have the highest proportion of students who inadequately manage their menstrual flow in a hygienic manner. The Nanton District, on the other hand, has the highest proportion of students who adequately manage their menstrual flow in a hygienic manner (86.5%) and they are followed by the Accra Metro (75.5%).

Table 4.7: Adequacy of MHM by selected demographics

Characteristics	Menstrual Hygiene Management (MHM)	
	Inadequate	Adequate
	(n=251)	(n=624)
Age		
10-15	195 (28.2)	501 (72.0)
16-24	56 (31.3)	123 (68.7)
School level		
Primary	107 (25.5)	312 (74.5)
JHS	144 (31.6)	312 (68.4)
Locality		
Rural	71 (22.4)	246 (77.6)
Urban	180 (32.3)	378 (67.7)
District		
Accra Metro	39 (24.5)	120 (75.5)
Shai Osudoku	51 (34.9)	95 (65.1)
Kumasi Metro	49 (30.8)	110 (69.2)
Sekyere South	39 (32.8)	80 (67.2)
Tamale Metro	55 (34.6)	104 (65.4)
Nanton	18 (13.53)	115 (86.5)
Total	**251 (28.7)**	**624 (71.3)**

Source: Field work, October, 2022
Note: percentages in parentheses

4.5 School Attendance

This section provides data relating to general trends in the school attendance of students. The first part provides basic evidence on menstruation induced absenteeism and the second part shows school attendance levels using standard measures: regular and irregular attendance.

4.5.1 Absenteeism attributable to menstruation

Figure 4.1 shows that close to a fifth (16.9%) of students miss school because of menstruation with the highest proportion (41.9%) missing at least a day in a typical month. The following voices from FGDs with girls corroborate this finding:

"Main reason is the pain associated with the menstruation, shyness is also a factor due to teasing from others, especially the boys" (FGD with girls at the primary level, Shai Osudoku District, Greater Accra Region)

"Some girls are afraid they will disgrace themselves when they stain their uniforms, others because of shyness and that's because they don't want people to know they are menstruating" (FGD with girls, primary, Nanton District, Northern Region)

"My reason for absenting myself is because of abdominal and stomach pain coupled with diarrhoea which I usually experience during my period" (FGD with girls, primary, Kumasi Metro, Ashanti Region)

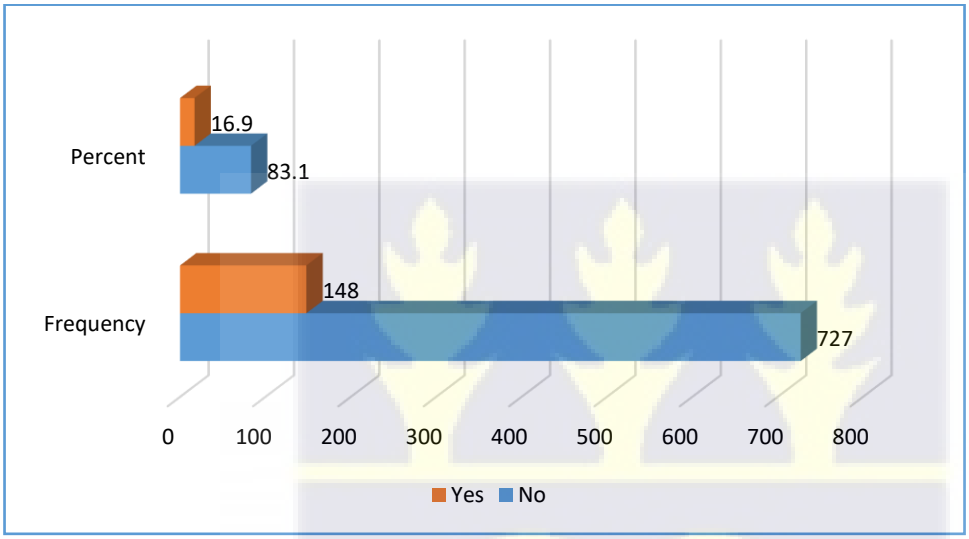


Figure 4.1: Menstruation related absenteeism
Source: Field work, October, 2022

4.5.2 Regularity of attendance

Overall, the data provides insights into the relationship between school level, locality, district, and school attendance – revealing variations in school attendance patterns based on these factors. Table 4.8 shows that about a third of students (33.5%) attended school irregularly in the first and second terms of the 2022/23 academic year. Among students who attended school irregularly, 40.1% are in primary school, and 27.4% are in JHS. In contrast, there is a higher proportion of students who attended school regularly at the JHS level (72.6%) compared to those at the primary level (59.9%). The locality dynamics follows a similar trend and a slightly higher proportion of students in

schools in urban areas (67.9%) attended school regularly compared to those in schools in the rural areas (64.0%). The district analysis shows that in general, almost all the study districts have higher proportions of students who attended school regularly with the exception of the Tamale Metro – where a slightly higher percentage of students attended school irregularly (56.6%) compared to those who attended school regularly (43.4%). Finally, the least number of students who attended school irregularly are in the Kumasi Metro (15.1%).

Table 4.8: School attendance by class level, locality and district

Characteristics	School Attendance	
	Irregular	Regular
	n=293 (33.5)	n=582 (66.5)
School level		
Primary	168 (40.1)	251 (59.9)
JHS	125 (27.4)	331 (72.6)
Locality		
Rural	114 (36.0)	203 (64.0)
Urban	179 (32.1)	379 (67.9)
District		
Accra Metro	55 (34.6)	104 (65.4)
Shai Osudoku	23 (15.8)	123 (84.2)
Kumasi Metro	24 (15.1)	135 (84.9)
Sekyere South	39 (32.8)	80 (67.2)
Tamale Metro	90 (56.6)	69 (43.4)
Nanton	62 (46.6)	71 (53.4)

Source: Field work, October, 2022
Note: percentages in parentheses

4.6 Learning outcomes

This section of the chapter presents evidence relating to the key outcome variable of the study – learning outcomes of students across the study schools. The first part presents descriptive statistics for examination scores in five subjects (English, Science, Mathematics, Social Studies and Our World, Our People), and shows the mean, standard deviation, minimum, and maximum values. The second part presents the evidence relating to aggregated examination scores.

4.6.1 Mean examination scores

Table 4.9 shows the mean examination scores for five subjects, highlighting the average performance and variability in each subject. The overall mean score for all the subjects is 55.51%, with a standard deviation of 12.839. This suggests a moderate amount of variability in the scores. The minimum score observed is 10, while the maximum score is 90. This result indicates that the mean score falls within the average score category and further highlights the results are widely dispersed from the mean score.

For the three core subjects (English, Science and Mathematics), the highest mean score was recorded in Science (56.24). This shows a slightly higher average performance compared to the overall performance mean. The standard deviation of 15.321 suggests a moderate amount of variability in the scores with a minimum score of 11 and a maximum score of 95. The least mean score (51.79) was expectedly recorded in Mathematics, and this is lower than both the overall performance and the other subjects. The standard deviation of 14.695 suggests a moderate level of variability in the scores with a minimum score as low as 3 and a maximum score of 96. In terms of the grade-level-specific subjects, the highest examination mean score of 60.95 is recorded in the subject 'Our World, Our People', which is only offered at the primary school level, indicating a relatively higher average performance compared to the overall performance mean.

Table 4.9: Mean examination scores of students

Learning outcomes	Descriptive Statistics				
	Freq.	Mean	Std. Deviation	Minimum	Maximum
Overall performance	838	55.51	12.839	10	90
English	838	54.79	15.199	8	96
Maths	838	51.79	14.695	3	96
Science	838	56.24	15.321	11	95
Our world, Our People*	387	60.95	14.691	13	94
Social Studies**	447	59.1	14.39	18	93

Source: Field work, October, 2022

* Primary only
** JHS only

4.6.2 Learning outcomes using the standard category

Table 4.10 shows the distribution of students across different categories of learning outcomes based on school level, locality, districts, and subjects. The data shows an almost equal split across the three learning outcome categories with a slightly higher proportion of students falling within the very good category (36.4%), followed by the good category (34.5%) and poor category (29.2%). The results highlight a relatively high proportion of students having poor academic results. The individual subjects follow a similar trend with most of the students aggregating towards either the very good or average categories. The key highlight is having close to half of the students (42.8%) recording poor scores in Mathematics. This confirms the generally held view of girls being largely fearful of Mathematics, culminating in usually poor performance in the subject (Casely-Hayford, 2017). The results relating to the more social subjects (Social Studies and Our World, Our People) recorded better learning outcomes (over 50% each), further highlighting the preference of girls to more social related subjects. The school level dynamics shows that generally, the learning outcomes are cumulatively almost the same across both primary and JHS levels. Over two-thirds of the students at the JHS level (71.0%) and at the primary level (70.6%) either scored average or very good. However, the proportion of students at the primary level having very good scores (37.6%) is slightly higher than at the JHS level (35.3%). The reverse holds for the average category with slightly higher proportions at the JHS (35.7%) compared to that of the primary (33.0%). The evidence from the locality analysis shows better learning outcomes across schools in urban areas compared to schools in rural areas. Students in schools in urban areas outperformed those in schools in rural areas by about 13 percentage points on the very good score. The district

analysis also follows a similar pattern with schools in the more urban districts having better learning outcomes compared to schools in the relatively rural districts. The only exception to this is the Shai Osudoku District that recorded the highest proportion of students (57.2%) scoring very good scores.

Table 4.10: Learning outcomes of students by school level, locality and district

Characteristics	Learning outcomes		
	Poor n=245 (29.2)	**Good n=289 (34.5)**	**Very good n=305 (36.4)**
Subjects			
English	274 (32.7)	263 (31.4)	302 (36.0)
Maths	359 (42.8)	226 (26.9)	254 (30.3)
Science	262 (31.2)	237 (28.3)	340 (40.5)
OWOP	75 (19.3)	104 (26.8)	209 (53.9)
Social Studies	114 (25.5)	99 (22.2)	234 (52.4)
School level			
Primary	115 (29.41)	129 (33.0)	147 (37.6)
JHS	130 (29.0)	160 (35.7)	158 (35.3)
Locality			
Rural	117 (37.3)	109 (34.7)	88 (28.0)
Urban	128 (24.4)	180 (34.3)	217 (41.3)
Districts			
Accra Metro	51 (32.7)	51 (32.7)	54 (34.6)
Shai Osudoku	31 (21.4)	31 (21.4)	83 (57.2)
Kumasi Metro	32 (24.2)	32 (24.2)	68 (51.5)
Sekyere South	41 (35.0)	33 (28.2)	43 (36.8)
Tamale Metro	30 (19.2)	82 (52.6)	44 (28.2)
Nanton	60 (45.1)	60 (45.1)	13 (9.8)

Source: Field work, October, 2022
*OWOP – Our World, Our People
Note: percentages in parentheses

4.7 Chapter Summary

The chapter provides insights into the socio-demographic characteristics of students, the availability of WASH facilities in schools, and MHM practices among girls in basic schools, school attendance and learning outcomes in Ghana. The findings highlight the need for improved

access to WASH facilities and the importance of addressing MHM challenges to support girls' education and well-being.

The socio-demographic characteristics of the study respondents show that the majority of girls are within the age range of 10-15 years. The educational level of parents is generally low, with higher levels of education among fathers compared to mothers. Access to basic water and sanitation facilities at home is limited for a significant proportion of students. The availability of WASH facilities in schools varies. While most schools have access to drinking water and sanitation facilities, some schools lack these services. Handwashing facilities are available in most schools, but there are a few schools without any form of handwashing facilities. The distribution of WASH facilities differs across districts and school levels, with variations in the types of facilities used. Regarding MHM, the average age at menarche for girls in the study sample is 12.63 years, with minimal differences across class levels. Most girls use disposable sanitary pads as their primary MHM material, followed by reusable cloth and commercial sanitary pads.

CHAPTER FIVE

ASSOCIATION BETWEEN WASH FACILITIES, SOCIO-DEMOGRPHIC CHARACTERISTICS, MENSTRUAL HYGIENE MANAGEMENT, SCHOOL ATTENDANCE AND LEARNING OUTCOMES

5.0 Introduction

The availability/non-availability of WASH facilities at the school level as well as socio-demographic characteristics have possible implications on key student outputs including menstrual hygiene management, school attendance and learning outcomes. This chapter, therefore, examines the association between the availability of WASH facilities in schools and socio-demographic variables on one hand, and menstrual hygiene management, school attendance and learning outcomes on the other hand, using statistical chi-square test. The data presented includes the frequencies and percentages of inadequate and adequate MHM across different variables, as well as the chi-square statistic and p-value indicating the significance of the association. The findings in this section respond to the second research question.

5.1 WASH, Socio-demographic Characteristics and Menstrual Hygiene Management

Overall, the study found that how well girls manage their menstrual hygiene in school is closely linked to having access to clean water and hygiene facilities at their school. If schools do not have these fundamental resources, girls may find it difficult to effectively handle their menstrual needs. Additionally, the study showed that factors like the type of school, ethnicity, parents' jobs, family wealth, where the school is located, and whether students have toilets at home can affect how well girls manage their menstrual hygiene.

Specifically, the findings in Table 5.1 indicate that water and hygiene facilities, school level, ethnicity, father and mothers' occupation, wealth status, district and locality of residence and access to toilet facility at home are statistically associated with menstrual hygiene management. The evidence highlights that the adequacy of MHM significantly varies with the availability of water facilities in schools (chi-square = 11.382, p=0.001). Schools without water facilities have a higher proportion of students adequately managing their menstrual flow in a hygienic manner compared to those with basic water facilities.

This implies that access to water at the school level is a key determinant to girls managing their menstrual hygiene adequately. Availability of hygiene facilities follows a similar trend. The results show that there is a significant association between the adequacy of MHM and the availability of hygiene facilities in schools (chi-square = 14.000, p<0.001). Schools without hygiene services have a higher proportion of students managing their menstrual hygiene inadequately compared to those with limited or basic hygiene facilities. In relation to sanitation facilities, however, no significant association is observed between the adequacy of MHM and the availability of sanitation services in schools (chi-square = 1.194, p = 0.551). The proportions of students who either manage their menstrual hygiene inadequately or adequately are relatively similar across different levels of sanitation services. The findings relating to the association between WASH facilities and MHM is in sync with existing studies (Sommer, 2012; Guya, 2014; Acheampong et al., 2018; Chinyama et al., 2019), which indicated that having water, sanitation and hygiene facilities, especially water facilities was essential to the wellbeing of girls in managing their menstruation in the context of the school system.

The results determining the association between socio-demographic variables and MHM presents interesting patterns. Age, religion, and distance to school do not show a significant association

with the adequacy of MHM. School level (p<0.048), ethnicity (p<0.017), fathers' occupation (p < 0.001), mothers' occupation (p = 0.008), wealth status (p < 0.001), district (p < 0.001), locality (p = 0.002), and access to toilet facility at home (p = 0.043) have significant associations with the adequacy of MHM among students. Overall, the results demonstrate that the adequacy of menstrual hygiene management is significantly associated with the availability of water and hygiene services in schools.

Table 5.1: Association between WASH facilities, socio-demographic characteristics and MHM

WASH, socio-demographic characteristics	Menstrual Hygiene Management (MHM)			
	Inadequate	Adequate	Chi-square	P-value
	n=251	n=624		
Water facilities			11.382	**<0.001**
No facility	15 (14.6)	88 (85.4)		
Basic	236 (30.6)	536 (69.4)		
Sanitation facilities			1.194	0.551
No facility	9 (23.1)	30 (76.9)		
Limited	43 (31.6)	93 (68.4)		
Basic	199 (28.4)	501 (71.6)		
Hygiene facilities			14.000	**<0.001**
No facility	8 (10.4)	69 (89.6)		
Limited	89 (29.6)	212 (70.4)		
Basic	154 (31.0)	343 (69.0)		
Age			0.743	0.389
10-15	195 (28.0)	501 (72.0)		
16-24	56 (31.3)	123 (68.7)		
School level			3.897	**0.048**
Primary	107 (25.5)	312 (74.5)		
JHS	144 (31.6)	312 (68.4)		
Religion			2.766	0.096
Christian	166 (30.7)	375 (69.3)		
Muslim	85 (25.5)	249 (74.5)		
Ethnicity			15.436	**0.017**
Akan	95 (32.2)	200 (67.8)		
Ewe	28 (33.7)	55 (66.3)		
Ga-Adangme	29 (22.5)	100 (77.5)		
Mole Dagbani	71 (23.8)	228 (76.2)		
Grusi	7 (35.0)	13 (65.0)		
Others (local)	20 (45.5)	24 (54.5)		
Others (Foreign)	1 (20.0)	4 (80.0)		
Fathers' occupation			22.942	**<0.000**

WASH, socio-demographic characteristics	Menstrual Hygiene Management (MHM)			
	Inadequate	Adequate	Chi-square	P-value
	n=251	n=624		
Agriculture	56 (21.4)	206 (78.6)		
Professional	34 (40.0)	51 (60.0)		
Skilled manual	68 (28.6)	170 (71.4)		
Unskilled manual	9 (17.7)	42 (82.3)		
Sales and services	30 (29.4)	72 (70.6)		
Others	54 (39.4)	83 (60.6)		
Mothers' occupation			15.654	**0.008**
Agriculture	24 (20.3)	94 (79.7)		
Professional	17 (39.5)	26 (60.5)		
Skilled manual	15 (20.8)	57 (79.2)		
Unskilled manual	22 (29.3)	53 (70.7)		
Sales and services	144 (28.9)	355 (71.1)		
Others	29 (43.3)	38 (56.7)		
Father's education			4.873	0.301
No formal education	61 (28.5)	153 (71.5)		
Primary	52 (26.9)	141 (73.1)		
	37 (27.4)	98 (72.6)		
Secondary/Technical/Vocational				
Tertiary	29 (39.7)	44 (60.3)		
Other	72 (27.7)	188 (72.3)		
Mother's education			6.077	0.193
No formal education	83 (27.1)	223 (72.9)		
Primary	81 (27.5)	214 (72.5)		
	28 (35.9)	50 (64.1)		
Secondary/Technical/Vocational				
Tertiary	16 (42.1)	22 (57.9)		
Other	43 (27.2)	115 (72.8)		
Wealth Status			28.847	**0.000**
Poorest	59 (33.1)	119 (66.9)		
Poorer	73 (42.4)	99 (57.6)		
Middle	47 (26.4)	131 (73.6)		
Richer	35 (20.1)	139 (79.9)		
Richest	37 (21.4)	136 (78.6)		
Region			3.238	0.198
Ashanti Region	88 (31.7)	190 (68.3)		
Greater Accra Region	90 (29.5)	215 (70.5)		
Northern Region	73 (25.0)	219 (75.0)		
District			23.089	**0.000**
Accra Metro	39 (24.5)	120 (75.5)		
Kumasi Metro	49 (30.8)	110 (69.2)		
Nanton	18 (13.5)	115 (86.5)		

WASH, socio-demographic characteristics	Menstrual Hygiene Management (MHM)			
	Inadequate	Adequate	Chi-square	P-value
	n=251	n=624		
Sekyere South	39 (32.8)	80 (67.2)		
Shai Osudoku	51 (34.9)	95 (65.1)		
Tamale Metro	55 (34.6)	104 (65.4)		
Locality			9.608	**0.002**
Rural	71 (22.4)	246 (77.6)		
Urban	180 (32.3)	378 (67.7)		
Distance to school			2.138	0.343
< 30	114 (28.1)	292 (71.9)		
30-60	128 (28.6)	320 (71.4)		
> 60	9 (42.9)	12 (57.1)		
Access to toilet facility at home			8.165	**0.043**
Composting toilet	5 (71.4)	2 (28.6)		
Flush or pour-flush	40 (23.8)	128 (76.2)		
KVIP	13 (26.5)	36 (73.5)		
No toilet facility	94 (24.9)	284 (75.1)		
Water at home			8.877	0.181
Bore hole/well/ spring	25 (32.5)	52 (67.5)		
Pipe borne water	107 (31.8)	230 (68.3)		
Rain water	3 (30.0)	7 (70.0)		
Sachet/bottled water	4 (26.7)	11 (73.3)		
Surface water (pond/river/stream)	2 (28.6)	5 (71.4)		
Tanker supply	3 (75.0)	1 (25.0)		
No water	107 (25.2)	318 (74.8)		

Source: Field work, October, 2022
p <0.05, p < 0.01, p < 0.001
Note: percentages in parentheses

5.2 WASH facilities, Socio-demographic Characteristics and School Attendance

Overall, the results show that having clean water at school does not affect school attendance, however, having basic sanitation facilities (toilet facilities) is important – students in schools with better sanitation tend to attend school more regularly. Having basic hygiene facilities at school also matters a lot – students in schools with these facilities are more likely to attend school regularly. Interestingly, how well students managed their menstrual hygiene did not seem to have a big impact on school attendance.

Specifically, the results in Table 5.2 indicates that with the exception of water facilities, menstrual hygiene management, occupation of parents and locality of residence, all the other WASH and socio-demographic characteristics are statistically significantly associated with regularity of school attendance. Although access to water facilities has a significant association with MHM, it has no association with school attendance (chi-square statistic of 0.012; $p< 0.913$).

Further, although access to sanitation facilities was not statistically significantly associated with MHM, it is significantly associated with school attendance (chi-square = 11.980, $p< 0.003$). Schools with limited access to sanitation facilities have a slightly higher proportion of students (43.4%) with irregular school attendance compared to those in schools with basic facilities. Availability of hygiene facilities, on the other hand, has a strong statistical association with school attendance (chi-square = 19.497, $p<0.000$). Schools with basic hygiene facilities have a higher proportion of students (71.6%) attending school regularly compared to those with limited or no facility. Menstrual Hygiene Management has no significant association with school attendance (chi-square = 0.023, $p<0.880$) and a slightly higher percentage of students who manage their menstrual hygiene adequately (66.7%) attended school regularly compared to those who manage their menstrual hygiene inadequately (66.1%).

The socio-demographic characteristics present mixed results. With the exception of occupation of parents and locality of residence, all the other variables have statistically significant associations with school attendance. Students within the lower ages had a higher proportion (69.3%) attending school regularly compared to those in the higher age category ($p< 0.001$). The reverse holds for school level (grade), with students at the JHS level attending school more regularly (72.6%) compared to those at the primary level (59.9%) – ($p< 0.001$). Religion, ethnicity, fathers' and

mothers' education, wealth status, region, district, locality, and distance to school also have significant associations with school attendance.

