UNIVERSITY OF CAPE COAST