The qualitative analysis highlights that aside from the WASH and socio-demographic variables, there are other socio-economic variables that determine school attendance. These comprise financial challenges and supporting parents in their economic activities. The following responses from the girls buttress this point:

> *"Most of us girls miss school due to pocket money especially those staying with caregivers. Others also miss school because of other health issues and distance especially when it rains"* (FGD with girls in primary, Kumasi Metro, Ashanti Region)
>
> *"Sometimes we help our parents in the market, most of us take care of our younger siblings and that is why we miss school"* (FGD with girls in primary, Accra Metro, Greater Accra Region)
>
> *"Farming activities such as planting and harvesting crops during the farming season, and ill health are some of the reasons why we miss school"* (FGD with girls in JHS, Nanton District, Northern Region)

Table 5.2: Association between WASH facilities, socio-demographic characteristics and school attendance

WASH and socio-demographic characteristics	School Attendance			
	Irregular (n=293)	Regular (n=582)	Chi-square	p-value
Water facilities			0.012	0.913
No facility	34 (33.0)	69 (67.0)		
Basic	259 (33.6)	513 (66.4)		
Sanitation facilities			11.980	**0.003**
No facility	6 (15.4)	33 (84.6)		
Limited	59 (43.4)	77 (56.6)		
Basic	228 (32.6)	472 (67.4)		
Hygiene Services			19.497	**<0.000**
No facility	40 (52.0)	37 (48.0)		
Limited	112 (37.2)	189 (62.8)		
Basic	141 (28.4)	356 (71.6)		
Menstrual Hygiene Management			0.023	0.880
Inadequate	85 (33.9)	166 (66.1)		
Adequate	208 (33.3)	416 (66.7)		
Age			11.456	**<0.001**
10-15	214 (30.8)	482 (69.3)		
16-24	79 (44.1)	100 (55.9)		
School level			15.771	**<0.000**
Primary	168 (40.1)	251 (59.9)		
JHS	125 (27.4)	331 (72.6)		
Religion			54.697	**<0.000**
Christian	131 (24.2)	410 (75.8)		
Muslim	162 (48.5)	172 (51.5)		
Ethnicity			61.543	**<0.000**
Akan	66 (22.4)	229 (77.6)		
Ewe	19 (22.9)	64 (77.1)		
Ga-Adangme	34 (26.4)	95 (73.6)		
Mole Dagbani	147 (49.2)	152 (50.8)		
Grusi	5 (25.0)	15 (75.0)		
Others (local)	21 (47.7)	23 (52.3)		
Others (Foreign)	1 (20.0)	4 (80.0)		
Fathers' occupation			5.435	0.365
Agriculture	96 (36.6)	166 (63.4)		
Professional	29 (34.1)	56 (65.9)		
Skilled manual	68 (28.6)	170 (71.4)		
Unskilled manual	15 (29.4)	36 (70.6)		
Sales and services	33 (32.4)	69 (67.7)		
Other	52 (38.0)	91 (15.6)		

Table 5.2 continued

WASH and socio-demographic characteristics	School Attendance			
	Irregular (n=293)	Regular (n=582)	Chi-square	p-value
Mothers' occupation			9.165	0.103
Agriculture	40 (33.9)	78 (66.1)		
Professionals	9 (20.9)	34 (79.1)		
Skilled manual	18 (25.0)	54 (75.0)		
Unskilled manual	33 (44.0)	42 (56.0)		
Sales and services	169 (33.9)	330 (66.1)		
Other	23 (34.3)	44 (65.7)		
Father's education			21.320	**<0.000**
No formal education	97 (45.3)	117 (54.7)		
Primary	59 (30.6)	134 (69.4)		
Secondary/Technical/Vocational	48 (35.6)	87 (64.4)		
Tertiary	19 (26.0)	54 (74.0)		
Other	70 (26.9)	190 (73.1)		
Mother's education			18.337	**0.001**
No formal education	127 (41.5)	179 (58.5)		
Primary	93 (31.5)	202 (68.5)		
Secondary/Technical/Vocational	27 (34.6)	51 (65.4)		
Tertiary	8 (21.1)	30 (78.9)		
Other	38 (24.0)	120 (76.0)		
Wealth Status			11.863	**0.018**
Poorest	50 (28.1)	128 (71.9)		
Poorer	54 (31.4)	118 (68.6)		
Middle	65 (36.5)	113 (63.5)		
Richer	50 (28.7)	124 (71.3)		
Richest	74 (42.8)	99 (57.2)		
Region			68.400	**<0.000**
Ashanti	63 (22.7)	215 (77.3)		
Greater Accra	78 (25.6)	227 (74.4)		
Northern	152 (52.1)	140 (47.9)		
District			93.321	**<0.000**
Accra Metro	55 (34.6)	104 (65.4)		
Kumasi Metro	24 (15.1)	135 (84.9)		
Nanton	62 (46.6)	71 (53.4)		
Sekyere South	39 (32.8)	80 (67.2)		
Shai Osudoku	23 (15.8)	123 (84.3)		
Tamale Metro	90 (56.6)	69 (43.4)		
Locality			1.369	0.242
Rural	114 (36.0)	203 (64.0)		

Urban	179 (32.1)	379 (67.9)		
Distance to school (In minutes)			7.697	**0.021**
< 30	118 (29.1)	288 (70.9)		
30-60	165 (36.8)	383 (63.2)		
>60	10 (47.6)	11 (52.4)		

Source: Field work, October, 2022
p <0.05, p < 0.01, p < 0.001
Note: percentages in parentheses

5.3 WASH, socio-demographic characteristics and learning outcomes (overall performance)

The implications of WASH on learning outcome have not always been a direct relationship but have in previous studies been linked through varied variables including school attendance, and health. This section presents the findings relating to the associations between WASH, socio-demographic variables and learning outcomes. The results are presented using overall aggregated learning outcomes.

In all, the results show that having basic WASH facilities at school contributes to better overall learning outcomes. Students in schools with these facilities tend to do better in their studies. Again, regular school attendance is strongly linked to better learning outcomes. Students who attend school regularly performed better than those who missed school often. Interestingly, how well students managed their menstrual hygiene does not seem to have any impact on their learning outcomes.

Table 5.3 shows that all the WASH and socio-demographic characteristics have a statistically significant association with learning outcomes, except MHM, school level and distance to school. The results indicate a statistically significant relationship between all the WASH variables and overall learning outcomes ($p < 0.000$). With regards to water facilities, a little over half of the students (55.3%) in schools with no water facilities have poor learning outcomes. The reverse

holds, where students in schools with basic water facilities have better overall learning outcomes (39.0%) compared to students in schools with no water facility (17.5%). Further, students with no or limited sanitation facilities have poor learning outcomes compared to those with basic facilities. A similar trend is observed in relation to hygiene facilities. A higher proportion of students in schools with no access to hygiene facilities (40.3%) show poor learning outcomes compared to those with basic facilities (3.1%).

The results further highlight school attendance as having a strong statistical association with learning outcomes ($p=0.000$). Students who attended school regularly have better learning outcomes (41.4%) compared to those who attended school irregularly (25.8%). Although the relationship between MHM and learning outcomes is not statistically significant ($p<0.062$), students who manage their menstrual hygiene adequately have slightly better learning outcomes.

Age, religion, ethnicity, parental occupation, education of parents, wealth status, district and location of residence also show strong associations with overall learning outcomes. Older students (16-24 years) have poorer learning outcomes compared to younger students (10-15 years). Students from different ethnic groups show variations in learning outcomes, with the Mole Dagbani group having the poorest outcomes. Both fathers' and mothers' occupation show a significant relationship with learning outcomes ($p < 0.001$ and $p = 0.005$, respectively). Students whose fathers work as 'skilled manual' or 'professionals' have better learning outcomes. Similarly, students whose mothers are professionals or engaged in sales and services have better learning outcomes. Further, higher levels of education for both parents is positively related to better learning outcomes for students. Finally, students in schools in urban areas have a higher proportion of very good learning outcomes compared to students in schools in rural areas.

Table 5.3: Association between WASH facilities, socio-demographic characteristics and learning outcomes (overall)

WASH and socio-demographic characteristics	Overall Learning Outcomes				
	Poor (n=245)	Average (n=289)	Very good (n=305)	Chi-square	P-value
Water facilities				40.778	**<0.000**
No facility	57 (55.3)	28 (27.2)	18 (17.5)		
Basic	188 (25.5)	261 (35.5)	287 (39.0)		
Sanitation facilities				21.539	**<0.000**
No facility	4 (13.4)	13 (43.3)	13 (43.3)		
Limited	36 (27.7)	64 (49.2)	30 (23.1)		
Basic	205 (30.2)	212 (31.2)	262 (38.6)		
Hygiene facilities				32.547	**<0.000**
No facility	31 (40.3)	30 (39.0)	16 (20.7)		
Limited	51 (18.0)	114 (40.1)	119 (41.9)		
Basic	163 (34.1)	145 (30.3)	170 (35.6)		
School attendance				19.158	**<0.000**
Irregular	92 (34.0)	109 (40.2)	70 (25.8)		
Regular	153 (26.9)	180 (31.7)	235 (41.4)		
MHM				5.566	0.062
Inadequate	62 (25.5)	78 (32.1)	103 (42.4)		
Adequate	183 (30.7)	211 (35.4)	202 (33.9)		
Age				12.809	**0.002**
10-15	184 (27.8)	217 (32.8)	261 (39.4)		
16-24	61 (34.5)	72 (40.6)	44 (24.9)		
School level				0.771	0.680
Primary	115 (29.4)	129 (33.0)	147 (37.6)		
JHS	130 (29.0)	160 (35.7)	158 (35.3)		
Religion				50.076	**0.000**
Christian	142 (27.8)	138 (27.0)	231 (45.2)		
Muslim	103 (31.4)	151 (46.0)	74 (22.6)		
Ethnicity				76.289	**0.000**
Akan	68 (25.3)	73 (27.1)	128 (47.6)		
Ewe	22 (26.8)	17 (20.7)	43 (52.4)		
Ga-Adangme	35 (27.1)	38 (29.5)	56 (43.4)		
Mole Dagbani	93 (38.0)	141 (47.6)	62 (21.0)		
Grusi	10 (55.6)	6 (33.3)	2 (11.1)		
Others (local)	17 (42.5)	12 (30.0)	11 (27.5)		
Others (Foreign)	0 (0.0)	2 (40.0)	3 (60.0)		
Fathers' occupation				29.341	**<0.001**
Skilled manual	52 (22.9)	83 (36.6)	92 (40.5)		
Agriculture	98 (38.0)	92 (35.7)	68 (26.4)		
Unskilled manual	12 (25.0)	12 (25.0)	24 (50.0)		

WASH and socio-demographic characteristics	Overall Learning Outcomes				
	Poor (n=245)	Average (n=289)	Very good (n=305)	Chi-square	P-value
Professional	17 (21.3)	23 (28.8)	40 (50.0)		
Others	37 (29.1)	46 (36.2)	44 (34.7)		
Sales and services	29 (29.3)	33 (33.3)	37 (37.4)		
Mothers' occupation				25.370	**0.005**
Agriculture	48 (42.1)	33 (29.0)	33 (29.0)		
Sales and services	129 (26.8)	173 (35.9)	180 (37.3)		
Professionals	10 (24.4)	10 (24.4)	21 (51.2)		
Unskilled manual	28 (38.9)	28 (38.9)	16 (22.2)		
Skilled manual	14 (21.2)	21 (31.8)	31 (47.0)		
Others	16 (25.4)	23 (36.5)	24 (38.1)		
Father's education				34.135	**0.000**
No formal education	69 (33.2)	87 (41.8)	52 (25.0)		
Primary	62 (33.2)	64 (34.2)	61 (32.6)		
Secondary/Tech./Voc.	34 (26.6)	41 (32.0)	53 (41.4)		
Tertiary	10 (14.9)	16 (23.9)	41 (61.2)		
Other	70 (28.1)	81 (32.5)	98 (39.4)		
Mother's education				33.632	**0.000**
No formal education	100 (33.6)	123 (41.3)	75 (25.2)		
Primary	81 (28.9)	80 (28.6)	119 (42.5)		
Secondary/Tech./Voc.	16 (22.2)	20 (27.8)	36 (50.0)		
Tertiary	8 (21.6)	9 (24.3)	20 (54.1)		
Other	40 (26.3)	57 (37.5)	55 (36.2)		
Wealth Status				20.505	**0.009**
Poorest	53 (31.0)	52 (30.4)	66 (38.6)		
Poorer	63 (38.4)	39 (23.8)	62 (37.8)		
Middle	47 (28.0)	63 (37.5)	58 (34.5)		
Richer	45 (27.3)	60 (36.4)	60 (36.4)		
Richest	37 (21.6)	75 (43.9)	59 (34.5)		
Region				62.006	**0.000**
Ashanti Region	73 (29.3)	65 (26.1)	111 (44.6)		
Greater Accra Region	82 (27.2)	82 (27.2)	137 (45.5)		
Northern Region	90 (31.1)	142 (49.1)	57 (19.7)		
District				109.489	**0.000**
Accra Metro	51 (32.7)	51 (32.7)	54 (34.6)		
Kumasi Metro	32 (24.2)	32 (24.2)	68 (51.5)		
Nanton	60 (45.1)	60 (45.1)	13 (9.8)		
Sekyere South	41 (35.0)	33 (28.2)	43 (36.8)		
Shai Osudoku	31 (21.4)	31 (21.4)	83 (57.2)		
Tamale Metro	30 (19.2)	82 (52.6)	44 (28.2)		
Locality				20.745	**0.000**

WASH and socio-demographic characteristics	Overall Learning Outcomes				
	Poor (n=245)	Average (n=289)	Very good (n=305)	Chi-square	P-value
Rural	117 (37.3)	109 (34.7)	88 (28.0)		
Urban	128 (24.4)	180 (34.3)	217 (41.3)		
Distance to school (In minute)				8.176	0.085
< 30	119 (30.4)	124 (31.6)	149 (38.0)		
30-60	121 (28.3)	153 (35.8)	153 (35.8)		
>60	5 (25.0)	12 (60.0)	3 (15.0)		

Source: Field work, October, 2022
p <0.05, p < 0.01, p < 0.001
Note: percentages in parentheses

5.4 Summary of results

The chapter explored the association between the availability of water, sanitation, and hygiene (WASH) facilities in schools, socio-demographic characteristics, and their impact on menstrual hygiene management, school attendance, and learning outcomes. The data is analysed using statistical chi-square tests.

In terms of menstrual hygiene management (MHM), the availability of water and hygiene facilities in schools is significantly associated with the adequacy of MHM. Schools without water or hygiene facilities have a higher proportion of students who manage their menstrual hygiene adequately compared to those with basic facilities. However, no significant association is observed between the adequate management of menstrual hygiene and the availability of sanitation services in schools. Socio-demographic variables such as age, religion, and distance to school do not show a significant association with the adequate management of menstrual hygiene. On the other hand, school level, ethnicity, parents' occupation, wealth status, district, locality, and access to a toilet facility at home exhibit significant associations with the adequate management of menstrual hygiene.

Access to water and hygiene facilities in schools do not show a significant association with school attendance, however, access to sanitation facilities and hygiene facilities is associated with regularity of school attendance. Schools with basic sanitation and hygiene facilities have a higher proportion of students who attend school regularly. The socio-demographic characteristics (including age, school level, religion, ethnicity, parents' occupation, education of parents, wealth status, region, district, locality, and distance to school) also show significant associations with school attendance.

Furthermore, all the WASH variables (water, sanitation, and hygiene facilities) have a statistically significant association with overall learning outcomes. Schools with basic water, sanitation, and hygiene facilities have better learning outcomes compared to those with limited or no facilities. School attendance also shows a strong association with learning outcomes, with regular attendance leading to better outcomes. The socio-demographic characteristics, such as age, religion, ethnicity, parents' occupation, education of parents, region, district, and locality, also show associations with learning outcomes. Older students tend to have poorer learning outcomes, while students from certain ethnic groups and those with parents in skilled manual or professional occupations tend to have better outcomes. Students in urban areas generally perform better than those in rural areas. Overall, the findings emphasise the importance of access to adequate WASH facilities in schools for improving menstrual hygiene management, school attendance, and learning outcomes. Socio-demographic characteristics also play a role in shaping these outcomes.

CHAPTER SIX

FACTORS PREDICTING LEARNING OUTCOMES

6.1 Introduction

This chapter presents the study findings relating to the predictors of learning outcomes using the ordered logistic model. It provides evidence relating to the relationship between WASH facilities in schools, MHM, school attendance and other socio-demographic variables. An ordered logistic regression model was used to analyse the data and determine the relationship between different characteristics and the outcome variable. Odds ratios, confidence intervals, p-values, and standard errors were calculated to evaluate the strength and significance of these relationships. Two models were fitted to determine the determinants of learning outcomes in schools. The first model predicts learning outcomes using the independent and intermediary variables (WASH, MHM and school attendance) and the second model controls for socio-demographic variables in determining the overall predictors of learning outcomes.

6.2 WASH, MHM and school attendance as predictors of learning outcomes

An ordered logit model was fitted to establish the determinants of learning outcomes – regressing the independent (WASH) and intermediary variables (MHM and school attendance) on the dependent variable. Overall, the results show that having basic WASH facilities at school and attending school regularly invariably leads to better academic performance. However, the management of menstruation does not predict learning outcomes. Specifically, the availability of WASH facilities, and school attendance are statistically significantly associated with overall learning outcome (Table 6.1). Students from schools with basic water facilities are 2.223 times more likely to perform better (Odds ratio = 3.223, p=0.000) on their overall academic performance relative to students from schools with no water facilities. This implies that having access to basic

WASH facilities increases the odds of achieving better learning outcomes compared to having no facilities. Students from schools with limited sanitation facilities are 52.8% less likely to perform better (Odds ratio = 0.472, p=0.047) on their overall learning outcomes compared with students from schools without sanitation facilities. This also implies that having 'limited' or 'no facility' contributes to achieving 'poor' learning outcomes. Students in schools with a limited hygiene facilities are more likely to have better learning outcomes compared to those in schools with no hygiene facilities (Odds ratio = 1.728 p=0.029).

In reference to regularity of school attendance, students who are regular in school are 1.7 times as likely to have better overall academic performance (Odds ratio = 1.715, p=0.000) compared to students who are irregular in school. Students practising adequate menstrual hygiene management are 23.4% less likely to have better learning outcomes (Odds ratio = 0.766, p=0.067) compared to students who have inadequate menstrual hygiene management..

Table 6.1: Determinants of learning outcomes

Characteristics	Odds Ratio	[95% C.I]	P-value	Std. error
Water facilities				
No facility (RC)	1			
Basic	3.223	[2.119 - 4.903]	**0.000**	0.690
Sanitation facilities				
No facility (RC)	1			
Limited	0.472	[0.225 - 0.989]	**0.047**	0.178
Basic	0.688	[0.348 - 1.358]	0.281	0.239
Hygiene facilities				
No facility (RC)	1			
Limited	1.728	[1.058 - 2.821]	**0.029**	0.432
Basic	1.003	[0.623 - 1.615]	0.989	0.244
School Attendance				
Irregular (RC)	1			
Regular	1.715	[1.304 - 2.257]	**0.000**	0.240
Menstrual Hygiene Management				
Inadequate (RC)				
Adequate	0.766	[0.576 - 1.018]	0.067	0.111

Source: Field work, October, 2022

p <0.05, p < 0.01, p < 0.001
RC- Reference Category, CI- Confidence Interval (in parentheses)

6.3 Overall predictors of learning outcomes

The results of the ordered logistic regression analysis between WASH, MHM, school attendance and socio-demographic characteristics on one hand, and learning outcomes on the other, are presented in Table 6.2 (controlling for socio-demographic characteristics).

Overall, the availability of basic water facilities at school and attending school regularly made students more likely to do better in their studies. However, having sanitation and hygiene facilities at school do not seem to make a difference in learning outcomes. Other factors including how educated a student's father is and which district the student lived in have an impact on learning outcomes. For example, if a student's father had only primary education, they are more likely to have poor learning outcomes. Living in certain districts, like Shai Osudoku, is linked to better learning outcomes.

In specific terms, the results show that the provision of basic water facilities and regular school attendance are associated with better learning outcomes. Compared to the reference category of no water facility, the availability of basic water facilities showed a significantly higher odds ratio of 2.377 (95% CI: 1.336 - 4.228, p=0.003), indicating a likelihood of better learning outcomes. This implies that students in schools with basic water facilities are 1.377 times more likely to achieve better learning outcomes compared to students in schools with no water facilities.

No statistically significant relationships are found for limited or basic sanitation facilities compared to the reference category of no facility. In addition, access to limited or basic hygiene facilities did not predict learning outcomes (p=0.434 and p=0.242, respectively). Compared to

irregular attendance, regular school attendance demonstrated a higher odds ratio of 1.357 (95% CI: 1.004 - 1.833, p=0.047), suggesting a likelihood of better learning outcomes. Students with regular school attendance are 35.7% more likely to achieve better learning outcomes (very good) compared to students with irregular school attendance.

Further, students whose fathers have primary education are 39.6% less likely to have better learning outcomes compared to students who did not know the educational level of their parents (Odds ratio = 0.604, p=0.018). Furthermore, students in the Shai Osudoku District are 2.583 times more likely to have very good learning outcomes compared to students in the Accra Metro (Odds ratio = 3.583, p=0.000).

All the other socio-demographic variables comprising age, religion, ethnicity, parents' occupation, wealth status, region, and locality, have no statistically significant relationships with learning outcomes (school performance).

Table 6.2: Predictors of learning outcomes (overall learning outcomes)

Characteristics	Odds Ratio	[95% Conf. Interval]	P-value	Std. Error
Water facilities				
No facility (RC)	1			
Basic	2.377	[1.336 - 4.228]	**0.003**	0.698
Sanitation facilities				
No facility (RC)	1			
Limited	0.709	[0.291 - 1.724]	0.447	0.321
Basic	0.747	[0.322 - 1.731]	0.496	0.320
Hygiene facilities				
No facility (RC)	1			
Limited	1.279	[0.691 - 2.365]	0.434	0.401
Basic	0.707	[0.395 - 1.265]	0.242	0.210
School Attendance				
Irregular (RC)	1			
Regular	1.357	[1.004 - 1.833]	**0.047**	0.208
Age				
10-15 (RC)	1			
16-24	0.816	[0.573 - 1.163]	0.261	0.147
Religion				

Characteristics	Odds Ratio	[95% Conf. Interval]	P-value	Std. Error
Christian (RC)	1			
Muslim	1.188	[0.605 - 2.329]	0.617	0.408
Ethnicity				
Akan (RC)	1			
Ewe	0.975	[0.538 - 1.767]	0.934	0.296
Ga-Adangme	0.916	[0.535 - 1.567]	0.749	0.251
Mole Dagbani	0.523	[0.219 - 1.248]	0.144	0.232
Grusi	0.151	[0.055 - 0.415]	**0.000**	0.078
Others (local)	0.465	[0.204 - 1.064]	0.070	0.196
Others (Foreign)	1.280	[0.198 - 8.291]	0.796	1.220
Fathers' occupation				
Skilled manual (RC)	1			
Agriculture	0.758	[0.504 - 1.142]	0.185	0.158
Unskilled manual	1.278	[0.675 - 2.419]	0.452	0.416
Professional	0.910	[0.498 - 1.661]	0.758	0.280
Sales and services	0.954	[0.597 - 1.524]	0.844	0.228
Others	0.761	[0.479 - 1.211]	0.250	0.180
Mothers' occupation				
Agriculture (RC)	1			
Sales and services	1.201	[0.767 - 1.882]	0.424	0.275
Professionals	1.118	[0.459 - 2.720]	0.807	0.507
Unskilled manual	0.851	[0.470 - 1.540]	0.593	0.258
Skilled manual	1.407	[0.731 - 2.709]	0.307	0.470
Others	1.309	[0.683 - 2.510]	0.418	0.435
Father's education				
Other (RC)	1			
No formal education	0.878	[0.557 - 1.383]	0.574	0.204
Primary	0.604	[0.397 - 0.918]	**0.018**	0.129
Secondary/Tech./Voc.	0.933	[0.582 - 1.496]	0.773	0.225
Tertiary	1.813	[0.889 - 3.697]	0.102	0.659
Mother's education				
Other (RC)	1			
No formal education	1.035	[0.632 - 1.696]	0.89	0.261
Primary	1.025	[0.657 - 1.599]	0.914	0.233
Secondary/Tech./Voc.	1.246	[0.676 - 2.298]	0.481	0.389
Tertiary	0.734	[0.292 - 1.849]	0.512	0.346
Wealth status				
Poorest (RC)	1			
Poorer	0.787	[0.507 - 1.222]	0.286	0.177
Middle	1.130	[0.739 - 1.729]	0.572	0.245
Richer	1.190	[0.775 - 1.827]	0.427	0.260
Richest	1.367	[0.895 - 2.089]	0.148	0.296
Region				

Characteristics	Odds Ratio	[95% Conf. Interval]	P-value	Std. Error
Ashanti (RC)	1			
Greater Accra	0.405	[0.135 - 1.212]	0.106	0.226
Northern	0.642	[0.186 - 2.222]	0.484	0.407
District				
Accra Metro (RC)	1			
Kumasi Metro	0.737	[0.237 - 2.286]	0.597	0.426
Nanton	1.331	[0.464 - 3.824]	0.595	0.717
Sekyere South	1	-	-	
Shai Osudoku	3.583	[1.923 - 6.675]	**0.000**	1.137
Tamale Metro	1.000			
Locality				
Rural (RC)	1			
Urban	1.445	[0.610 - 3.426]	0.403	0.636

Source: Field work, October, 2022
p <0.05, p < 0.01, p < 0.001
RC- Reference Category, CI- Confidence Interval (in parenthesis)

6.4 Summary of Results

The chapter provides findings relating to the predictors of learning outcomes. The study found that the availability of water, sanitation, and hygiene facilities in schools, as well as school attendance, were found to be significantly associated with overall learning outcomes. Students from schools with basic water facilities are more likely to perform better academically, while limited sanitation facilities are associated with lower odds of better learning outcomes. Limited hygiene facilities in schools positively predicted better learning outcomes. Regular school attendance was also associated with better overall academic performance. However, the association between menstrual hygiene management and learning outcomes is not statistically significant.

In summary, the findings in this chapter highlights the importance of WASH facilities, school attendance, and socio-demographic variables in predicting learning outcomes in schools. Access to basic water facilities and regular school attendance are consistently associated with better learning outcomes.

CHAPTER SEVEN

LIVED EXPERIENCES OF GIRLS – PERSPECTIVES OF STUDENTS AND SCHOOL HEALTH AND ENVIRONMENT PROGRAMME (SHEP) COORDINATORS

7.1 Introduction

This chapter provides evidence relating to the lived experiences of girls from both the perspective of the School Health and Education (SHEP) coordinators/teachers and the girls (students). The findings are presented under four key themes for both the SHEP Coordinators and the students: background characteristics; friendliness/unfriendliness of school environments (WASH and MHM); drivers of school absenteeism; and the possible solutions and learning experiences of girls during menstruation.

7.2 Perspectives of SHEP Coordinators

7.2.1 Background characteristics of SHEP Coordinators

Table 7.1 presents the background characteristics of 43 SHEP coordinators/teachers across the study schools. Over two-thirds of the SHEP coordinators are either in the Ashanti or Northern Regions (74.4%) with a further fifth (25.6%) in the Greater Accra Region. The district data shows an almost equal split across the six study districts with the highest proportions from the Kumasi Metro, Nanton, Sekyere South and Tamale Metro (18.6% each). About two-thirds of the SHEP teachers (72.1%) are female with a further 67.4% being teachers in schools in urban areas. Further, a slightly higher proportion of teachers (51.2%) are teaching at the Junior High school level.

Table 7.1: Background characteristics of SHEP Coordinators

Characteristics	Frequency	Percentage
n = 43		
Region		
Ashanti	16	37.2
Greater Accra	11	25.6
Northern	16	37.2
District		
Accra Metro	6	14.0
Kumasi Metro	8	18.6
Nanton	8	18.6
Sekyere South	8	18.6
Shai Osudoku	5	11.6
Tamale Metro	8	18.6
Gender		
Female	31	72.1
Male	12	27.9
Locality		
Rural	14	32.6
Urban	29	67.4
School level		
Primary	21	48.8
JHS	22	51.2

Source: Field work, October, 2022

7.2.2 Friendliness/unfriendliness of the school to menstruating girls

From the perspectives of the SHEP Coordinators, almost all the schools are conducive and friendly for menstruating girls. This assertion is based on the periodic provision of MHM materials including sanitary pads and reusable towels, continuous MHM education, teacher support and access to WASH facilities. Although most of the schools do not have changing rooms, the SHEP coordinators indicated the provision of 'make-shift' changing places (office spaces, toilet areas etc.) for use by the girls (Figure 7.1). The following quotes speak to this:

The school is friendly to menstruating girls because we have separate urinals for girls and changing rooms for the girls ***[Female SHEP Coordinator, Tamale Metro, JHS, Urban, R12]***

We do not have a specific room for changing, however the girls sometimes use a small space by the toilet. I have taken the girls through some orientation on what to expect during their cycle. Such as, how to use the pads. When to change. Symptoms of the cycle ***[Female SHEP Coordinator, Accra Metro, JHS, R13]***

The school does not have a changing room, but students are allowed to use the teachers' urinal which is always locked as a changing room. However, the new facility under construction has a changing room in it ***[Female SHEP Coordinator, Kumasi Metro, JHS R2]***

School provides sanitary pads to girls who need it, assist those who soil themselves to clean up, have a changing room for girls as well ***[Female SHEP Coordinator, Shai Osudoku, JHS, R4]***

*The school has organised an educative gathering for girls in the past. We do not have any separate space for changing. The girls use the toilets to change [****Female SHEP Coordinator, Accra Metro, Prim. R5]***

The school tries its best to support girls who are menstruating. Last term we held a programme where we talked to the girls about issues concerning their hygiene. Also, before COVID, we had a girl's club and we usually meet on Fridays to talk about any issues concerning their health, hygiene and how to take care of themselves during their menstrual period ***[Female SHEP Coordinator, Accra Metro, JHS, Urban, R6]***

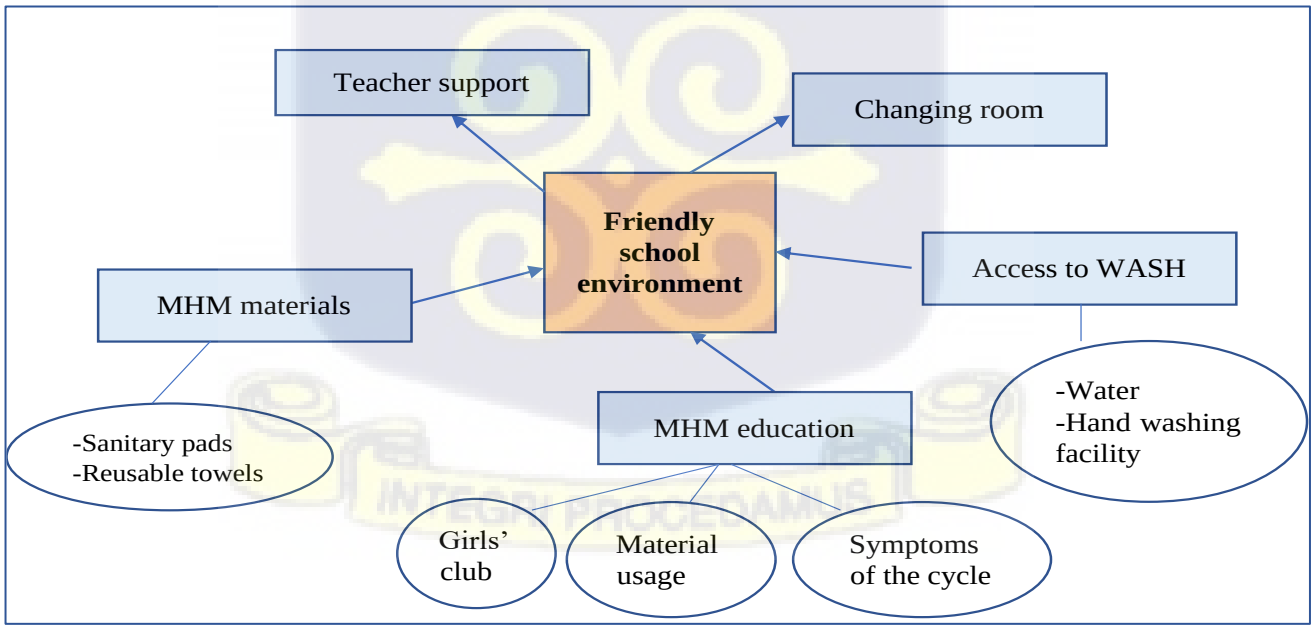


Figure 7.1: Thematic Network showing friendliness of school environment for girls
Source: Field work, interview with SHEP coordinators, October, 2022

- **Unfriendly school environment**

A few of the SHEP coordinators, however, indicated that some of the schools are not conducive and friendly for menstruating girls. The key challenges making the schools unfriendly included absence/limited support from teachers, absence of changing rooms and MHM materials at the school level, no education on MHM and having male teachers as SHEP coordinators – which was as a result of the absence of female teachers (Figure 7.2). The following voices speak to this finding:

> *The school environment is not friendly for menstruating girls. There is no changing room. No form of support from teachers. There used to be support from the teachers sometime, but it's not there at the moment* ***[Male SHEP Coordinator, Nanton, Prim., Rural, R28]***
>
> *The school environment is not friendly for menstruating girls. There is no changing room for menstruating girls. The school does not have a female staff and it's a great challenge. The school normally rely on the community nurses to come and educate the girls. The girls don't receive support from the teachers* ***[Male SHEP Coordinator, Nanton, Prim., Rural, R33]***
>
> *The school environment is not friendly for menstruating girls. The school does not have a changing room for menstruating girls. The girls change their pads in the toilet and urinal. The pupils do not receive support from the teachers. They normally receive support from the SHEP coordinator* ***[Female SHEP Coordinator, Nanton, Prim., Rural, R35]***
>
> *The school is not friendly for menstruating girls. There is no changing rooms for girls. Some students in times of emergency have to be taken to the teacher's office to change and others change in the plantain farm near the school* ***[Male SHEP Coordinator, Tamale Metro, Prim., Rural, R40]***

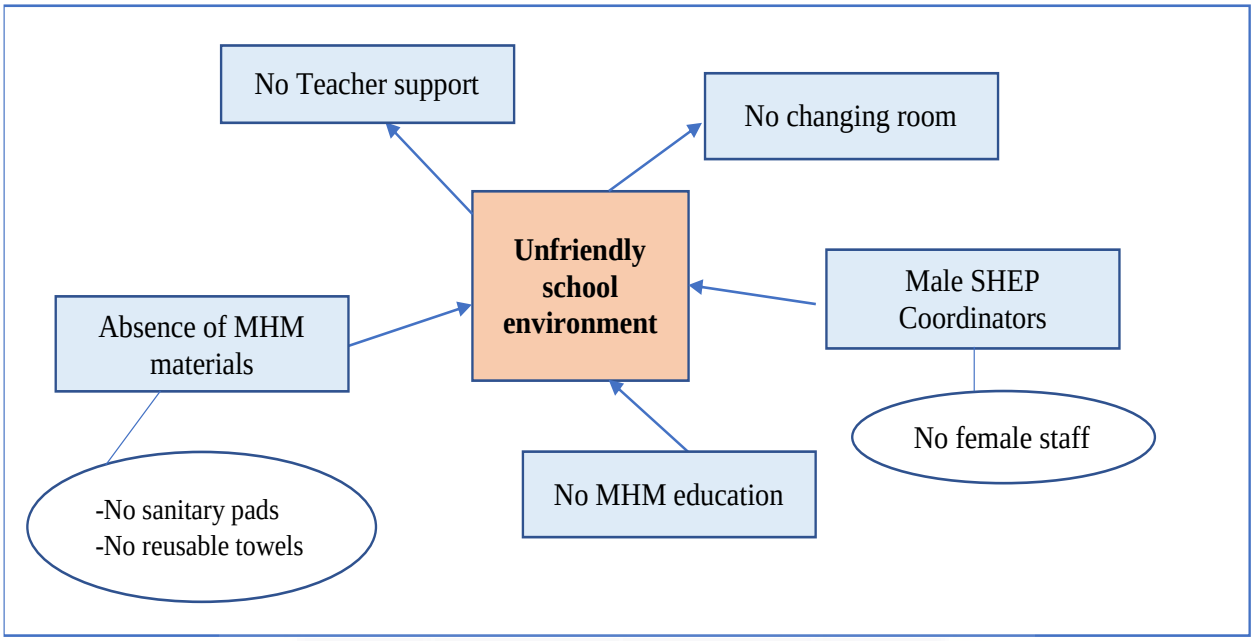


Figure 7.2: Thematic Network showing unfriendliness of school environment for girls
Source: Field work, interview with SHEP coordinators, October, 2022

7.2.3 Menstruation-related absenteeism

The analysis shows girls hardly miss school as a result of menstruation. For the few who miss school days, they usually miss the first day of the cycle when they are really in pain. From the perspective of the SHEP Coordinators, this rarely happens. The following voices validate this finding:

It's rare, never happened before because they have been educated that menstruation should not prevent them from coming to school ***[Female SHEP Coordinator, Kumasi Metro, JHS, Urban, R14]***

Sometimes we have girls going home because they are on the first day of their cycle and are in pain, but it rarely happens ***[Female SHEP Coordinator, Accra Metro, Prim. Urban, R2]***

Girls hardly miss school when they are menstruating because they get pad from the school ***[Female SHEP Coordinator, Accra Metro, Prim. Urban, R3]***

Girls in this school do not miss school or leave school because of menstruation. It has never happened before ***[Female SHEP Coordinator, Kumasi Metro, JHS, Urban, R18]***

From the perspective of the SHEP coordinators, the few who miss school as a result of menstruation do so for fear of soiling uniforms, menstrual pains and absence of MHM materials.

Sometimes, girls are absent from school because they are afraid to "soil" themselves. Maybe they have severe abdominal pain. And other times, the girls do not have pad, so they prefer to stay home ***[Female SHEP Coordinator, Accra Metro, Prim., Urban, R9]***

Yes, some do miss school for the period of menstruating. But most of them always come to school. ***[Male SHEP Coordinator, Tamale Metro, JHS, Urban, 23]***

Yes. They sometimes miss school when they are menstruating. It's not all that frequent. This cuts across all the girls ***[Male SHEP Coordinator, Nanton, Primary, Rural, 28]***

Yes. They sometimes miss school. This happens to all the girls. Some of them fall sick during menstruation and this normally affects their school attendance ***[Female SHEP Coordinator, Nanton, Primary, Rural, 29]***

It happens because some of them will feel pains so we cannot keep them in school or if it happens at home they will not even come to school. Also, because some of them may have a heavy flow we cannot force them to stay in school ***[Female SHEP Coordinator, Tamale Metro, Primary, Rural, 43]***

7.2.4 Main drivers of school absenteeism

The study further assessed other factors contributing to school absenteeism apart from menstruation and its associated factors. The results showed girls usually miss more school days as a result of other factors other than menstruation. These factors include financial challenges, sickness, assisting parents in trading, distance to school, and lack of school materials (Figure 7.3). These reasons cut across both primary and JHS levels. The following quotes also speak to this:

Some girls help their parents who are traders, so they miss out. Financial issues, others do not come to school, because their parents do not have money ***[Female SHEP Coordinator, Accra Metro, Prim., Urban, R2]***

They sometimes miss school because they don't have money to feed themselves, and also the distance from their homes to the school ***[Female SHEP Coordinator, Shai Osudoku, JHS, Urban, R8]***

Mainly girls absent themselves from school when their parents don't have money to give them to come to school, they may be taken to funeral, or the girl does not have school materials etc. ***[Male SHEP Coordinator, Tamale Metro, JHS, Urban, R12]***

Most parents of students here are single parents so most girls missing school have to do with pocket money and work-related support to family sometimes. Distance is also another reason especially when it rains in the morning ***[Female SHEP Coordinator, Kumasi Metro, Prim., Urban, R16]***

Some girls miss school sometimes due to distance and work-related support to family ***[Female SHEP Coordinator, Kumasi Metro, Prim., Urban, R18]***

Sometimes it is financial reasons that make the girls miss school because some of them their houses are very far from the school. So, when their parents don't have money to give them, they will not come to school. The distance from their homes to the school is not a walking distance. Sometimes too their parents will take them to farms ***[Female SHEP Coordinator, Sekyere South, Prim., Urban, R24]***

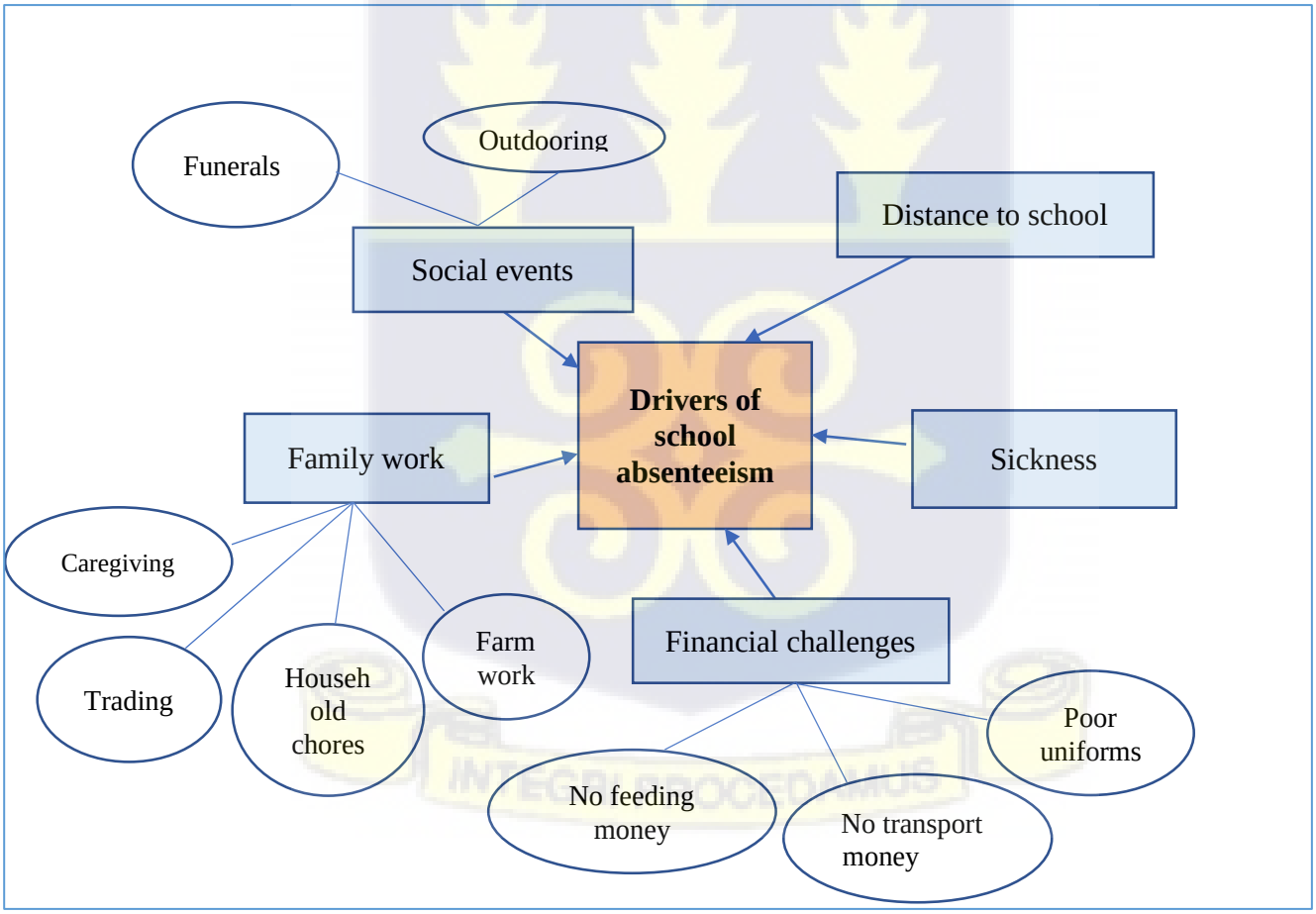


Figure 7.3: Thematic Network showing drivers of absenteeism
Source: Field work, interview with SHEP coordinators, October, 2022

Table 7.2: Spread of views on drivers of school absenteeism

Drivers of school absenteeism	Spread of views
Financial challenges/difficulties (no money for feeding, no transport money, no pocket money, poor uniforms	Twenty-five of the SHEP Coordinators across the six study districts
Sickness	4
Distance to school	Four of the respondents mostly in schools in rural areas
Family work	21
Social events	10
Care giving	15

Note: Multiple responses

7.2.5 Possible MHM mitigation measures

The study aimed to understand the views of SHEP Coordinators on how best to reduce school absenteeism due to menstruation. The evidence points to the need to focus on the continuous provision of sanitary pads (reusable and disposable), and the organisation of MHS programmes, especially at the primary level, constant education of girls on sexual reproduction health, hygiene and related issues, provision of pads, and constant water supply. The following voices speak to this finding:

Provision of Sanitary pads, WASH facilities and organising menstrual hygiene education at the Primary level ***[Female SHEP Coordinator, Sekyere South, Prim., Urban, R1]***

Provide pads for the girls with the support of capitation. More education on how to take care of your self during this period and creating an environment where girls feel safe to talk about what they are going through ***[Female SHEP Coordinator, Accra Metro, Prim., Urban, R2]***

Schools should appeal to NGOs to put up modern WASH facilities for the schools ***[Female SHEP Coordinator, Shai Osudoku, JHS, Urban, R4]***

Provide more resources such as pads (disposable or reusable), invite more nurses or experts to the school, so they can talk to the girls. Because they are at stage in their life where they could easily get pregnant ***[Female SHEP Coordinator, Accra Metro, Prim., Urban, R9]***

Supporting them with sanitary pads and continuous education about menstrual health ***[Male SHEP Coordinator, Sekyere South, Prim., Urban, R10]***

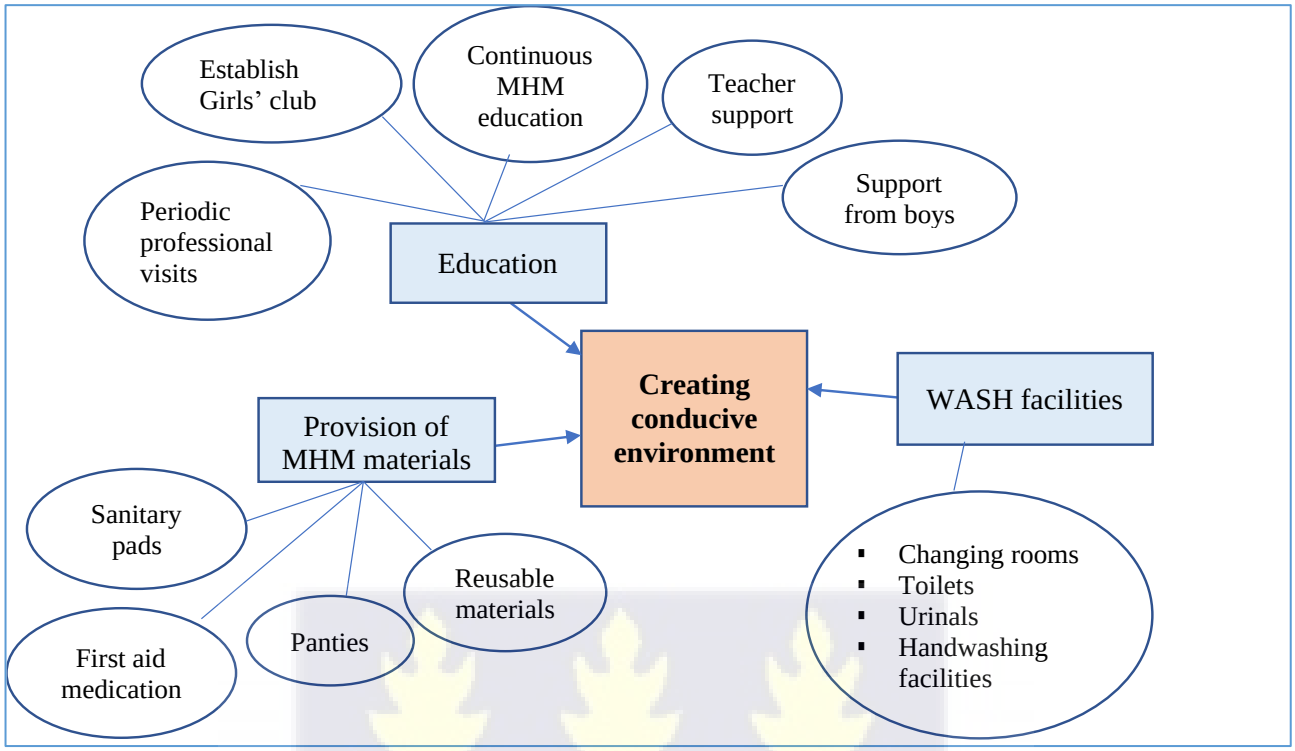


Figure 7.4: Creating a conducive environment for girls
Source: Field work, interview with SHEP coordinators, October, 2022

7.2.6 Learning experiences during menstruation

The study also assessed the learning experiences of girls during menstruation from the perspective of the SHEP coordinators. The respondents highlighted a number of learning difficulties girls usually go through when menstruating. These comprised difficulty in concentration and tiredness, sleepiness and frustration as a result of pains, and excessive discomfort.

Some of the girls are not able to concentrate, they keep their head on the table most of the time. They do not participate in class activities fully ***[Female SHEP Coordinator, Accra Metro, Prim., Urban, R5]***

A few of them keep their head on the table because of the pain. They are not able to concentrate because they feel tired or weak. Some do not go for break ***[Female SHEP Coordinator, Accra Metro, Prim., Urban, R9]***

Some of the girls lose concentration in class and do not fully participate in class activities due to the discomfort they feel but few of them are able to tell us the reason whether its menstruation or other health issues ***[Female SHEP Coordinator, Kumasi Metro, Prim., Urban, R16]***

They don't participate in class because some of them automatically become sick during this period. They sometimes look tired, and this affects their concentration ***[Male SHEP Coordinator, Nanton, JHS, Rural, R16]***

Some of them sleep in class when they are in their menses or they will just look dull, no one will tell you they are in their menses. When it happens like that, they don't answer questions when you ask during lessons. Some of them will not even go out for break ***[Male SHEP Coordinator, Tamale Metro, JHS, Urban, R23]***

Learning is difficult for some of them, especially those who experience cramps. They are so concentrated on the pain, and they lose concentration during lessons. Their participation in class activities is very low and some of them even sleep in class ***[Female SHEP Coordinator, Kumasi Metro, JHS, Urban, R37]***

When girls are menstruating, especially when they have heavy flow, they are not able to concentrate in class. It affects their learning whether they stay in school, or they go home ***[Female SHEP Coordinator, Tamale Metro, Prim., Urban, R38]***

Alternately, the continuous MHM education programmes have contributed to strengthening the resolve of most of the girls. Some of the girls, although still experiencing menstruation and related pains, have braced themselves and are able to cope through the class sessions. The following quotes speak to this:

Due to the constant education on menstrual hygiene, girls see menstruation as a normal issue, so they cope with school work when they are menstruating. They take part in all activities ***[Female SHEP Coordinator, Shai Osudoku, JHS, Urban, R4]***

In my class the girls don't miss school even when they are menstruating. They always come to school and learn ***[Female SHEP Coordinator, Tamale Metro, JHS, Urban, R11]***

Because of the education they are able to manage the discomfort but sometimes there are some changes we notice in some girls in class with regards to concentration and participation but few of them tell us it's because they are menstruating ***[Female SHEP Coordinator, Kumasi Metro, JHS, Urban, R14]***

Learning is normal for the girls when they are menstruating. We have few ones that feel pains and some look dull, but this category are not many ***[Male SHEP Coordinator, Tamale Metro, JHS, Urban, R42]***

7.2.7 Impact of missing school on learning outcomes

Over 80% of the respondents indicated that missing school definitely affects the learning outcomes of students. This was based on missing contact hours with its associated impact on missing lessons. Missing lessons meant not all the students could quickly make up for lost class sessions and sometimes missing out on class assessment sessions. All these contribute to negatively influencing the end learning output of students.

Yes. It affects their learning outcomes. When they miss school, they equally miss certain lessons and definitely can't answer questions related to the missed lessons during examination. This subsequently results in poor performance in exams ***[Male SHEP Coordinator, Nanton, JHS, Rural, R20]***

Yes, it does. Because they are unable to catch up with the others ***[Female SHEP Coordinator, Shai Osudoku, Prim., Urban, R7]***

Definitely, it affects their learning outcomes, because some of them are not able to do some class tests and exercises ***[Female SHEP Coordinator, Shai Osudoku, JHS, Urban, R8]***

Obviously if students miss school, it will affect the progress of their learning. Their continuous assessment results will be low. There will be gaps in their understanding of certain concepts because they were not in during the lessons ***[Male SHEP Coordinator, Tamale Metro, JHS, Urban, R12]***

Missing school obviously affect their learning, but they do not care. When the girls miss school their continuous assessment marks are affected. This will go a long way to affect their performance in the BECE because the continuous assessment is usually calculated and given to WAEC which forms part the grade a student will make at the end ***[Male SHEP Coordinator, Tamale Metro, JHS, Rural, R23]***

Yes. It affects their performances. When they miss school, they will definitely miss some lessons and cannot answer questions on lessons they missed during their menses and this will subsequently affect their performances ***[Male SHEP Coordinator, Nanton, Prim., Rural, R28]***

Alternately, a few of the SHEP Coordinators indicated that missing school does not affect the learning outcomes of students.

> *"Some of the girls have missed school days but it has not affected their learning outcomes. For the JHS they come to school very early, so they are able to catch up"* ***[Female SHEP Coordinator, Accra Metro, Prim., Urban, R2]***

7.3 The Lived Experiences of Students

This section provides evidence from the perspective of students on their lived experiences – relating to WASH, menstrual hygiene management, school attendance and learning. In all, 43 FGDs were conducted across all six study sites.

7.3.1 Friendliness/unfriendliness of school environment for girls

The study explored the experiences of girls in relation to the friendliness of the school environment in aiding their menstrual hygiene management. The analysis points to a generally unfriendly environment for most menstruating girls. This is attributable to the absence of functional WASH facilities, limited support from the schools (unfriendly teachers, absence of/dysfunctional SHEP Coordinators), absence of MHM materials, and the presence of male SHEP Coordinators (Figure 7.5). The following quotes speak to this finding:

The school is not friendly for menstruating because there is no water inside the washrooms for us to wash ourselves and change our sanitary pads ***[FGD Group 3, R3, Tamale Metro, Urban]***

Because there's no water if you are menstruating and you want to use the urinary room you have to buy sachet water a day for use ***[FGD Group 3, R7, Tamale Metro, Urban]***

We don't feel comfortable talking to the teachers. We only go to the SHEP teacher for pad, we however don't talk to her about menstrual challenges and the changing room is sometimes locked ***[FGD Group 6, R7, Shai Osudoku, Urban]***

There is no changing room in the school and so if you are mensurating in school and there's the need to wear a pad or change your pad we just go back home ***[FGD Group 8, R1, Nanton, Rural]***

We usually just go home when we need to change because even in the school there's nothing the teacher can do for you because they don't have pads in the school ***[FGD Group 8, R2, Nanton, Rural]***

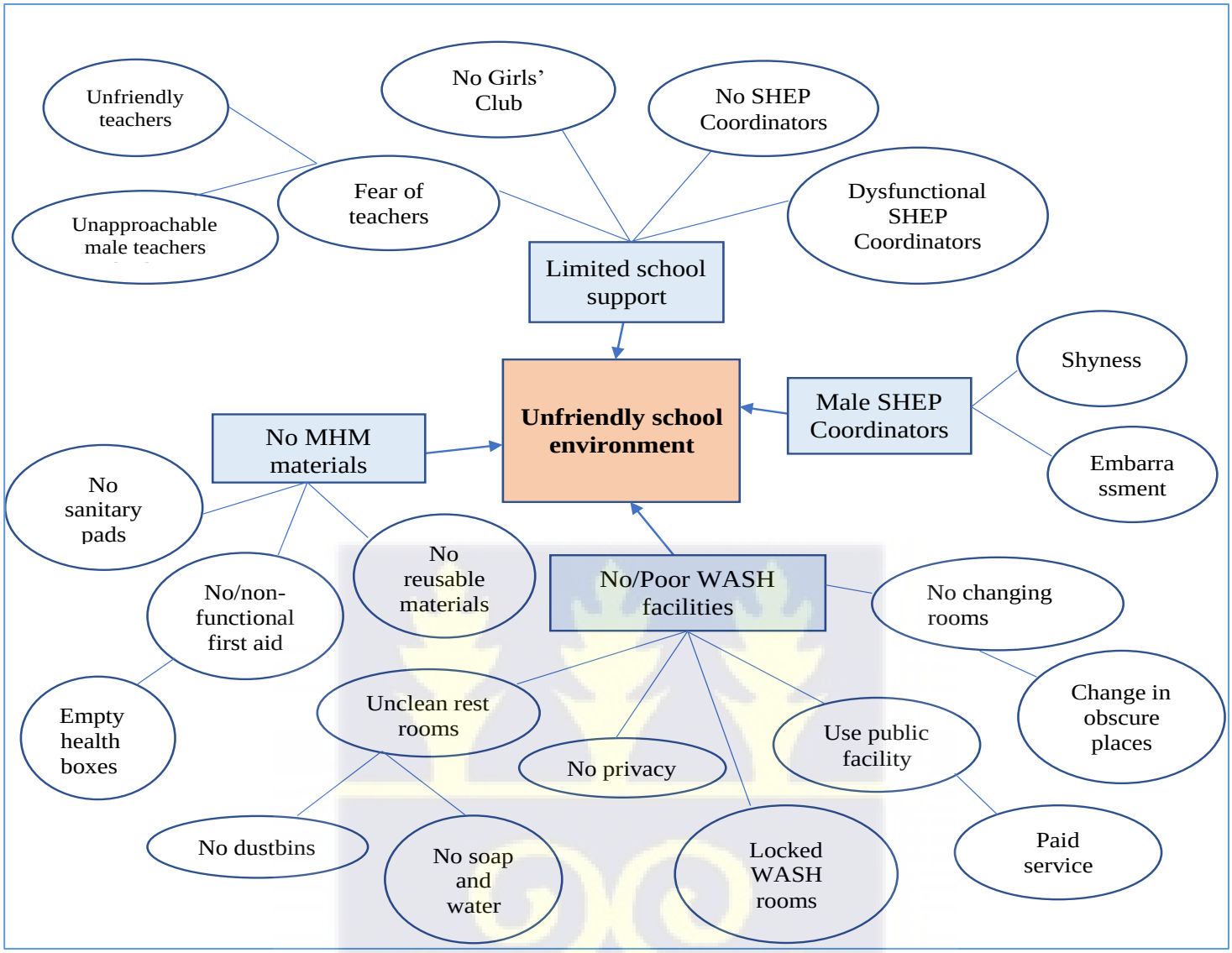


Figure 7.5: Thematic themes on the unfriendly school environment - perspectives of students
Source: Field work, FGD with girls, October, 2022

- **Friendly school environment**

In a few of the schools, largely in urban areas, the girls indicated that their schools were conducive for menstruating girls. This assertion emanated from the provision of sanitary pads provided by the school and occasionally by philanthropists, access to changing rooms, support from the SHEP Coordinators and other teachers, provision of first aid medication, periodic education on menstrual hygiene and related issues (Figure 7.6). The following quotes speak to this finding:

There are sanitary pads for girls who are menstruating. There are two changing rooms for girls (one for staff and another for females). The SHEP coordinator also provides medication for girls who have abdominal pain, and you can take permission to go home if you feel the need ***[FGD Group 5, R2, Shai Osudoku, Urban]***

The school is very accommodating for menstruating girls, our SHEP Coordinator advises us on menstrual hygiene, she often gives us pad when we do not have any on ourselves at the time of our period but there are no changing rooms for us ***[FGD Group 17, R2, Accra Metro, Urban]***

The school is menstrual friendly in terms of the support girls get from teachers especially SHEP and Girl Child teachers. They support and assist the students with their menstrual need, when necessary, especially those who experience their first menstruation in school. There is sanitary pads and new panties available for girls to use in times of emergency ***[FGD Group 18, R2, Kumasi Metro, Urban]***

The school is friendly for menstruating girls. Though we do not have a changing room, we are allowed to use the teachers urinal as changing room when necessary. We also get support and assistance from our teachers with regards to menstruation issues, given pads and new panties when necessary to change ***[FGD Group 19, R2, Kumasi Metro, Urban]***

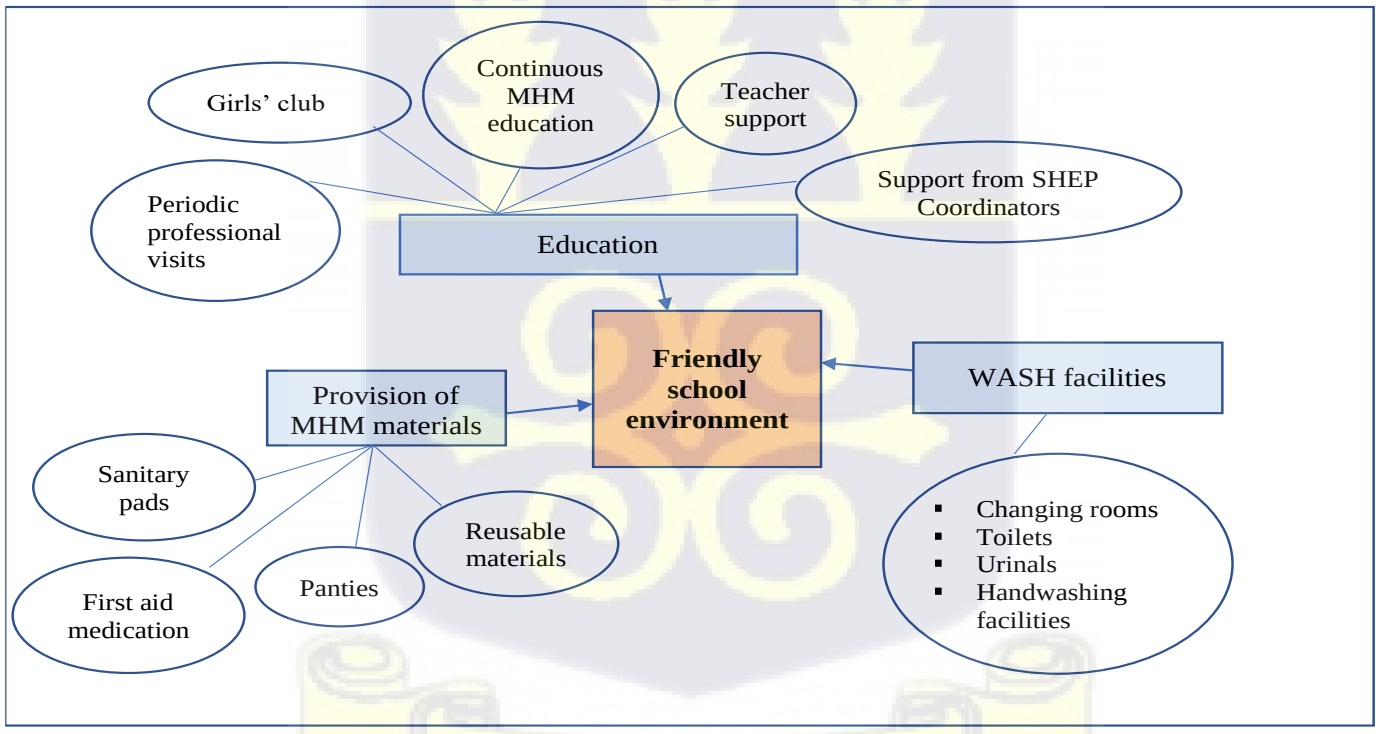


Figure 7.6: Thematic themes on the friendly school environment - perspectives of students
Source: Field work, FGD with girls, October, 2022

7.3.2 Menstruation-related school absenteeism/attendance

The findings relating to whether students missed school as a result of menstruation showed almost all the girls hardly missed school as a result of menstruation. A few of them did state that they are forced to go home whenever the pains became unbearable, especially on the first day of menstruation. The following voices validate this finding:

> *We hardly absent ourselves, we come to school but when the pain is unbearable, we go back home* ***[FGD Group 2, R1, Tamale Metro, Urban]***
>
> *Never absented myself because of my menses* ***[FGD Group 16, R3, Accra Metro, JHS, Urban]***
>
> *I don't absent myself from school during my period. I always come to school* ***[FGD Group 17, R1, Accra Metro, Prim., Urban]***
>
> *We come to school when we are menstruating because we do not want to miss lessons* ***[FGD Group 19, R1, Kumasi Metro, Prim., Urban]***

A few of the students, however, did state that they miss school as a result of menstruation and related occurrences. The factors accounting for this included severe abdominal pains, fear of staining uniforms, inability to buy menstrual materials, heavy flows, teasing from their male colleagues, and shyness.

> *I sometimes miss school due to abdominal pains. I also sometimes miss school because of the pain around my vagina because it makes it difficult to walk* ***[FGD Group 2, R3 and 9, Tamale Metro, Urban]***
>
> *Main reason is the pain associated with the menstruation. Shyness is also a factor due to teasing from others* ***[FGD Group 6, R1, Shai Osudoku, rural]***
>
> *Because if I get my uniform stained, the boys in my class will mock at me and am not always comfortable sitting in the classroom because my uniform can get stained* ***[FGD Group 12, R1, Tamale Metro, urban]***

We don't have a place to change our sanitary pad, and also the boys laugh at us when we stain our uniforms ***[FGD Group 29, R2, Accra Metro, JHS, urban]***

Because of the abdominal pains I can't concentrate when I come to class ***[FGD Group 12, R8, Tamale Metro, urban]***

7.3.3 Other drivers of school absenteeism – students' perspective

From the perspective of the students, different issues/circumstance contribute to missing school, other than menstruation. These are usually financial, work and family related. Other factors comprise distance to school, sicknesses, peer influence and social events (Figure 7.7). These reasons also cut across both primary and JHS levels. The following quotes also speak to this:

Some are learning jobs alongside schooling, so they go to the job site ***[FGD Group 7, R1, Shai Osudoku, JHS, urban]***

Caregiving and house chores. Some girls are nannies, so they stay home to do babysitting ***[FGD Group 7, R1, Shai Osudoku, JHS, urban]***

R1. I miss school when I'm not feeling well. R2. When there's a wedding or a naming ceremony in our house, I have to stay back home to help do the work. R3. During the farming season we go to farm to plant or harvest crops ***[FGD Group 8, Nanton, Prim., rural]***

When there's occasion like funeral or wedding in my house ***[FGD Group 12, R3, Tamale Metro, JHS, urban]***

Farming activities and during wedding or naming ceremonies. Also, when your mother is not around and you have to take care of your young siblings ***[FGD Group 14, R3, Nanton, JHS, rural]***

Sometimes we help our parents in the market, most of us take care of our younger siblings ***[FGD Group 26, R1, Accra Metro, Prim., urban]***

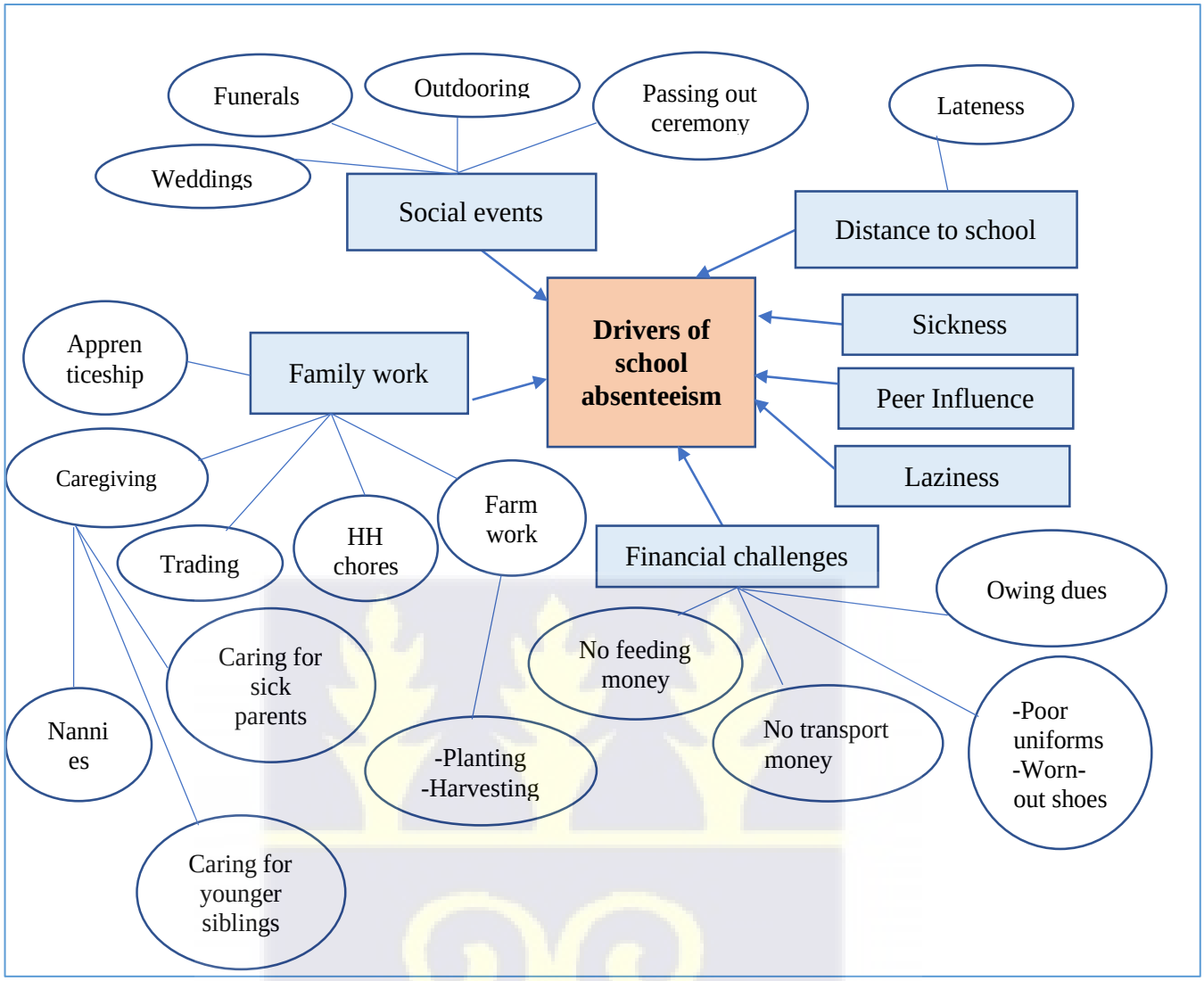


Figure 7.7: Thematic Network showing drivers of absenteeism – students' perspective
Source: Field work, FGD with girls, October, 2022

7.3.4 Learning experiences of girls during menstruation

In assessing the lived experiences of students, the study assessed what learning is typically like for girls during their menstruation cycle. Several lived experiences were shared – these comprised difficulty in concentration during lessons, discomfort, absent mindedness, irritation and pain (Figure 7.8). The following quotes speak to this result:

I bleed a lot and it makes it difficult to concentrate ***[FGD Group 3, R1, Tamale Metro, Prim., urban]***

I keep checking myself because I am scared to stain my uniform and I end up not understanding what is been taught ***[FGD Group 2, R9, Tamale Metro, Prim., urban]***

I don't feel like eating the whole day and my body becomes weak and I can't concentrate when the teacher is teaching ***[FGD Group 3, R3, Tamale Metro, Prim., urban]***

I will be quiet in class, and I will not be able to even answer questions when the teacher ask questions because my concentration will be on the menses ***[FGD Group 3, R4, Tamale Metro, Prim., urban]***

Because of the pain associated with menstruation, I sometimes don't pay attention to what the teacher is teaching ***FGD Group 8, R1, Nanton, Prim., rural]***

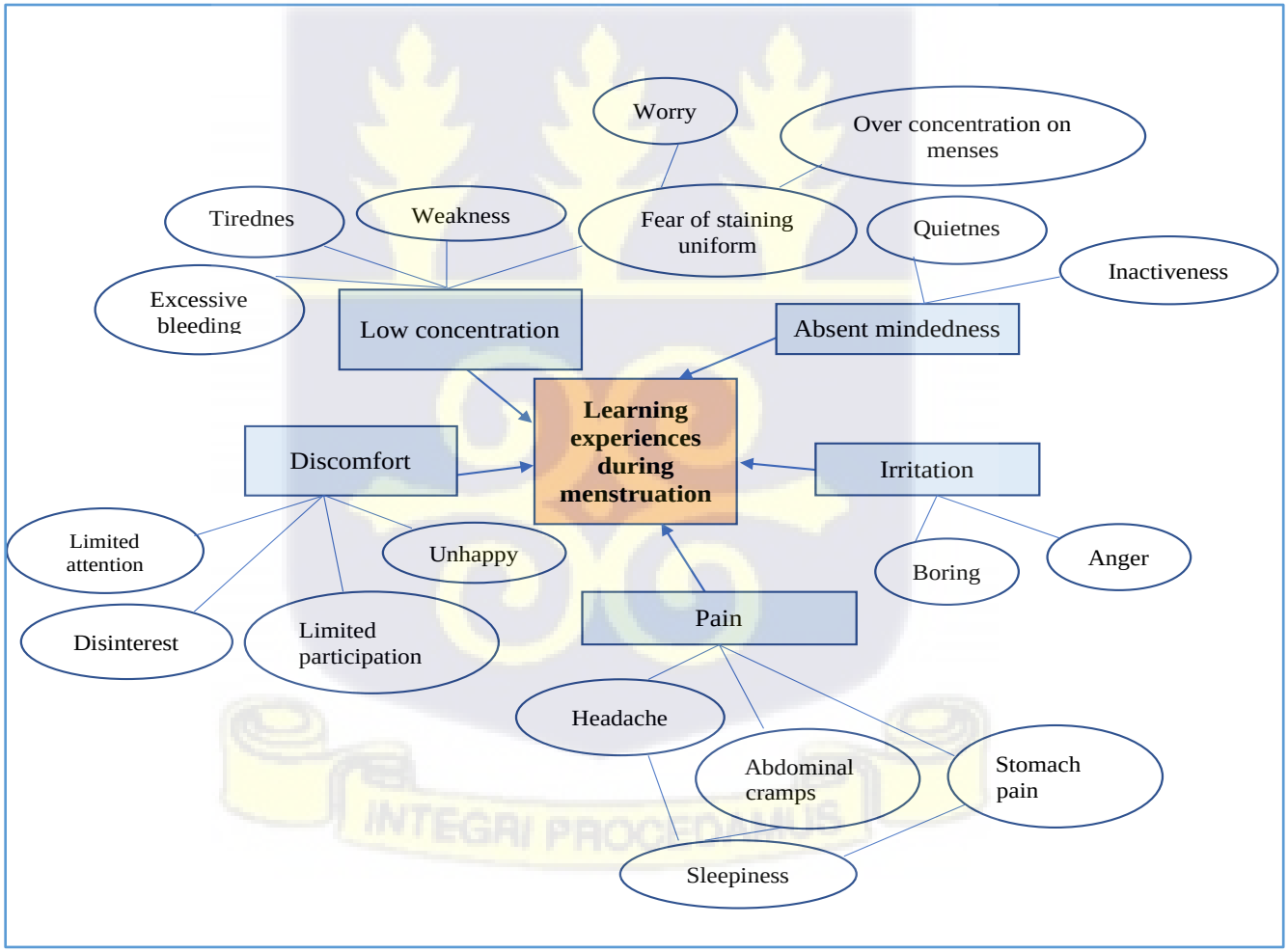


Figure 7.8: Thematic network showing learning experiences of girls during menstruation
Source: Field work, FGD with girls, October, 2022

7.3.5 Impact of school absenteeism on learning outcomes

The study also assessed the possible impact of school absenteeism on learning outcomes (school performance). The students agreed generally that missing school days as a result of menstruation and other factors does affect their learning outcomes. This is as a result of missing some key lessons – implying the inability to answer questions relating to the missed topics. Although some students are able to catch-up when they miss class sessions, most are unable to do so.

We are not able to respond to some questions in the exam because we missed school. Also, we miss marks for class test ***[FGD Group 9, R1, Shai Osudoku, Prim., rural]***

It affects the school performance because you might miss an important lesson and because you did not study for it, in the positioning of academic performance, your position will be lower ***[FGD Group 31, R1, Shai Osudoku, Prim., rural]***

Yes, it affected me because of the marks I lost from that particular subject because the teacher did not allow me to write when I came to school after the pains ***[FGD Group 32, R8, Tamale Metro, Prim., urban]***

Sometimes, some are able to catch-up, but some also find it difficult to catch up ***[FGD Group 38, R1, Accra Metro, Prim., urban]***

Sometimes because something was taught and one was not there it becomes difficult to understand it and questions come from that topic one may not be able to answer correctly ***[FGD Group 42, R8, Nanton, Prim., rural]***

No. we make sure we catch up with what we missed ***[FGD Group 26, R1, Accra Metro, Prim., urban]***

7.4 Chapter Summary

The chapter explores the lived experiences of students from the perspectives of both the students themselves and the SHEP coordinators/teachers. From the perspective of the SHEP coordinators, most schools are conducive and friendly for menstruating girls. This assessment was based on the provision of MHM materials, continuous MHM education, teacher support, and access to water,

sanitation, and hygiene (WASH) facilities. The coordinators highlighted the existence of challenges in most schools, including limited support from teachers, absence of changing rooms and MHM materials, lack of MHM education, and male teachers as SHEP coordinators due to a shortage of female teachers. The students, however, provided contrary views. The girls indicated that the schools are generally unfriendly for menstruating girls. This is attributable to the absence of functional WASH facilities, limited support from schools and SHEP coordinators, lack of MHM materials, and the presence of male SHEP coordinators. Regarding menstruation-related absenteeism, the analysis suggests that girls rarely miss school due to menstruation. If they do miss school, it is typically on the first day of their menstrual cycle when they experience severe pain. SHEP coordinators confirm this finding, stating that the few girls who miss school due to menstruation do so because of fear of staining uniforms, menstrual pain, and lack of MHM materials.

The chapter explored other factors contributing to school absenteeism apart from menstruation. These factors were the same from both the perspectives of students and the SHEP coordinators. The factors comprise - financial challenges, sickness, assisting parents in trading, distance to school, and lack of school materials. The learning experiences of girls during menstruation, as reported by both students and SHEP coordinators, include difficulties in concentration, tiredness, sleepiness, frustration due to pain, and excessive discomfort. However, continuous MHM education programmes have helped strengthen the resilience of many girls, enabling them to cope during class sessions. Overall, the findings highlight the importance of creating friendly school environments, addressing menstrual hygiene management challenges, and implementing strategies to reduce school absenteeism for improved learning outcomes among students.

CHAPTER EIGHT

DISCUSSION OF RESULTS

8.1 Introduction

This chapter presents the discussion of the study results. The discussion is done in line with the study research objectives and in relation to reviewed empirical and grey literature. The discussion is presented as per the following research objectives:

1. Assess how WASH facilities differ across basic schools in Ghana;
2. Ascertain the association between WASH facilities and the following:
    a. Menstrual hygiene management
    b. School attendance
    c. Learning outcomes
3. Explore how WASH, mediated by MHM, school attendance and other socio-economic and demographic characteristics, predict learning outcomes of students in Ghana;
4. Examine the lived experiences of students relating to WASH, MHM, school attendance and learning outcomes – perspectives of both students and SHEP Coordinators.

8.2 Differences in the availability of WASH facilities across basic schools in Ghana and other key study variables (MHM, school attendance and learning outcomes) (Objective 1)

8.2.1 Water, Sanitation and Hygiene facilities

The study establishes that generally, the WASH situation across basic schools in Ghana (primary, JHS) has slightly improved over the years; however, there is much more to be achieved in terms of coverage, especially in relation to hygiene facilities. The distribution in relation to water facilities/services at the school level shows that generally, most of the schools on average have

access to improved water services (drinking). This implies that there has been a sustained effort at improving access to drinking water in schools and the country may be on track to meeting the Sustainable Development Goals (SDG) goal 6.1, which focuses on ensuring the provision of safe and affordable drinking water (WHO/UNICEF Joint Monitoring Report, 2020; EMIS 2019/20). Despite the marked improvements, some schools are still resorting to unimproved sources of drinking water comprising streams and ponds. This could have far more reaching consequences on the health and wellbeing of students with implications for continuous absence from school resulting from sickness, which could also have a possible impact on the learning of students (Baxter et al., 2011; Casely-Hayford et al., 2021). A similar scenario is observed in relation to sanitation services where four out of every five schools have access to an improved toilet facility. This further stresses the ongoing progress in relation to sanitation facilities; and again, the country may well be in line to achieving the first part of SDG 6.2, which focuses on providing access to sanitation and hygiene facilities.

The case of hygiene facilities is much direr, with about five out of every 10 public schools having no handwashing facilities. The study expected to find significantly improved availability to hygiene facilities in schools as a result of the Covid-19 induced surge in hygiene and related education and the government's apparent supply of hygiene facilities ('veronica buckets') to all public schools. This was, however, not evident in the schools and further highlights the generally poor sanitation situation in basic schools across the world, and especially in the sub-region (Garn et al., 2017; Tiswin et al., 2019). Similar to findings from previous studies relating to hygiene facilities in schools (Dearden et al., 2017; Appiah-Brempong et al., 2018; Kojo Abanyie et al., 2021), poor handwashing habits resulting from the absence of hygiene facilities is also related to poor health outcomes of students (diarrhea disease), which has a direct association to reduced

contact hours in schools and its possible impact on school performance. The evidence across the study districts shows that WASH distribution is largely better across the Metros and the bigger towns. This may be accounted for by the generally better access to resources/facilities in more urban areas compared to rural areas (Acheampong et al., 2018; Kojo Abanyie et al., 2021). The situation by school level (primary/JHS) indicates slightly better access to WASH facilities at the primary school level compared to the JHS level. This observed difference may be explained by the large focus of WASH interventions at the primary level than at higher levels (Ahmed et al., 2022). The locality (urban/rural) dynamics puts schools in urban areas slightly ahead in terms of access to water coverage compared to schools in rural areas. However, an interesting trend emerges where there are slightly better sanitation and hygiene facilities across schools in rural areas. This scenario may again be explained by the recent focus of most sanitation and hygiene interventions in rural schools, which hitherto were extremely poor in terms of access to WASH facilities (Gyabaah et al., 2009). The reports by the WHO/UNICEF Joint Monitoring Programme (2018, 2020) confirm these marked and consistent improvements in WASH facilities in schools in very remote areas.

In summary, the findings of this study is largely in tandem with the data from the Ghana Education Management Information System (EMIS, 2019/20), which states that three out of four schools have access to improved drinking water and sanitation services. The results confirm that Ghana's WASH in school coverage is higher than the sub-Saharan Africa (SSA) average of 50% (Susmita et al., 2018; Edmonds et al., 2020; WHO/UNICEF JMP, 2020). This implies that the country may be on track to achieving the 2030 SDGs minimum targets of 80% and probably the maximum target of 100% coverage in WASH in schools (Ghana WASH Sector Development Programme (GWASHSDP) - 2021-2030).

8.2.2 Menstrual Hygiene Management (MHM)

8.2.2.1 Average age at menarche

Previous studies estimate the average age at menarche to be about 13-years (Morgan et al., 2017; Alam et al., 2017; Guya, 2014). The mean age of 12.6 years at menarche for girls in the study sample is therefore consistent with the evidence in literature. The school level dynamics show very minimal differences in mean age at menarche with slight increases in age at menarche across higher class levels.

8.2.2.2 Usage of MHM materials

The evidence relating to the usage of MHM materials by girls points generally to almost a universal usage of improved absorbent materials (disposable sanitary pads and reusable clean dry cloth and disposable clean dry cloth) to absorb blood during menstruation. This result may be attributable to the sustained MHM campaign by civil society and Development Partners in promoting the distribution of sanitary pads at the school level. Some institutions, including UNICEF through their WinS4Girls project, have had sustained programming in providing MHM materials across the country – including the provision of re-usable MHM materials (WinS4Girls Progress Report for Ghana, 2017). Other institutions including WaterAid as well as several Non-Governmental Organisations (NGOs) have likewise been periodically supplying MHM materials to schools and providing education on MHM practices, especially on 'World Menstrual Hygiene Day' every year on 28th May (Montgomery et al., 2012; Kaur et al., 2018).

Although the results point to almost a universal coverage in the usage of improved MHM materials, there are slightly observed differences in usage across schools in rural and urban areas with a slightly higher number of students in rural areas using disposable sanitary pads than those in schools in urban areas. This, again, could be attributable to the focus of menstrual hygiene

interventions in more rural areas/schools than in urban areas. A key deviation in the finding from what is generally known (Montgomery et al., 2012) is having more girls in schools in urban areas using reusable clean dry cloth, which was an intervention targeted at rural schools, rather than those in urban schools. Re-usable MHM materials were originally for use in rural communities where continuous access to MHM materials was always difficult – making the reusable material the more reliable option.

8.2.2.3 Adequacy of MHM Practices

The study highlights the persistent challenge relating to girls adequately managing their menstrual hygiene, especially at the school level. Having three out of every 10 girls inadequately managing their menstrual flow in a hygienic manner poses great risk at all levels – health, school attendance and learning (Caruso et al., 2013; Chinyama et al., 2019). The key challenge is having more girls at the higher levels of basic education (JHS) inadequately managing their menstruation in a hygienic manner compared to those at the primary level. The study expected to have the reverse scenario, and this may be attributed to the focus of most MHM education and support interventions at the primary level with the view of providing more education to girls at the beginning or early stages of menarche (Kaur et al., 2018; Crofts & Fisher, 2012; WinS4Girls Progress Report for Ghana, 2017). The locality dynamics again shows higher proportions of students in schools in rural areas adequately managing their menstruation in a more hygienic manner compared to girls in schools in urban areas. These dynamics in the adequacy of MHM practices in favour of students in schools in rural areas and lower levels (primary) could be attributable to programmes such as the Girls-Participatory Approaches for Student Success (G-PASS), a collaboration between the United Kingdom's Foreign, Commonwealth and Development Office (FCDO) and the Ghana

Education Service (GES) helping to ameliorate some of the challenges some girls face in accessing sanitary materials.

8.2.3 School Attendance

Several studies have highlighted the possible impact of the availability of WASH and menstruation on school attendance (Acheampong et al., 2018; Caruso et al., 2013; Kaur et al., 2018; Alam et al., 2017). On average, girls could miss school 3% (9 times), 7% (18 times) and 10% (27 times) of the entire academic year for girls who absented themselves once, twice or three times per week, respectively (Acheapong et al., 2018). A similar study conducted by Alam et al. (2017) showed that girls missed an average of 2.8 days each menstrual cycle, constituting approximately 16% of the academic year and this is directly the result of poor/absence of WASH and MHM facilities in schools. The study findings confirm these empirical results – showing that on average, about two out of 10 girls miss at least one day of schooling as a result of menstruation and related issues. This could culminate in missing at least three school days in a school term and nine days in an academic year. Again, the study indicates that about a third of students have irregular school attendance (having below 80% of school attendance in an academic term). The locality (urban/rural) and school level (primary/JHS) analysis pointing to higher attendance levels at the higher level (JHS) and among students in urban schools compared to those in schools in rural areas was an expected result and confirms the evidence in the empirical literature (Trinies et al., 2016; Chard et al., 2019).

8.2.4 Learning outcomes

The synthesis of evidence relating to learning outcomes of girls provides key insights into the general performance of students in basic schools in Ghana. One of the key conclusions drawn from

the study is that learning outcomes are relatively low in schools. The finding that about a third of students have poor learning outcomes, scoring below 50% in aggregate examination scores, is concerning. It suggests that a significant portion of the student population is not achieving satisfactory results in their studies. The most striking observation is that nearly half of the students record poor scores in Mathematics. This finding aligns with a generally held view that girls tend to be more fearful of Mathematics, leading to lower performance in the subject and further highlights notable gender disparity in performance in the subject.

The wide dispersion of scores from the mean indicates that there is a considerable variation in individual performance. This variation could be attributed to various factors, such as differences in teaching methodologies, abilities, and individual study habits (Jasper et al., 2012; Casely-Hayford, 2016). Although the examination scores were generally low, this study's mean score of 55.51, when compared to the average mean score of 50.5 in the BECE examination results, shows that the students in this study performed slightly better than the broader examination average. This may suggest that the schools involved in this study have on average, higher-performing students compared to the general population. The comparison of learning outcomes between primary and JHS levels indicates that, generally, the performance levels are quite similar. While the examination scores may not be entirely comparable due to variations in test standards across schools, this provides some evidence of the general performance trends across schools in Ghana.

8.3 Association between WASH and MHM, school attendance, learning outcomes and socio-demographic characteristics (Objective 2)

8.3.1 WASH facilities, socio-demographic characteristics and MHM

The study indicates that different factors influence girls' ability to manage menstruation effectively in the context of the school system. Firstly, the availability of water and hygiene facilities play a

crucial role in MHM practices, however, the presence of sanitation services alone may not be enough to impact the adequacy of MHM. This emphasises the critical role of access to water and hygiene facilities in enabling girls to practice adequate MHM (Sommer, 2012; Guya, 2014; Acheampong et al., 2018; Chinyama et al., 2019). The ecological systems model, which underpins the MHM dimension of this study, suggests that at the exosystem level social systems (including educational systems) shape the menstrual practices of girls. This is reflected in the role water and hygiene facilities play in shaping menstrual hygiene practices. Acheampong et al. (2018), in a study conducted in the Ashanti Region of Ghana, found that girls in schools with better WASH facilities are able to better manage their menstruation process in a more hygienic manner compared to those in schools with limited or no facilities. The study findings are therefore in line with existing studies that have demonstrated a direct association between WASH facilities, especially water availability, and better MHM outcomes among schoolgirls (Assefa & Kumie, 2014; Guya, 2014).

Socio-economic factors have been established as key drivers to achieving effective menstrual hygiene management among adolescent girls (Assefa & Kumie, 2014). The association between socio-demographic variables and MHM presents important trends. Age, religion, and distance to school do not show significant associations with the adequacy of MHM. However, school level, ethnicity, fathers' and mothers' occupation, wealth status, district, locality of residence, and access to a toilet facility at home all show significant associations with the adequate management of menstruation in schools. The ecological systems model (at the individual, meso and exo system levels) highlights the importance of individual and family factors to the achievement of adequate management of menstruation. The study findings re-emphasise this point, stressing how relevant parental and household factors are in influencing girls' MHM practices. For example, the wealth

status and occupation of parents is a key determinant of the purchasing power of girls – determining their ability to consistently purchase and use improved menstrual hygiene materials. The availability of WASH facilities at home could also determine whether girls are familiar with even the use of WASH facilities and whether access to it at the school level could even make a difference.

The findings underscore the need for holistic approaches that consider not only school-level interventions but also involve parents and households to create a conducive environment for MHM. The findings emphasise the crucial role of water and hygiene facilities in promoting adequate MHM practices and underscore the significance of parental and household factors in influencing MHM outcomes. These findings could inspire further scientific research exploring additional socio-demographic variables in the academic community and how these impact MHM. It could also inform policymakers and educators when designing targeted interventions to improve MHM practices and creating a supportive environment for girls in schools.

8.3.2 WASH facilities, Socio-demographic characteristics and school attendance

The evidence from the study suggests that while access to water facilities is important for MHM, it may not directly impact school attendance. The findings highlight the multi-faceted nature of determinants of school attendance and the need for comprehensive approaches that consider various factors in promoting regular school attendance among students as espoused by the chronic absenteeism model.

The results indicate that access to water in schools does not seem to have a direct impact on school attendance. While it is associated with better MHM outcomes, there are other key drivers of regular school attendance, such as family work, financial challenges, social events, and peer influence.

This suggests that the availability of water alone may not be enough to influence school attendance positively. However, access to hygiene facilities in schools demonstrates a strong association with school attendance. This finding is in line with previous studies that have shown that handwashing promotion and water treatment interventions reduce student absenteeism significantly. Some studies have shown that handwashing promotion and point-of-use water treatment interventions have been found to reduce student absence by 21% to 61%. For example, Freeman et al. (2012) shows a 58% reduction in the probabilities of absence for girls. Another study in Kenya by Patel et al. (2012) showed that a school-based water and hygiene intervention resulted in a 35% reduction in student absenteeism.

Interestingly, MHM does not show a significant association with school attendance. While girls with adequate MHM practices have a slightly higher proportion of regular school attendance, the overall difference is not substantial. This finding is consistent with a section of the empirical evidence that indicates that MHM has no association with school attendance. According to a study conducted by Oster and Thornton (2009) in Nepal, there is no indication that menstruation technology has any impact on school attendance or test scores. The qualitative data also supports this, as girls rarely missed school due to menstruation, indicating a level of awareness and education on managing menstruation without hindering their attendance.

In terms of socio-demographic characteristics, age, and school level show significant associations with school attendance. Younger students and those at the JHS level have higher proportions of regular school attendance. Additionally, factors like religion, ethnicity, parents' education, wealth status, region, district, locality, and distance to school also demonstrate significant associations with school attendance. These findings corroborate other studies that have found connections

between absenteeism and socio-demographic factors, parental occupation, education levels, and economic status. A study by Davis et. al., (2018) discovered that absenteeism was strongly connected with the type of location, the class level, menstrual difficulties, parental occupation and education and a lack of awareness – corroborating the findings of this study. This finding is also corroborated by a study conducted Akyeampong and Rolleston (2013) – that revealed that parental factors comprising education level, occupation and economic status contribute to determining child outputs – including school attendance.

8.3.3 WASH, socio-demographic characteristics and learning outcomes

The study findings underscore the significance of WASH facilities in influencing learning outcomes – showing consistency with the 'WASH and child growth model' which indicates that child outcomes including learning outcomes are determined by the interactions between WASH as well as socio-demographic variables. Having access to water, sanitation, and hygiene facilities in schools is linked to improved learning outcomes, highlighting the importance of enhancing WASH infrastructure in educational institutions. Following from what exists in the empirical literature, school attendance emerges as a strong determinant of learning outcomes. Students with regular school attendance tend to have better learning outcomes than those with irregular attendance. This aligns with previous research that emphasises the importance of regular school attendance for academic success (Casely-Hayford, 2017; UNICEF WinS4Girls progress report, 2017). This finding also confirms a study by Divyanshi Wadhwa in 2016 in Indian that posits that having at least one usable toilet and a drinking water source in schools is positively associated with test scores.

While the association between MHM and learning outcomes is not statistically significant, there is a trend suggesting that students with adequate MHM may have slightly better learning outcomes.

This could be attributed to the comfort and confidence that comes with proper MHM, leading to increased class participation and concentration, which can positively impact learning outcomes.

Socio-demographic variables, such as age, religion, ethnicity, parental occupation, education of parents, wealth status, district, and location of residence, are also found to be strongly associated with learning outcomes. Students with parents in skilled manual or professional occupations tend to have better learning outcomes. Higher levels of parental education are also correlated with better learning outcomes for students. Urban students exhibit a higher proportion of very good learning outcomes compared to rural students. These findings support previous studies that have identified parental factors, education level, occupation, and economic status as key determinants of child outputs, including learning outcomes (Akyeampong and Rolleston, 2013).

8.4 Predictors of learning outcome (Objective 3)

8.4.1 WASH, MHM and school attendance as predictors of learning outcomes

The evidence from the study confirms the significance of WASH facilities and school attendance as predictors of learning outcomes. Access to basic water facilities and regular school attendance impact academic performance, while poor sanitation facilities may have a negative impact. This finding confirms the empirical evidence which establishes that access to WASH and school attendance are key predictors of learning outcomes (Divyanshi, 2016; Sommer et al., 2012; Alam et al., 2017).

This finding aligns with existing empirical evidence that establishes the importance of WASH facilities and school attendance as key predictors of learning outcomes. In addition to the physical health benefits, maintaining proper hygiene practices also has a positive impact on academic performance. A study conducted by UNESCO (2017) found that students who have access to

adequate water, sanitation, and hygiene (WASH) facilities are more likely to have improved attendance and learning outcomes. This is primarily due to the fact that good hygiene practices reduce the risk of infectious diseases, thus minimising school absenteeism. Furthermore, the provision of clean water and proper sanitation facilities create a conducive learning environment for students, allowing them to focus on their studies rather than on discomfort or health concerns. Therefore, implementing effective WASH programmes in schools is essential not only for promoting good health but also for enhancing academic performance. By recognising the link between hygiene practices and academic outcomes, educational institutions can prioritise the development and maintenance of WASH facilities, ensuring the overall well-being and success of students. A study by Dreibelbis et al. (2013) also found a positive correlation between improved hygiene practices and improved academic performance.

On the other hand, it's noteworthy that the link between how students manage their menstruation, and their academic performance is not very clear. While it seems that students who handle their periods well might do a little better in school, overall, the connection between period management and how well students do in their studies is not conclusive, corroborating previous studies that have shown no significant impact of MHM on school attendance or test scores (Willmott et al., 2016; Birdthistle et al., 2011). The empirical evidence on the relationship between MHM and learning outcomes shows no such relationship exists. For example, a study by Oster and Thornton (2009) in Nepal on menstruation technology and school attendance and academic performance showed no evidence that menstruation management affects school attendance or test scores. The evidence establishes a strong positive association between regular school attendance and better overall academic performance. This underscores the importance of consistent school attendance in promoting better learning outcomes.

8.4.2 Predictors of learning outcomes (all variables)

When socio-demographic variables are controlled for, the evidence still points to WASH facilities, particularly access to basic water facilities, and regular school attendance as significant predictors of learning outcomes among students. The findings also underscore the significance of parental education and district of residence in influencing learning outcomes.

Access to basic water facilities in schools is positively associated with learning outcomes. Students in schools with basic water facilities are more likely to achieve better learning outcomes compared to those in schools with no water facility. This finding aligns with a previous study that also demonstrated a positive association between having usable toilet and water facilities in schools and improved test scores. In a study conducted by Jenkins, Scott, and Cairncross (2015), the relationship between Water, Sanitation, and Hygiene (WASH) and learning outcomes was explored. According to their findings, inadequate access to clean water, proper sanitation facilities, and hygiene education significantly hinder students' overall academic performance. Moreover, evidence suggested that poor WASH conditions in schools were associated with increased rates of illness, such as diarrhea and intestinal worms, further contributing to absenteeism among students and subsequently resulting in poor learning outcomes. Conversely, schools that implemented comprehensive WASH interventions, including the provision of safe drinking water, improved sanitation facilities, and hygiene promotion, reported higher rates of school attendance and academic achievement. These results underscore the importance of adequate WASH infrastructure in educational settings to enhance student well-being and educational outcomes.

The study further confirms the well-established understanding that regular school attendance is strongly linked to improved learning outcomes. Students with regular attendance are more likely

to achieve better learning outcomes compared to those with irregular attendance. This finding reinforces the widely recognised connection between school attendance and academic performance (Casely-Hayford, 2017; UNICEF WinS4Girls progress report, 2017). Additionally, socio-demographic variables, such as fathers' education level and district of residence, also show associations with learning outcomes. Students whose fathers had primary education were less likely to have better learning outcomes compared to those who did not know the educational level of their parents. This is rooted in the evidence that there is an inverse relationship between the educational attainment of parents and that of their children (Akyeampong and Rolleston, 2013).

In summary, the evidence underscores the importance of water facilities and regular school attendance in positively influencing learning outcomes among students. The study highlights the significance of access to water in schools and the well-established connection between school attendance and academic performance. Moreover, the findings suggest that fathers' education level and district of residence can also have some impact on learning outcomes. However, the study does not find statistically significant associations between learning outcomes and other socio-demographic variables.

CHAPTER NINE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

9.1 Introduction

Access to safe drinking water, sanitation, and hygiene (WASH), at all levels, especially at the school level is deemed a right for all (WHO & UNICEF, 2018; Acheampong et al., 2018; McMichael, 2019). Again, the provision of WASH facilities and services in schools is seen as a key determinant to improving educational achievement, improving reproductive health, and promoting gender equity (WHO, 2020; Kojo Abanyie et al. 2021). Notwithstanding the benefits of WASH facilities, the stock in schools across the world depicts a rather disturbing trend (WHO/UNICEF Joint Monitoring Programme, 2020).

The key argument of this study is how the availability or non-availability of WASH facilities impact on key school-level variables including menstrual hygiene management for girls, school attendance and its implications for learning outcomes (academic performance). While there is a growing pool of evidence on the impact of 'WASH facilities' on educational outcomes, limited attention has been focused on studying the interlinkages (Ahmed et al. 2022; Hemson, 2007). Specifically, the role of WASH facilities in mediating the effect of MHM on school attendance and learning outcomes is not fully established, and studies at lower levels of education (primary and Junior High School) are scarce. The implications of WASH availability on schooling output (learning outcome) and the comparison of experiences between upper primary and JHS students are also understudied.

In filling this gap, the study answered questions relating to the direct effects of WASH availability or non-availability on learning outcomes (academic performance) of school girls. The study

specifically provides evidence on how WASH facilities differ across basic schools in Ghana, the association between WASH facilities in schools and MHM, school attendance and learning outcomes. Again, the study contributes to the literature by providing evidence on the predictors of learning outcomes and the lived experiences of girls – from both the perspectives of the girls and the SHEP coordinators. Theoretically, the study contributes to the empirical literature by providing systematic interlinkages between WASH, MHM, school attendance and learning outcomes – at the overall aggregate and at the subject specific level.

In this study, a triangulation mixed method approach was adopted – using both quantitative and qualitative methods to answering the research questions. The quantitative aspect of the study focused on the distribution of WASH facilities in schools, some aspect of MHM, school attendance and on academic examination scores (learning outcomes) through structured questionnaires and templates. The qualitative method was, on the other hand, used to explore the lived experiences of school girls through Focus Group Discussions (FGDs) using a semi-structured guide. The lived experiences of the students was also measured from the perspectives of the School Health Education Programme (SHEP) coordinators across the various schools. The study used a survey approach in gathering primary data at the school and student levels.

9.2 Summary of empirical findings

9.2.1 Differences in the availability of WASH facilities across basic schools in Ghana

The study showed that there has been a slight improvement in the water, sanitation, and hygiene (WASH) conditions in schools over the years. However, there is still a lot of progress needed, particularly regarding hygiene facilities. Importantly, the study highlights the limited availability of hygiene facilities in schools as a key challenge requiring attention. Despite the increased

emphasis on hygiene and the efforts made by government in supplying hygiene facilities to all public schools during the Covid-19 pandemic, this is not evident in schools. The study also establishes that distribution of WASH facilities vary by school level and locality (urban/rural) as established by the WASH and child growth model. Primary schools generally have more improved WASH facilities compared to Junior High Schools. Similarly, schools in rural areas have slightly better sanitation and hygiene facilities compared to schools in rural areas. The differences could be attributed to the conscious effort at improving WASH interventions at the primary level and rural areas by both government and development partners.

9.2.2 WASH facilities and MHM

The mean age at menarche for girls in the study sample (12.63) shows consistency with the evidence in literature (Ghana Education Service, 2014; Morgan et al., 2017). The study also establishes widespread adoption of improved absorbent materials, including disposable sanitary pads and reusable clean dry cloth by girls at all levels. This high usage rate can be attributed to the ongoing MHM campaigns led by civil society and Development Partners. While the results indicate almost universal usage of improved menstrual hygiene management (MHM) materials, there are slight differences observed between rural and urban areas. In rural schools, a slightly higher number of students use ‘disposable sanitary pads’ compared to urban schools. This could be attributed to the emphasis of MHM interventions in rural areas, leading to greater availability and adoption of disposable pads.

Contrary to what is generally known (Montgomery et al. 2012), it is noteworthy that many girls in urban schools are using ‘reusable clean dry cloth’, which was initially targeted at girls in rural areas. The use of reusable MHM materials was designed for communities where continuous access to MHM materials was challenging, making reusable options more reliable.

In terms of association, the study establishes a strong significant association between the availability of water and sanitation facilities and menstrual hygiene management in schools. This suggests that while water and hygiene facilities play a crucial role in MHM practices, the presence of sanitation services alone may not be enough to impact the adequacy of MHM. The ecological systems model suggests that social and structural factors including age, ethnicity, locality, and economic status combine to shape practices of people over time. In this study, however, age, religion, and distance to school do not show significant associations with managing menstrual hygiene in a hygienic manner. Nonetheless, factors such as school level, ethnicity, fathers' and mothers' occupation, wealth status, district, locality of residence, and access to a toilet facility at home all demonstrate significant associations with MHM adequacy.

9.2.3 WASH facilities and school attendance

The study suggest that although access to water facilities is important for menstrual hygiene management, it may not directly influence school attendance. The results emphasise the complexity of factors that determine school attendance and the need for comprehensive approaches that consider various aspects to promote regular school attendance among students. While access to water in schools is associated with better MHM outcomes, it does not seem to have a direct impact on school attendance. Other significant drivers of regular school attendance include family work, financial challenges, social events, and peer influence. This implies that merely providing water alone may not be sufficient to positively influence school attendance. Further, the availability of hygiene facilities in schools is strongly associated with school attendance and is consistent with previous studies that have shown the positive effects of handwashing promotion and water treatment interventions on reducing student absenteeism (Freeman et al., 2012; Acheampong et al., 2018).

MHM does not show a significant association with school attendance. Although girls with adequate MHM practices tend to have slightly higher rates of regular school attendance, the overall difference is not substantial. This aligns with a section of the empirical evidence indicating that MHM may not directly impact school attendance (Oster & Thornton, 2009). The chronic absenteeism model highlights social and environmental factors as key drivers of school attendance. The study relates to these causal factors, showing that socio-demographic characteristics comprising age, school level, religion, ethnicity, parents' education, wealth status, region, district, locality, and distance to school show significant associations with school attendance (Davis et al., 2018; Akyeampong & Rolleston, 2013).

9.2.4 WASH facilities and learning outcomes

The study findings underscore the significance of WASH facilities and socio-demographic factors in influencing learning outcomes – showing consistency with the WASH and child growth model, which indicates that child outcomes (including learning outcomes) are determined by the interactions between WASH as well as socio-demographic variables. Having access to water, sanitation, and hygiene facilities in schools is linked to improved learning outcomes, highlighting the importance of enhancing WASH infrastructure in educational institutions. Following from what exists in the empirical literature, school attendance emerges as a strong determinant of learning outcomes. Students with regular school attendance tend to have better learning outcomes than those with irregular attendance. This aligns with previous research that emphasises the importance of regular school attendance for academic success (Casely-Hayford, 2017; UNICEF WinS4Girls progress report, 2017). While the association between MHM and learning outcomes is not statistically significant, the evidence suggests students who manage their menstruation in a hygienic manner may have slightly better learning outcomes. This could be attributed to the

comfort and confidence that comes with proper MHM, leading to increased class participation and concentration, which can positively impact learning outcomes.

Similar to the propositions in the WASH and child growth model, the study reveals significant associations between learning outcomes and socio-demographic variables. These factors comprise age, religion, ethnicity, parental occupation, parental education, wealth status, district, and location of residence (Lenhoff & Pogodzinski, 2018; Akyeampong & Rolleston, 2013).

9.3 Overall Predictors of Learning Outcomes

The evidence points to WASH facilities, particularly the availability water facilities, and school attendance as significant predictors of learning outcomes among students. The findings also underscore the significance of parental education and district of residence in influencing learning outcomes. The study further confirms the well-established understanding that regular school attendance is strongly linked to improved learning outcomes. Students with regular attendance are more likely to achieve better learning outcomes compared to those with irregular attendance. This finding reinforces the widely recognised connection between school attendance and academic performance (Casely-Hayford, 2017; UNICEF WinS4Girls progress report, 2017). On the other hand, socio-demographic variables, such as fathers' education level and district of residence, predict better learning outcomes.

On the contrary, other socio-demographic variables, including age, religion, ethnicity, parents' occupation, wealth status, region, and locality, do not show statistically significant associations with learning outcomes. This finding deviates from previous studies, which emphasise the influential role of parental factors such as education level, occupation, and economic status in determining child outcomes, including learning outcomes (Lenhoff & Pogodzinski, 2018; Dearden

et al., 2017). In summary, the evidence emphasises the crucial role of water facilities and consistent school attendance in positively impacting learning outcomes among students. The study underscores the importance of water access in schools and reinforces the well-established link between school attendance and academic performance.

9.4 Lived Experiences of Girls

Girls' experiences regarding the friendliness of the school environment for menstruation management point to a typically unfriendly setting. The lack of operational WASH facilities, the insufficient support provided by schools and SHEP coordinators, the scarcity of MHM resources, and the predominance of male SHEP coordinators are all blamed for this. While the majority of girls rarely missed school because of their periods, several noted missing class because of excruciating stomach pains, a concern that their uniforms would get stained, a lack of access to menstrual products, heavy periods, mocking from male classmates, or shyness.

The finding highlights that school absenteeism among students is influenced by various factors beyond menstruation. Financial constraints, family and work responsibilities, distance to school, sickness, peer influence, and social events are identified as some of the drivers of absenteeism. During menstruation, girls shared experiences of facing difficulties in concentration, discomfort, absent-mindedness, irritation, and pain, which can impact their learning experiences negatively. The students unanimously agreed that both menstruation-related and non-menstruation-related absences have adverse effects on their learning outcomes. Missing important lessons and being unable to catch up with the curriculum were cited as contributing factors to the negative impact on academic performance. This highlights the importance of addressing not only menstrual challenges

but also other factors affecting school attendance to improve overall learning outcomes for students.

9.5 Policy Implication of Findings

Ghana currently has quite a number of policies, strategic plans and programmes related to addressing WASH and related issues in school. These comprise the School Health and Education (SHEP) Policy with a national implementation model; the Sanitation and Water policies; as well as specific WASH and related programmes including the Ghana WASH Sector Development Programme (GWASHSDP) 2021-2030 being rolled out by the Ministry of Sanitation and Water Resources. These policies and strategic documents provide targets, guidelines and implementation modalities for achieving WASH in schools. The GWASHSDP, for example, has a whole chapter on WASH in institutions including schools with specific targets to be achieved by 2030. However, these documents, especially, the implementation strategies do not make reference to financing modalities/supply of WASH and MHM materials at the school level. This leaves a huge gap in implementation and in the agenda targeted at achieving higher learning outcomes and higher educational attainment for the girl child. The study highlights the key role played by the SHEP coordinators in shaping MHM in schools. However, their work becomes much more difficult in the absence/adequate supply of MHM materials, improved WASH facilities and resources to sustain MHM education.

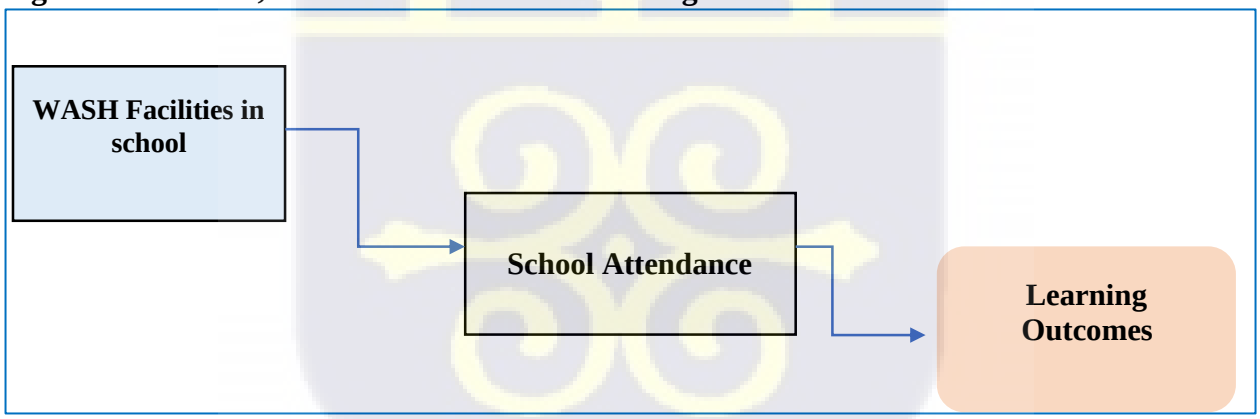
Secondly, the SHEP Policy and Implementation Plan is almost a decade old and quite a lot has changed since its inception. One key change is the role of the SHEP Coordinators. These teachers were originally set to manage school health in general but their specific role to WASH and MHM is not specifically highlighted. Revision to the implementation manual may be the best option to

strengthen the role of the SHEP Coordinators in the schools and by so doing improve regularity of school attendance for girls, and subsequently their learning outcomes.

9.6 Contribution of the thesis to knowledge

The study has been able to fill a major gap in adding the learning outcome component to the WASH, MHM and school attendance discussions – which prior to this study was very limited and in some cases (primary and JHS), non-existent. The study has also been able to establish the interlinkages between WASH facilities and school attendance as key predictors of learning outcomes. The linkage has always not been clear and has been limited largely to WASH and school attendance and WASH to MHM – without measuring the impact on school performance (learning outcomes). This study has therefore developed a WASH, school attendance and learning outcome model to depict the nature of relationship among these key variables (Figure 9.1).

Figure 9.1: WASH, school attendance and learning outcome model



Source: Author's construct (2023)

Secondly, establishing the interconnectedness of the availability of WASH facilities on all three key variables (menstrual hygiene management, school attendance and learning outcomes) in a single study is an important contribution to the scientific academic community.

9.7 Conclusions

The study, based on the empirical findings, provides an overall conclusion and specific conclusions based on the different variables of focus:

Overall conclusion: the study underscores the critical impact of adequate WASH, alongside regular school attendance, on students' learning outcomes. The results emphasise the fundamental significance of these factors in influencing educational experiences and levels of accomplishment among students in schools in Ghana.

9.7.1 Differences in WASH facilities

The study establishes that generally, the water, sanitation and hygiene situation across schools in Ghana has slightly improved over the years; however, there is much more to be achieved, especially in relation to hygiene facilities. In relation to the availability of water for drinking, the study concludes that on average, out of every 10 public schools, one of them has no access to improved drinking water sources (12.5%); and about a fifth of schools (20.8%) do not have sanitation (toilet) facilities or are using an improved source. This implies that in every 10 public schools in Ghana, two of them either has no toilet facilities or are using unimproved sources. The case of hygiene facilities is much more dire, with a little below 50% (43.7%) having no hygiene (handwashing) facilities (five out of every 10 public schools). It was expected that hygiene facilities would have improved significantly across schools as a result of the Covid-19 induced surge in hygiene and related education and the government's supply of hygiene facilities to all public schools. This was, however, not evident in the schools. The results further conclude that access to WASH facilities is slightly better at the primary school level compared to the JHS level. For instance, slightly higher primary schools (52.4%) have access to 'basic' water facilities

compared to the JHS level (47.6%). Further, four (66.7%) Junior High Schools had no access to water compared to only two primary schools (33.3%).

9.7.2 Menstrual Hygiene Management (MHM)

The study concludes that the adequacy of MHM practices is still low with close to a third of students (28.7%), with three out of every 10 girls practising inadequate menstrual hygiene management. The inadequacy of MHM practices is higher at the JHS level (31.3%) compared to the primary level (25.5%). This could be attributed to the focus of most interventions are at the primary level. In terms of association, the availability of water and hygiene facilities in schools, school level, ethnicity, parents' occupation, wealth status, district, locality, and access to toilet facility at home are significantly associated with the adequacy of MHM.

9.7.3 School attendance

The findings show that on average, close to two out of 10 girls (16.9%) miss at least one day of schooling as a result of menstruation and related issues. Again, the study concludes that about a third of students (33.5%) have irregular school attendance (having below 80% of school attendance in an academic term). Regularity in school attendance is higher at the JHS level (72.6%) compared to the primary level (59.9%). There is also higher attendance levels among girls in urban schools (67.9%) compared to those in rural schools (64.0%). In relation to association, access to water facilities in schools does not show a significant association to school attendance. However, access to sanitation (toilet) facilities and hygiene facilities, age, school level, religion, ethnicity, parents' occupation, education of parents, wealth status, region, district, locality, and distance to school are all associated with regularity of school attendance.

9.7.4 Learning outcomes

The study concludes that learning outcomes are relatively low in schools with about a third of students (29.2%) having poor learning outcomes (below 50% in aggregate examination scores). The key highlight is having close to half of the students (42.8%) recording poor scores in Mathematics. The school level analysis shows that generally, the learning outcomes are cumulatively almost the same across both primary and JHS levels. Over two-thirds of the students at the JHS level (71.0%) and at the primary level (70.6%) either scored good/average or very good. In terms of learning outcomes, all WASH variables (water, sanitation, and hygiene facilities) demonstrate a statistically significant association with overall learning outcomes; and school attendance shows a strong association with learning outcomes, with regular attendance leading to better outcomes.

Overall, the availability of water, sanitation, and hygiene facilities in schools, as well as school attendance are key predictors of learning outcomes.

9.7.5 Lived Experiences of Girls

The study findings also revealed that girls missed more school days due to reasons other than menstruation. These factors comprise financial challenges, sickness, assisting parents in trading, distance to school, and lack of school materials. The learning experiences of girls during menstruation, as reported by both students and SHEP coordinators, include difficulties in concentration, tiredness, sleepiness, frustration due to pain, and excessive discomfort. However, continuous MHM education programmes have helped strengthen the resilience of many girls, enabling them to cope during class sessions.

9.8 Recommendations

The implications of WASH on learning outcome (academic performance) have mostly not been a direct kind of relationship. The study findings show water, sanitation and hygiene facilities and school attendance as key predictors of learning outcomes. This key finding implies that in determining programming geared at improving learning outcomes of students in Ghana, especially girls, attention must also be given to ensuring the continuous improvement in WASH facilities at all levels. This calls for continuous collaboration between the Ministry of Education, working through the Ghana Education Service and with support from the development community with interest in WASH and related interventions to continue the WASH expansion drive in schools.

The study also showed that learning outcome is generally poor with about a third of students (28%) having poor learning outcomes – especially in schools located in rural localities and districts. The study therefore recommends that more effort be put in by the Ghana Education Service in strengthening classroom-level methodologies in improving teaching and learning for girls. Further, there should be more sensitisation at the school level by the Girl Child Officers in collaboration with other like-minded Civil Society Organisations (CSOs) in whipping up girls' interest in learning and education in general. Other effective learning strategies from other contexts comprising incorporating menstrual health education into the curriculum, providing gender-responsive WASH (Water, Sanitation, and Hygiene) facilities, establishing peer support networks, training female teacher-mentors, and supplying free or subsidised menstrual hygiene products to ensure a supportive environment for menstruating girls could be added to improve learning outcomes for girls.

This study highlights marked differences in the availability of WASH facilities across the different regions, districts and localities. It is therefore recommended that specific WASH interventions and resources be made more targeted, especially across schools located in rural areas.

The qualitative data highlights that girls miss more school days as a result of factors other than access to WASH and menstruation. These factors relate to family work, social events, financial challenges, distance to school, and sickness. The study therefore recommends that a more holistic approach be adopted in crafting interventions targeted at improving school attendance and learning outcomes of girls. Focus must be placed in addressing some of the social cultural and economic challenges that keep girls out of school and impacts on the learning outcomes of those who manage to stay in school.

The JMP service ladders' use of time as a key determinant of whether a school has 'basic', 'limited' or 'no facility' may not always reflect the actual WASH status at the school level, especially, the definition of 'limited' WASH facilities. The study therefore recommends an adjustment of the time element to 'one-month' prior to data collection instead of 'at the time of data collection'.

9.8.1 Recommendations for future studies

Based on the findings from this study, the following recommendations are made for future studies. First, the exams results used to measure learning outcomes are not from standardised examination results. These were termly examinations results collated from the various schools of focus. This may have introduced some level of bias into the measure of learning outcomes – some of the examinations questions may have been much tougher than others and may therefore not reflect exactly what the actual situation was. However, using two-date points (examination results for terms one and two) contributed to reducing the potential biases. It is therefore recommended that

standardised examination results, including the National Standardised Test (NST) results organised by the National Council for Curriculum and Assessment (NaCCA), be used to measure learning outcomes. This may produce much more robust and generalisable estimates. Other standardised tools which could be complimentary comprise standardised tools like attendance tracking systems, student health records, classroom participation logs, and qualitative surveys or focus group discussions to assess the broader impact of WASH on education outcomes beyond examination results.

Secondly, the study focused only on public schools at the primary and JHS levels. It would be interesting to see the trend and impact across private basic schools as well. The study therefore recommends a comparative study be done across both public and private schools. The justification for this recommendation is to identify disparities in WASH facility availability, access, and impact on learning outcomes between public and private basic schools, thereby providing a more comprehensive understanding of the overall WASH situation in schools.

Another key research recommendation is to explore the linkages between WASH, MHM, school attendance and learning outcomes at the senior secondary school level, particularly in light of the Free SHS programme, which has resulted in changes to the intake of students, their access to adequate WASH facilities, among others which may impact learning outcomes.

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Appendix 1: Sampled Schools

S/N	NAME OF SCHOOL	LOCATION
GREATER ACCRA REGION		
Accra Metropolitan Assembly		
1.	Gbegbeyise Basic Primary	Gbegbeyise, Accra
2.	Gbegbeyise Basic JHS	Gbegbeyise, Accra
3.	Nii Kojo Ababio Basic Prim School	Mamprobi, Accra
4.	Nii Kojo Ababio JHS	Mamprobi, Accra
5.	Osu Salem 1 Basic Prim Sch	Osu, Accra
6.	Osu Salem 1 Basic JHS	Osu, Accra
7.	Bishop's Girls' Primary	High street, Accra
8.	Bishop's Girls' JHS	High street, Accra
Shai Osudoku District		
9.	Dodowa Newtown D/A Basic 'A' Prim	Dodowa
10.	Dodowa Newtown D/A Basic 'A' JHS	Dodowa
11.	Kasunya R/C Basic Primary	Kasunya
12.	Kasunya R/C Basic JHS	Kasunya
13.	Presby Basic 'B' Primary	Dodowa
14.	Presby Basic 'B' JHS	Dodowa
15.	Kadjanya-Dormeliam D/A Primary	Kadjanya-Dormeliam
16.	Kadjanya-Dormeliam D/A J.H.S	Kadjanya-Dormeliam
ASHANTI REGION		
Kumasi Metro		
17.	Prempeh College M/A Basic 'C' Primary	Sofoline, Kumasi
18.	Prempeh College M/A Basic 'C' JHS	Sofoline, Kumasi
19.	Suame Salvation Army Basic 'A' Primary	Suame, Kumasi
20.	Suame Salvation Army Basic 'A' JHS	Suame, Kumasi
21.	Bantama Presby Primary	Bantama, Kumasi
22.	St. Anthony RC Primary	Bantama, Kumasi
23.	Holy Cross RC JHS	Agric Nzema, Kumasi
24.	Father Krische RC JHS	Old Tafo, Kumasi
Sekyere South		
25.	Agona African Faith Prim Sch	Agona
26.	Agona African Faith JHS	Agona
27.	Boanim S.D.A Primary	Boanim
28.	Boanim S.D.A JHS	Boanim
29.	Domeabra Presby Primary	Domeabra
30.	Domeabra Presby JHS	Domeabra
31.	Tano-Odumasi Methodist Prim Sch	Tano-Odumasi
32.	Tano-Odumasi Methodist JHS	Tano-Odumasi
NORTHERN REGION		
Tamale Metropolitan Assembly		
33.	Nuriya Central Islamic Primary	Tamale

S/N	NAME OF SCHOOL	LOCATION
34.	Nuriya Central Islamic JHS	Tamale
35.	St. Paul's R/C Primary 'A'	Tamale
36.	St. Paul's R/C JHS	Tamale
37.	Abubakari Sadiq Islamic Primary	Tamale
38.	Abubakari Sadiq Islamic J.H.S	Tamale
39.	Kukuo AME Zion Primary	Kukuo, Tamale
40.	Kukuo AME Zion JHS	Kukuo, Tamale
Nanton District		
41.	Nanton-Kurugu E/A Primary	Nanton-Kurugu
42.	Nanton-Kurugu E/A JHS	Nanton-Kurugu
43.	Zieng Primary	Zieng
44.	Zieng JHS	Zieng
45.	Nanton-Kurugu E/A Primary	Nanton-Kurugu
46.	Nanton-Kurugu E/A JHS	Nanton-Kurugu
47.	Tampiong JHS A	Tampion
48.	Tampiong Primary A	Tampion

Appendix 2: Summary of Review

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
Global								
1.	Bieri et al. (2013)	Health-Education Package to Prevent Worm Infections in Chinese Schoolchildren	China	Cluster-randomised trial	2013	38 schools	soil-transmitted helminths, self-reported hygiene behaviours, and observed hand-washing behaviour.	Health-education package increased students' knowledge of STHs, improved hygiene behaviour, and reduced STH infection by 50% within 1 school year.
WASH & MHM								
2.	Asimah et al. (2017)	Menstrual Hygiene management in Ghana under the ruling the socio cultural economic, political factors, challenges and opportunities	Ghana	Mixed method approach using survey and FGD, desk study, and observation	2017			The findings showed pupils avoided using the school's toilet facilities due to their poor condition. Girls struggled with hygiene difficulties due to the scarcity of toilets provided in schools.
3.	Tiswin et al. (2019)	Availability and types of WASH facilities in 25 schools	Ghana		2019			None of the schools studied had menstrual hygiene facilities. Again, it was indicated that some of the sampled schools lacked

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
								personal toilet facilities and that others may have substandard facilities. According to report, these schools were using the public KVIP. It showed that school water facilities were not a significant issue. However, urinal facilities were occasionally substandard or in disrepair in comparison to toilet facilities. Additionally, the research found that some handwashing facilities were underutilised.
4.	Bowen et al. (2007)	A cluster-randomised controlled trial evaluating the effect of a handwashing-promotion programme in Chinese primary schools	China	Cluster randomised trial	2007	87 primary schools	School attendance, WASH facilities	Provision of standard and expanded hand-washing promotion programme and soap in schools was associated with significantly reduced days and episodes of student absence.
SSA – WASH & school attendance								

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
5.	Mahbub-Ul Alam et al. (2017)	Menstrual hygiene management among Bangladeshi adolescent School girls and risk factors affecting school absence: results from a cross-sectional survey.	Bangladesh	it was conducted in Bangladeshi schools on girls who have passed the adolescent stage. it used an interview and observation as well as adjusted prevalence difference to analysis		the study sampled 700 schools proportionally from rural and urban areas		The study found that close to half of female students miss at least three days of school during their menstruation.
6.	Davis et al. (2018)	Menstrual hygiene management and school absenteeism among adolescent students in Indonesia: evidence from a cross-sectional school-based survey.	Indonesia	A cross-sectional survey enrolled a representative sample of urban and rural school-going girls aged 12-19 years in four provinces of Indonesia	2018	A total of 1159 adolescent girls with a mean age of 15 years participated.	knowledge, practices and attitudes, MHM and school absenteeism.	The findings showed less than 20% of girls who are menstruating do not report to school throughout their period. The study discovered that absenteeism was strongly connected with the type of location, the class level, menstrual difficulties, and a lack of awareness, and may be influenced by the school's WASH facilities.

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
7.	McMichael, C. (2019)	Water, Sanitation and Hygiene (WASH) in Schools in Low-Income Countries: A Review of Evidence of Impact	Low-income countries	Systematic review of literature on WASH interventions in schools in low-income countries.	2019	38-peer reviewed papers	Water, sanitation, hygiene, WASH, schools, intervention	Evidence of the impact of school-based WASH programmes in reducing student absence from school was mixed. Ensuring access to safe and sufficient water and sanitation and hygiene promotion in schools has great potential to improve health and education and to contribute to inclusion and equity, yet delivering school-based-WASH intervention does not guarantee good outcomes.
8.	Alexander et al. (2013)	Improving service delivery of water, sanitation, and hygiene in primary schools: A cluster-randomised trial in western Kenya.	Kenya	Cluster-randomised trial	2013	70 schools divided into a control group and three intervention groups	Quality of school latrines, rainwater-harvesting systems, handwashing facilities, and other school infrastructure	Intervention schools made significant improvements in provision of soap, handwashing water, treated drinking water, and clean latrines. Unclear whether expanded interventions out-performed budget-only intervention.

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
9.	Blanton et al. (2010)	Evaluation of the role of school children in the promotion of point-of-use water treatment and handwashing in schools and households	Kenya	Longitudinal study	2010	17 schools (666 students at baseline)	Installation of drinking water and hand-washing stations in schools; teacher training on WASH promotion; hygiene education	The programme resulted in pupil-to-parent knowledge transfer around water treatment and increases in household water treatment practices that were sustained over 1 year and reduction in student absentee rates.
10.	Boubacar Maïnassara and Tohon (2014)	Assessing the Health Impact of the following Measures in Schools in Maradi (Niger): Construction of Latrines, Clean Water Supply, Establishment of HandWashing Stations,	Niger	Before and after intervention study	2014	6 schools (sample of children aged 7 to 12 years; n = 720)	latrines, handwashing stations and clean drinking-water; student, teacher and parent hygiene	A reduction in self-reported diarrhoea cases and abdominal pain was noted in both intervention and control schools. Student absence increased post-project, but not as much as in control schools. There was an increase in reported handwashing in intervention schools.

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
		and Health Education						
11.	Caruso et al. (2014)	Assessing the impact of a school-based latrine cleaning and handwashing programme on pupil absence in Nyanza Province, Kenya: A cluster-randomised trial	Kenya	Cluster-randomised trial	2014	17,564 pupils in 60 schools	Latrine conditions and use; student absence	The addition of a latrine cleaning component may not have affected student absence beyond reductions attributable to the original school-based intervention.
12.	Dreibelbis et al. (2013)	Water, sanitation, and primary school attendance: A multi-level assessment of determinants of household-reported absence in Kenya.	Kenya	Cross-sectional survey	2013	7966 children from 3857 households, enrolled in 175 primary schools.	WASH conditions, knowledge, attitude and practices, student school absence	School latrine cleanliness was the only school WASH factor associated with odds of absence. Demographic features (e.g., gender, SES, household characteristics) were important predictors of absence.
13.	Garn et al. (2017)	The Role of Adherence on	Mali	Matched-control trial	2017	200 primary schools: 100	Water and sanitation	Comprehensive WASH interventions that focus on

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
		the Impact of a School-Based Water, Sanitation, and Hygiene Intervention in Mali.				beneficiary schools and 100 matched control schools	infrastructure, hand-washing facilities, wash supplies, hygiene promotion and capacity strengthening.	adherence maximise the health effects of school WASH programmes. WASH alone might not be sufficient to decrease pupils' absenteeism.
14.	Hunter et al. (2014)	Impact of the Provision of Safe Drinking Water on School Absence Rates in Cambodia.	Cambodia	Quasi-experimental case-control longitudinal study	2017	8 schools (4 case, 4 control)	Drinking water, absenteeism	A strong association between providing free safe drinking water and reduced absenteeism, though only in the dry season.
15.	Montgomery et al. (2012)	Sanitary Pad Interventions for Girls' Education in Ghana: A Pilot Study	Ghana	Non-randomised trial	2012	120 schoolgirls aged between 12 and 18 years.	School attendance, puberty education	After 3 and 5 months, pads with puberty education significantly increased attendance. Puberty education alone resulted in a similar attendance level.
16.	O'Reilly et al. (2008)	The impact of a school-based safe water and hygiene programme on knowledge and practices of	Kenya	Baseline and endline survey	2008	9 schools (with nine comparison schools for some indicators); 390 students.	WASH facilities, knowledge and practices, absenteeism	The intervention reduced student absenteeism; safe water and hygiene. students' knowledge of water treatment procedure increased significantly; students' knowledge of

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
		students and their parents: Nyanza Province, western Kenya				Final evaluation of 363 students and their parents		appropriate times for hand-washing increased substantially
17.	Oster and Thornton (2009)	Menstruation and Education in Nepal	Nepal	Randomised control trial	2009	4 schools in rural Nepal, Chitwan province; 198 adolescent girls and their mothers.	Menstruation technology, school attendance	No evidence that menstruation technology affects school attendance or test scores. Suggested that menstruation technology assists management of blood, but doesn't reduce cramps and fatigue.
18.	Talaat et al. (2011)	Effects of hand hygiene campaigns on incidence of laboratory-confirmed influenza and absenteeism in schoolchildren, Cairo, Egypt.	Egypt	Cluster randomised trial		60 elementary schools (30 intervention; 30 control)	Absenteeism, WASH facilities	In the intervention group, absences caused by influenza-like illness, diarrhea, conjunctivitis and laboratory-confirmed influenza reduced by 40%, 30%, 67%, and 50%, respectively. The campaign was effective in reducing absenteeism.
19.	UNICEF 1994 [42]	Evaluation of the Use and Maintenance of Water Supply and Sanitation	Bangladesh	Cross-sectional survey design	1994	228 schools	Girls, attendance, WASH facilities	Girls' school attendance rate was found to have increased following intervention.

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
		System in Primary Schools						
20.	Abanyie et al. (2021)	WASH in Selected Basic Schools and Possible Implications on Health and Academics: An Example of the Wa Municipality of Ghana, West Africa	Wa, Upper East, Ghana	Employed a cross-sectional study design using an observational checklist & self-administered questionnaires assess the accessibility, availability, functionality, sufficiency, and quality of WASH facilities	2021	29-public schools	Water, Sanitation, Hygiene, Basic Schools, Health	WASH in most of the schools was poor since they lacked facilities - only a third of schools had access to potable water which were largely fecally contaminated. Hygiene facilities were lacking as 75.9% of the schools lacked handwashing facilities and all the schools lacked menstrual hygiene facilities.
21.	Gyabaah et al. (2009)	Sanitation in Basic Schools- A Case Study in Tano South District	Tano South District, Brong Ahafo Region	Mixed method approach using quantitative and qualitative methods	2009	30-public schools	Sanitation, hygiene, basic schools	Very low coverage of water and sanitation facilities in schools in the district study districts. The numbers of schools without toilet facilities, safe drinking water, handwashing facilities, and dustbins, were 53%, 83%, 40%, and 47% respectively.
WASH and MHM								

S/N	Author (s)	Title of study	Study Setting/Country	Study design/Methods	Data/ Period of publication	Methodology - Variables		Key Findings
						Sample Size	Variables	
22.	Acheampong et al. (2018)	WASH infrastructure and menstrual hygiene management in basic schools: a study in Kumasi, Ghana	Kumasi, Ghana	Qualitative design using FGDs, key informant interviews and observation of WASH facilities in the selected schools	2018	7-public and private schools (154-girls)	Menstrual hygiene Management	Public schools had poor facilities for MHM while the private schools had better WASH infrastructure that provided a better environment for MHM. The poor WASH facilities in basic schools constrained school girls from maintaining good menstrual hygiene practices.

Appendix 3: Instrument 1 - School WASH Checklist

Introduction: This is a tool for observation of school-level water, sanitation and hygiene facilities for all the selected study schools. The tool is based on the standard measurements of WASH facilities in schools developed by the UNICEF/WHO Joint Monitoring Programme (JMP), 2020 for measuring the Sustainable Development Goals (SDGs) in schools (Table 1). This provides a basis for categorising WASH facilities - drinking water, sanitation and hygiene facilities into 'Basic', 'Limited' and 'No Service' which are further re-categorised into 'Improved' and 'unimproved' facilities. Observers are to provide a good representation of issues as required for each section.

Primary objective: To observe and record information about the school WASH facilities.

SCHOOL FACILITY OBSERVATIONS	
A01. Observer name:	**A02. Date (dd/mm/yy): ____/_____/____**
A03. Start time/Time of visit ____: ___ am / pm	**A04. End time ____: ___ am / pm**
A. Basic school information	
A1. School name:	A2. Community school is located in:

A. Check with school head:

Enrollment Details				
Class	**Boys**	**Girls**	**Total**	**Other notes/comments**
Primary Schools				
Primary 1				
Primary 2				
Primary 3				
Primary 4				
Primary 5				
Primary 6				
Junior High Schools				
JHS 1				
JHS 2				
JHS 3				

AI. Teachers

Teacher status	**Sex**	
	M	**F**
Trained		
Untrained		

B. Water Facilities:

Note: Place a check mark in the appropriate box below, based on your observation

S/N	Source	Response		Comments
1.	**Source (s) of drinking water for the school**	**Currently Available**	**Main Source of Drinking Water *(tick only one)***	
	Pipe-borne [ ]	[ ] Yes [ ] No	[ ] Yes [ ] No	
	Borehole [ ]	[ ] Yes [ ] No	[ ] Yes [ ] No	
	Covered well/spring [ ]	[ ] Yes [ ] No	[ ] Yes [ ] No	
	Open well/spring [ ]	[ ] Yes [ ] No	[ ] Yes [ ] No	
	Tanker/cart truck [ ]	[ ] Yes [ ] No	[ ] Yes [ ] No	
	Lake/river/stream [ ]	[ ] Yes [ ] No	[ ] Yes [ ] No	
	Rain water [ ]	[ ] Yes [ ] No	[ ] Yes [ ] No	
	Bottled water [ ]	[ ] Yes [ ] No	[ ] Yes [ ] No	
	No water source [ ]	[ ] Yes [ ] No	[ ] Yes [ ] No	
	Sachet water	[ ] Yes [ ] No	[ ] Yes [ ] No	
	Other, specify			
2.	Is the source of water from outside the school compound?	[ ] Yes [ ] No		
3.	Are there water storage containers at the school?	[ ] Yes [ ] No		
4.	Are students drinking water from the school drinking water storage?	[ ] Yes [ ] No		

C. Toilet & Urinal Facilities (Sanitation Facilities)

Note: Place a check mark in the appropriate box below, based on your observation

S/N	Toilet and latrines	Response		Comments
1.	**What type of student toilets/latrines are at the school?**	**Functional** *(working & being used)*	**Non-functional** *(not being used)*	
	○ Flush/Pour -flush toilets			
	○ Pit latrines with slab/KVIP			
	○ Composting toilets			
	○ Pit latrines without slab			
	○ Hanging latrine (hole over water)			
	○ Bucket latrine			
	○ No toilets or latrines			
	○ Other: ……..			
2.	What is the main toilet facility? ***(Choose from the list in Q1 above)***	……		
3.	Is the main toilet / latrine on the school compound?	[ ] Yes [ ] No		

Urinal		Yes	No	Comments
4.	Is there a urinal separate from the toilet?			
5.	Is the urinal functional? (Being used)			

D1: Details on toilet facilities

Note: Visit all the toilets facilities & indicate the number for each

S/N	Toilets /latrines	Girls' only	Boys' only	Both boys & girls	Female staff only	Male staff only	Both male & female staff	Common use toilets for all (students/ teachers, male/female)
1.	Total number ***Hint:*** *count total number of seats & not just the rooms*							
2.	Number that are usable *(Available, functional, private)*							
3.	Are there changing rooms for girls?	[ ] Yes [ ] No						

E: Hygiene Facilities

Note: Select the right option as observed in the school

S/N	Hygiene observation	Options
1.	Does the school have handwashing facility(ies)	Yes ……1 No……...2
2.	What kind of handwashing facility is available? *(Tick all that apply)*	1. Running water from a piped system or tank? (faucet & sink/stand post /rainwater tank & faucet/bucket & spigot) *1a. Total Number: ……* 2. Hand-poured water system (e.g., bucket or ladle) *2a. Total Number: ……* 3. Basin/ bucket (hand-washing done in the water and is not running or poured) *3a. Total Number*: …… 4. Tippy tap *4a. Total Number: ……* 5. Other……5

3.	How many hand-washing facilities are there? (Enter number for each line)	_____ Inside toilet/latrine blocks …..1 _____ Close to girls toilet/latrine blocks …..2 _____ Close to boys toilet/latrine blocks …..3 _____ In classrooms ……4 _____ Within grounds but not close to toilets…5 _____ Close to cooking areas ……..6 _____ Inside individual latrine/ toilet stalls ……7 _____ Other: …….8
4.	Are both soap and water currently available at the handwashing facilities?	○ Yes, soap and water ○ Water only ○ Soap only ○ Neither soap nor water
5.	At the time of the visit, was water available for handwashing at the hand-washing facilities? ***(Visit all hand-washing facilities in the school)***	Yes, in all facilities visited……..1 Yes, in more than 50% of the facilities visited…2 Yes, but only in 50% or fewer of the facilities visited…….3 No water was available…….4
6.	At the time of the visit, was soap available for handwashing at the Hand-washing facilities? ***(Visit all hand-washing facilities in the school)***	Yes, in all facilities visited……..1 Yes, in more than 50% of the facilities visited…2 Yes, but only in 50% or fewer of the facilities visited…..3 No soap was available…….4

F. Waste Disposal

Note: Place a check mark in the appropriate box below, based on your observation

S/N	Waste disposal	Yes	No	Don't Know	Other notes or comments
1.	At the time of the visit, are the waste pits/composting chambers/septic tanks obviously too full or overflowing				
2.	At the time of the visit, did you see an incinerator for burning used sanitary towels or toilet papers?				
3.	Does the school have a drainage system for removing waste water from the school grounds?				
4.	How are sanitary pads disposed of generally by girls in this school?				

Appendix 4: Instrument 2: Survey with Girls (Structured Questionnaire)

Instruction to researcher: This questionnaire is to be administered to students **(Girls only)** at **Primary 5 and 6** (Upper Primary) who have attained menarche and students in Junior High School **(JHS) 1 and 2** who have also attained menarche. Questions relate to general background characteristics, knowledge, attitudes and practices relating to Menstrual Hygiene Management (MHM), use/non-use of MHM materials, access to water, sanitation and hygiene facilities, school attendance and learning outcomes.

The results of the study would hopefully serve as an important input to intervention programmes that aim at improving adolescent girls' health in general and students in particular.

It will take about 45-min. to complete the whole questionnaire.

I thank you in advance for taking your time to respond to these questions!

S1. Are you willing to participate in this study?

Yes	01	CONTINUE
No, I am not interested	02	CLOSE INTERVIEW

A. Background details:

1. Interviewer's name and number	NAME_____ ___ _ TEL. NO.___
2. Date: *Day / Month / Year of interview:*	___ ___ /___ ___ / _ __
3. Start time	
4. Region	Precode
5. District	Precode
6. Locality	○ Urban ○ Rural
7. Name of school	Precode

MIAN QUESTIONS:

Part I: Socio-Demographic Variables

S/N	Questions	Option/Response	Skips
1.	Age	_____ (in completed years)	
2.	Grade *(Tick only one)*	1. P5 2. P6 3. JHS 1 4. JHS 2	
3.	Religion *(Tick only one)*	1. None 2. Protestant 3. Orthodox 4. Catholic 5. Charismatic 6. Muslim 7. Traditional 8. Others (Specify)_____	
4.	To what ethnic group do you belong to? *(ethnic group of household head)* *(Tick only one)*	1. Akan 2. Ga/Dangme 3. Ewe 4. Guan 5. Gruma 6. Mole Dagbani 7. Grusi 8. Sissala 9. Kusasi 10. Mande/Gonja 11. Non-Ghanaian 12. Other (*Specify*)	
5.	Whom do you live with currently? *(Select the main caregiver)* *(Tick only one)*	1. With my mother and father 2. With my mother only 3. With my father only 4. with step mother and my father 5. With step father and my mother 6. With relatives 7. With friends 8. Alone 9. Other (specify)	
6.	Occupation of father *(Multiple responses)*	1. Agriculture 2. Manufacturing 3. Selling/Trading 4. Gold Mining 5. Mining (Other minerals) 6. Stone quarries or Sand Wining 7. Providing Services (e.g., plumbing, carpentry etc.) 8. Formal services (teaching, nursing, policing etc.) 9. Construction	

S/N	Questions	Option/Response	Skips
		10. Other (specify)_____	
7.	Occupation of mother *(Multiple responses)*	1. Agriculture 2. Manufacturing 3. Selling/Trading 4. Gold Mining 5. Mining (Other minerals) 6. Stone quarries or Sand Wining 7. Providing Services (e.g., plumbing, carpentry etc.) 8. Formal services (teaching, nursing, policing etc.) 9. Construction 10. House wife only 11. Other (specify)_____	
8.	What is the highest level of education of your father? *(Tick only one)*	1. None 2. Pre-school 3. Primary 4. JSS/Middle school 5. SSS/'O'-level/'A' level 6. University or higher 7. Vocational 8. Technical training 9. Non-formal 10. Don't know 11. Other (Specify)_____	
9.	What is the highest level of education of your mother? *(Tick only one)*	1. None 2. Pre-school 3. Primary 4. JSS/Middle school 5. SSS/'O'-level/'A' level 6. University or higher 7. Vocational 8. Technical training 9. Non-formal 10. Don't know Other (Specify)_____	
10.	Do you have toilet facility at home/in your house?	○ Yes ○ No	*If no, ⇨ Q12*
11.	If Yes, what is the main type of toilet facility your Household uses?	1. Flush or pour-flush toilet 2. KVIP 3. Pit latrine 4. Bucket/pan 5. No facility/bush/field 6. Composting toilet	

S/N	Questions	Option/Response	Skips
		7. Others (please specify) _____	
12.	Do you have any direct source of water inside your house/at home?	1. Yes 2. No	*If no, ⇨ Q14*
13.	If yes, what is the main source of drinking/cooking water at home?	1. Pipe borne water 2. Bore hole/well/ spring 3. Sachet/bottled water 4. Tanker supply 5. Rain water 6. Surface water (pond/river/stream) 7. Others (Please specify) _____	
14.	Do you get pocket money from your parents?	1. Yes 2. No	
15.	Do you earn money for yourself through any type of work?	1. Yes 2. No	
16.	If yes, what do you do to earn money?	1. Trade / sell 2. Help with farm activities 3. Male friends give money 4. Other, specify ……	
Part- II About menstruation:			
17.	Have you started menstruating?	1. Yes 2. No	*If no, ⇨ end interview*
18.	At what age did you experience your first menstruation?	_____ (in completed years)	
19.	Where did you experience your first menstruation?	1. Home 2. School 3. Play ground 4. Other (specify):_____	
20.	What was the reaction to your first menstruation?	1. Happy 2. Scared 3. Discomfort 4. Emotional disturbance 5. Other (specify):_____	
21.	What were the physical symptoms when you had your first menstruation?	1. Abdominal and back pain 2. Sleeplessness 3. Heavy bleeding 4. Other(specify)	
22.	What is the average duration of your current menstrual flow?	_____ days Can't tell	

S/N	Questions	Option/Response	Skips
23.	Quantity (amount) of bleeding during menstruation during the last time?	1. Scanty 2. Heavy 3. Moderate 4. Can't tell	
24.	Do you have any problem associated with menstruation?	1. Headache 2. Vomiting 3. Weakness 4. Abdominal pain 5. Back pain 6. Other (Specify)	
Part IIb: School Attendance			
25.	How long does it take you to walk to school? *(Answer should be in minutes or hours)*	……..	
26.	Have you ever missed school due to your menstrual cycle?	1. Yes 2. No	
27.	If yes, how many days do you usually (on average) miss **per month** due to your menstrual cycle?	○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7+	Ask if yes in Q25
28.	Do you come to school during menstruation?	1.Yes 2. No	
29.	If No, why?	_____	
30.	I feel confident to come to school even if I am in my menstrual period	Strongly Disagree…….1 Disagree……2 Neutral ……..……3 Agree……4 Strongly Agree……5	
31.	Do you think menstruation interferes with school attendance for most girls?	1. Yes 2. No 3. Don't Know	
32.	Please explain your answer in Q 30	…….	
33.	When menstruating, do you stay in school all day?	1. Yes 2. No	

S/N	Questions	Option/Response	Skips
		3. Half day 4. Other…	
34.	Explain your answer in Q32	…….	
35.	Have you ever missed school as a result of home chores or work?	1. Yes 2. No	
36.	If yes, explain your answer in Q34	…….	
Part- III Knowledge on menstruation			
37.	Menstruation is a natural process (stage) for every girl	1. True 2. False	
38.	The following are causes of menstruation *(Multiple responses)*	1. Hormones 2. Ovulation 3. Curse of a god 4. Disease	
39.	From which organ does menstrual blood come? *(Tick only one)*	1. Uterus 2. Vagina 3. Bladder 4. Abdomen 5. Don't know 6. Other (Specify)_____	
40.	Menstruation should occur approximately every month	1. Yes 2. No 3. Don't Know	
41.	At what age, do you think most girls usually get their first menstrual period?	_____ years Don't know	
42.	What is the average number of days a normal menstruation should take?	_____ days. Don't know	
43.	Did anyone tell you about menstruation before you first had yours?	1. Yes 2. No 3. Don't Know	
44.	From whom did you get information regarding menstruation? *(More than one answer is possible)*	1. Mother 2. School / Teacher 3. Friends 4. Books 5. Media (TV, Radio) 6. Others (Specify)_____	

S/N	Questions	Option/Response	Skips
45.	Do you think menstruation interferes with school attendance and performance for most girls?	1. Yes 2. No 3. Don't Know	
46.	Which of the following normally happens to you before or after menstruation? *(Multiple response)*	1. Discharge with itching, rash and soreness 2. Increase continuous discharge 3. White, lumpy discharge 4. Yellow/ green or grey/ white discharge with bad smell 5. None	
47.	Do you think menstrual blood is unhygienic?	1. Yes 2. No 3. Don't Know	
Part-IV: Practices of Menstruation			
48.	Do you use absorbent material during your period?	1. Yes 2. No	
49.	What absorbent material do you use during menstruation? *(More than one answer is possible)*	1. Disposable sanitary pad 2. Toilet rolls 3. Reusable clean dry cloth 4. Disposable clean dry cloth 5. Paper 6. Other(specify)_____	
50.	If you are using reusable cloth as pad, how do you clean it?	1. Soap & water 2. Only water 3. Other (Specify): _____	
51.	If you use reusable cloth, how do you dry the cloth?	1. Sunlight 2. Inside the house 3. Other (Specify)	
52.	How many times do you change the cloth/pad in a day?	1. Three and more 2. Once 3. Twice	
53.	Where do you dispose off your pads at school?	1. Dustbin 2. Drain 3. Toilet 4. Open field 5. Take it home 6. Other (specify)_____	
54.	If you take it home, why do you prefer to do so? *(Multiple response)* **Do not read out**	1. I don't want anybody to see it 2. Avoid anybody to use my blood for rituals 3. My parents asked me to do so 4. Don't have any reason 5. Other specify ……	
55.	Where do you dispose of your pads at home?	1. Dustbin 2. Drain 3. Toilet	

S/N	Questions	Option/Response	Skips
		4. Open field 5. Burn 6. Other (specify)_____	
56.	What types of pad wrap do you use for disposing off your pads?	1. Papers 2. Plastic bag 3. No wrap 4. Other (Specify)_____	
57.	Do you always wash your hands after changing your sanitary pad or cloth?	1. Yes 2. No	
58.	What do you use to wash your hands after changing? *(Do not read answers)*	1. Water only 2. Water and soap 3. Use sand 4. Use ash 5. Other specify ……..	
59.	Where do you mostly change your sanitary pads when you are at school?	1. Toilet 2. Urinary place (if separate from toilet) 3. Back of the classroom 4. At the bush close to the school 5. WASH changing room 6. None	
60.	Do you clean your genitalia during menstruation?	1. Yes 2. No	
61.	If yes, mostly by what?	1. Water and soap 2. Only with water 3. Tissue paper 4. Towel 5. Other (Specify)	
Part V: Menstrual Poverty			
62.	In the past 12-months, have you struggled to afford menstrual products such as sanitary pads or tampons?	1. Yes 2. No	
63.	Do you struggle to afford menstrual products every month?	1. Yes 2. No	
Part VI: Attitudes towards Menstruation			
64.	I feel embarrassed or shameful when men find out that I am menstruating	Strongly Disagree…….1 Disagree……2 Neutral ……3 Agree……4 Strongly Agree……5	
65.	Older women offer a lot of advice when girls start menstruating	Strongly Disagree…….1 Disagree……2 Neutral ……3	

S/N	Questions	Option/Response	Skips
		Agree……4 Strongly Agree……5	
66.	It is important to discuss the topic of menstrual period at school with boys and girls together.	Strongly Disagree……1 Disagree……2 Neutral ……3 Agree……4 Strongly Agree……5	
67.	It is uncomfortable for us girls to talk about our periods.	Strongly Disagree……1 Disagree……2 Neutral ……3 Agree……4 Strongly Agree……5	
68.	Girls are not allowed to cook, serve visitors or go to public gathering when having their menstruation	Strongly Disagree……1 Disagree……2 Neutral ……3 Agree……4 Strongly Agree……5	
69.	In your mind, how important do you think menstruation is to the girl child?	Very Important……5 Important ……4 Somewhat important …….3 Not important ……2 Not important at all ……1	
Part-VII: Learning outcomes			
70.	Do you think menstruation interferes with school performance for most girls?	1. Yes 2. No 3. Don't Know	
71.	Have you ever missed any class test because of menstruation?	1. Yes 2. No	
72.	Have you ever missed an end of term examination as a result of menstruation?	1. Yes 2. No	
Other Community and Household questions			
73.	Does your household own any of the following / Do your parents have any of the following at home?	Yes No Radio..... 1 2 Wall Clock..... 1 2 Refrigerator..... 1 2 Freezer ..... 1 2 Black and White Television ..... 1 2 Colour Television ..... 1 2 LCD/Led/Plasma/Smart Tv ..... 1 2 Electric Generator..... 1 2 Washing Machine ..... 1 2 Audio Player/Deck ..... 1 2 DVD/VCD/VCR/Blue Ray..... 1 2 Water Pump ..... 1 2 Electric Fan..... 1 2	

S/N	Questions	Option/Response	Skips
		Bicycle ..... 1 2 Motorcycle / Scooter ..... 1 2 Animal-Drawn Cart ..... 1 2 None Other, Specify	
74.	What is the main source of drinking water for the community?	1. Pipe-borne 2. Borehole 3. Covered well/spring 4. Open well/spring 5. Tanker/cart truck 6. Lake/river/stream 7. Rain water 8. Bottled water 9. No water sources 10. Sachet water 11. Other, please specify: …….	
75.	What is the main source of waste disposal in this community?	……..	
76.	What type of health facility is available in the community?	1. CHPS 2. Clinic 3. Hospital 4. Health Centre 5. Hospital	
Closing questions			
77.	What advice/recommendation would you like us to pass along to policy makers that you think would make this school better for girls?		

Appendix 5: Instrument 3 - Focus Group Discussion with Girls

Instruction: The Focus Group Discussion (FGD) is to be administered to students **(Girls only)** at either **Primary 5 and 6** (only one at the primary level) who have attained menarche and students in Junior High School **(JHS) (either 1 or 2)** who have also attained menarche. (About 5-7 girls should be randomly selected for the FGD).

B. Background details:

Note: Moderator to complete background template before or after the FGD:

WARM-UP QUESTIONS: (5-10 min.)

I would like to know each of you a little bit, so please introduce yourself and tell me a bit about yourself:

- Your name
- Your age
- Your class
- Tell us about family / parents / siblings / profession of parents / who you are living with?
- What do you like most about being in school?

A. Introductory Questions:

1. Can you tell me about the Water, Sanitation and Hygiene (WASH) situation in this school? (*Probe for general availability of WASH facilities – separate for each sex, different for teacher/students, functionality of the facilities etc.*)

2. Can you all describe the types and usual conditions of the water, sanitation and hygiene (WASH) facilities available and being used in this school? *(Probe for the types of WASH facilities, number, current functionality of the facilities etc.)*

3. Is this school friendly for menstruating girls? *(Probe for access to changing rooms, support from teachers, SHEP Coordinator etc.)*

B. Menstruation and Menstrual Hygiene Management (MHM):

4. Can you describe a typical day when you have your period? What do you usually feel in the morning?

    a. What time do you get to school on such days? (Do you report late or the usual time)

    b. What activities do you engage in with friends on such days?

5. Are you able to change your sanitary pad or cloth at school during these days?

    a. Where do you do this?

    b. What else do you do to make sure you feel comfortable during such periods?

6. What materials do you or your friends use during menstruation? *(Probe for the usage of disposable pads, toilet rolls, reusable dry cloth, paper etc.)*

7. Where do you usually dispose off your used menstrual materials? *(Probe for dustbins, drains, etc.)*

C. School Attendance:

8. Do some of your mates or yourself, ever absent herself/yourself from school due to menstruation? Why?

9. How often do you or your mates absent yourself from school as a result of menstruation? *(Probe for approximate number of days per month…)*

10. What was the reason for absenting yourself from school as a result of menstruation? *(Probe for cultural myths, absence of WASH facilities, shyness, fear of staining dress etc.)*

11. What are the other reasons why girls miss school days? *(Probe for distance to school, work-related support to family, household chores, caregiving etc.).*

D. Learning (outcomes)

12. What is learning like during such menstruating days? *(Probe for difficulty in concentration, tiredness, participation in class activities etc.)*

13. Has any of you or your friends missed an exams or class test as a result of menstruation? *(Probe for why they missed the exams, class test, the frequency, what happened etc…)*

14. When your friends or you miss school days as a result of menstruation, does it affect your class test or examination results in any way? *(Probe for ways missing school affects their performance in exams and class test…)*

Exit Questions

15. What recommendations will you give to improve the resources for managing your menstruation at the school level? *(Probe for WASH facilities, access to menstrual hygiene materials etc.)*

16. Do you have any questions for me?

Appendix 6: Instrument 4 - Examination Results & Attendance Template

Introduction: This is a template for recording examination scores **(raw scores)** of sampled students in primaries 5 and 6 and JHS 1 and 2 for terms 1 and 2 (2022-acadeic year). The data should be collected for only the 4-core subjects – **Primary - (English, Maths, Science, Our World, Our People)** and **JHS - (English, Maths, Science, Social Studies).** This data will help estimate the learning outcomes of students across the various levels. Data should also be collected on the attendance numbers for terms 1 and 2 for the same sampled students

Primary objective: To record the exams scores of sampled girls for terms 1 and 2 (2021 academic year).

A. Background details:

S/N	Part 1: Participant Details	
1.	Name of School	
2.	Region	
3.	District	
4.	Locality Type	Rural ☐ Urban ☐
5.	Class	

B. Examination Scores:

Note: The Researcher/Assistant to complete this template for each student (girl) sampled for the study (10-girls per class):

Part 2: Examination scores (Raw scores: 0-100) + Attendance for each term															
Core Subjects															
S/N	**Name of student[9]**	**English**		**Maths**		**Science**		**Our World, Our People *(Primary only)***		**Social Studies (JHS only)**		**School Attendance *(No. of days present in school)***			
		Term 1	**Term 2**	**Term 1**	**Term 2**	**Term 1**	**Term 2**	**Term 1**	**Term 2**	**Term 1**	**Term 2**	**Term 1 (student)**	**Total days for term *(entire school)***	**Term 2 (student)**	**Total days for term *(entire school)***
1.															
2.															
3.															
4.															
5.															
6.															

[9] Names of students was just for identification purposes and was anonymised at the analysis level

Appendix 7: Instrument 5: Key Informant Interview Guide With SHEP Teachers & Coordinators

Instruction: The Key Informant Interview (KII) is to be administered to School Health and Education Project (SHEP) Teachers/Coordinators at the school level.

Complete background template

A. Introductory Questions:

1. Can you tell me about the Water, Sanitation and Hygiene (WASH) situation in this school? (*Probe for general availability of WASH facilities – separate for each sex, different for teacher/students, functionality of the facilities etc.*)

2. What is the usual conditions of the water, sanitation and hygiene (WASH) facilities available and being used in this school? *(Probe for the types of WASH facilities, number, current functionality of the facilities etc.)*

3. Is this school friendly for menstruating girls? *(Probe for access to changing rooms, support from teachers, SHEP Coordinator etc.)*

B. Menstruation and Menstrual Hygiene Management (MHM):

4. Do girls receive menstruation and menstruation management-related education at the school?
   - ○ Yes
   - ○ No

5. If yes, how is menstruation-related education taught at the school?
   - ○ As a component of the core curriculum (e.g., in science class)
   - ○ As a stand-alone special module on menstrual hygiene exclusively
   - ○ Through a school-sponsored extracurricular programme (e.g., health clubs)
   - ○ Only sporadically/informally/occasionally when girls ask
   - ○ Only sporadically/informally/occasionally when teachers perceive girls need information
   - ○ Other: _____

6. If yes, can you explain what is covered in the education session?
   - ○ Information provided is about biological reasons for menstruation
   - ○ Information provided teaches girls about managing menstruation,
   - ○ Hygiene, how to clean/use cloths, etc.
   - ○ Information provided includes information about reproductive health
   - ○ Other: _____

7. Are teachers at this school trained on menstrual health and hygiene promotion/education? If yes, please tell me about the training?

8. Are sanitary materials available for girls at the school level? If yes, how are they made available? *(Probe: who funds; do girls pay for them; how are they distributed? do girls need to ask for them?)*

C. School Attendance:

9. Can you tell me if girls are expected to come to school while menstruating? *(Probe: why, do girls abide by these expectations, what do girls' parents think, etc.)*

10. In many schools, girls miss school or leave school early when they are menstruating - How often does that happen at this school? *(Probe: frequency, certain girls only/specifically, etc).*

11. What are the other reasons why girls in your school miss school days? *(Probe for distance to school, work-related support to family, household chores, caregiving etc.).*

12. What do you think schools can do to make it easier for girls to be in school during menstruation? *(Probe: education, facilities, support, resources, etc.)*

D. Learning (outcomes)

13. What is learning like for girls in this school/your class when they are menstruating? *(Probe for difficulty in concentration, tiredness, participation in class activities etc.)*

14. Has any of your students missed an exams or class test as a result of menstruation? *(Probe for why they missed the exams, class test, the frequency, what happened etc…)*

15. When your students miss school days as a result of menstruation, does it affect their learning outcomes (examination results) in any way? *(Probe for ways missing school affects their performance in exams and class test…)*

Exit Questions

16. What recommendations will you give to improve the resources for managing your menstruation at the school level? *(Probe for WASH facilities, access to menstrual hygiene materials etc.)*

17. Do you have any questions for me.

Appendix 8: Consent Forms

UNIVERSITY OF GHANA

Official Use only Protocol number

Ethics Committee for Humanities (ECH)

PROTOCOL CONSENT FORM

Section A- BACKGROUND INFORMATION

Title of Study:	Availability of school-based Water, Sanitation and Hygiene (WASH) Facilities: Implications for Menstrual Hygiene Management, School Attendance and Learning Outcomes
Principal Investigator:	Jones Agyapong Frimpong
Certified Protocol Number	ECH 045/ 22-23

Section B– CONSENT TO PARTICIPATE IN RESEARCH

General Information about Research

Hello… my name is Jones A. Frimpong, a student at the Regional Institute for Population Studies (RIPS), University of Ghana, Legon currently working on my PhD thesis on the topic: *Availability of school-based Water, Sanitation and Hygiene (WASH) Facilities: Implications for Menstrual Hygiene Management, School Attendance and Learning Outcomes.* I am interested in learning more about your access to water, sanitation and hygiene (WASH) facilities in this school and how these affect the management of your menstruation. I am also interested in knowing whether you sometimes miss school as a result of menstruation and if this in any way affects your learning in school. I hope you will assist the work by agreeing to participate in the study.

It will take about 45-minutes to complete the whole instrument.

I will ask you general questions about yourself and your parents, specific questions about water, sanitation and hygiene facilities in this school, your menstrual hygiene practices, whether you come to school regularly or not and issues relating to how well you are performing in school academically.

Benefits/Risks of the study

There are no direct benefits from participating in this study. However, the results of the study would hopefully serve as an important input to intervention programmes that aim at improving water, sanitation and hygiene facilities in schools. The findings from the study are expected to help bridge the gap between policy and implementation by strengthening the evidence on how relevant WASH facilities are to achieving school outcomes and would provide evidence to development partners to further strengthen their interventions in the WASH space, especially at the school level.

There will be no direct or indirect risks for participating in this study. However, there is the possibility of students finding some of the questions on the survey to be uncomfortable, especially questions relating to menstrual hygiene management. There are also no hazards to you for participating in this study.

Confidentiality

None of your answers will be available to anyone at any time. All the information you give will be kept private and your name will not be put anywhere on any instrument. Unique identification numbers will be assigned to your data for use in the analysis. You will not be asked any personal identifiable data in this study. During data cleaning, all personal data will be erased or anonymised. The data will be available only to the student investigator and no one else.

Compensation

Student (girls) selected for the study will be provided with biscuit and a mini-paper drink (kalipo) drink for their participation in the study.

Withdrawal from Study

Your participation in this study is voluntary. You can decide to withdraw/stop at any time, even part-way through the interview, for whatever reason. If you decide to stop participating, there will be no consequences/penalty to you at all. You will not be affected in any way if you decide not to participate, or you decide to withdraw in the course of the interview

If you decide to stop, I will ask you how you would like the information collected up to the point of withdrawal to be handled. This could include returning it to you, destroying it or using the data collected up to that point. If you do not want to answer some of the questions, you do not have to, but you can still participate in the study.

When it becomes necessary, you or your legal representative will be informed in a timely manner if information becomes available that may be relevant to your willingness to continue participation or withdraw from the study.

There are no circumstances or reasons under which your participation in this study may be terminated.

Contact for Additional Information

If you have any questions about this study or would like more information, you can contact Jones Agyapong Frimpong (Student Investigator) at the Regional Institute for Population Studies, University of Ghana, Legon, Accra. P.O. Box LG 96, Accra Ghana.

Email: jafrimpong@st.ug.edu.gh / ohenebajones_1@yahoo.com

Tel.: 0243876325 / 0302 906800

- If you have any questions about your rights as a research participant in this study you may contact the Administrator of the Ethics Committee for Humanities, ISSER, University of Ghana at ech@ug.edu.gh or 00233- 303-933-866.

Section C- PARTICIPANT AGREEMENT

"I have read or have had someone read all of the above, asked questions, received answers regarding participation in this study, and am willing to give consent for me, my child/ward to participate in this study. I will not have waived any of my rights by signing this consent form. Upon signing this consent form, I will receive a copy for my personal records."

_____

Name of Participant

_____ _____

Signature or mark of Participant Date

If participant cannot read and or understand the form themselves, a witness must sign here:
I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered, and the volunteer has agreed to take part in the research.

_____

Name of witness

_____ _____

Signature of witness / Mark Date

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____

Name of Person who Obtained Consent

_____ _____

Signature of Person Who Obtained Consent Date

UNIVERSITY OF GHANA

Official Use only Protocol number

Ethics Committee for Humanities (ECH)

GUARDIAN /PARENTAL PROTOCOL CONSENT FORM

Section A- BACKGROUND INFORMATION

Title of Study:	Availability of school-based Water, Sanitation and Hygiene (WASH) Facilities: Implications for Menstrual Hygiene Management, School Attendance and Learning Outcomes
Principal Investigator:	Jones Agyapong Frimpong
Certified Protocol Number	ECH 045/ 22-23

Section B– CONSENT TO PARTICIPATE IN RESEARCH

General Information about Research

Hello… my name is Jones A. Frimpong, a student at the Regional Institute for Population Studies (RIPS), University of Ghana, Legon currently working on my PhD thesis on the topic: *Availability of school-based Water, Sanitation and Hygiene (WASH) Facilities: Implications for Menstrual Hygiene Management, School Attendance and Learning Outcomes.*

I am interested in learning more about your ward's access to water, sanitation and hygiene (WASH) facilities at school and how these affect the management of her menstruation. I am also interested in knowing whether she sometimes misses school as a result of menstruation and if this in any way affects her learning in school.

I will take about 45-minutes of her time to complete the whole instrument.

I will ask her general questions about herself and her parents/household, specific questions about water, sanitation and hygiene facilities in her school, her menstrual hygiene practices, whether she comes to school regularly or not and issues relating to how well she is performing in school academically.

Benefits/Risks of the study

There are no direct benefits for your daughter for participating in this study. However, the results of the study would hopefully serve as an important input to intervention programmes that aim at improving water, sanitation and hygiene facilities in schools that will be of immense help to her

and other girls. The findings from the study are expected to help bridge the gap between policy and implementation by strengthening the evidence on how relevant WASH facilities are to achieving school outcomes and would provide evidence to development partners to further strengthen their interventions in the WASH space, especially at the school level – which will also help girls, including your daughter at the school level.

There will be no direct or indirect risks to your daughter for participating in this study. However, there is the possibility she may find some of the questions on the survey to be uncomfortable, especially questions relating to menstrual hygiene management. There will also be no hazards to her for participating in this study.

Confidentiality

None of the answers to be provided by your daughter will be available to anyone at any time. All the information she gives will be kept private and her name will not be put anywhere on any instrument. Unique identification numbers will be assigned to her data for use in the analysis. She will also not be asked any personal identifiable data in this study. During data cleaning, all personal data will be erased or anonymised.
The data will be available only to the student investigator and no one else.

Compensation

Your daughter will be provided with biscuit and a mini-paper drink (kalipo) drink for her participation in the study.

Withdrawal from Study

Your daughter's participation in this study is voluntary. She may decide to withdraw/stop at any time, even part-way through the interview, for whatever reason. If she decides to stop participating, there will be no consequences/penalty to her at all. She will also not be affected in any way if she decides not to participate or withdraws in the course of the interview
When it becomes necessary, she or your legal representative will be informed in a timely manner if information becomes available that may be relevant to your willingness to allow your daughter continue participation or withdraw from the study.

There are no circumstances or reasons under which your daughter's participation in this study may be terminated.

Contact for Additional Information

If you have any questions about this study or would like more information, you can contact Jones Agyapong Frimpong (Student Investigator) at the Regional Institute for Population Studies, University of Ghana, Legon, Accra. P.O. Box LG 96, Accra Ghana.
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Section C- PARTICIPANT AGREEMENT

"I have read or have had someone read all of the above, asked questions, received answers regarding my child's participation in this study, and am willing to give consent for me, my child/ward to participate in this study. I will not have waived any of my rights by signing this consent form. Upon signing this consent form, I will receive a copy for my personal records."

_____

Name of Participant

_____

_____

Signature or mark of Participant Date

If participant cannot read and or understand the form themselves, a witness must sign here:
I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered, and the volunteer has agreed to take part in the research.

_____

Name of witness

_____ _____

Signature of witness / Mark Date

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

_____

Name of Person who Obtained Consent

_____ _____

Signature of Person Who Obtained Consent Date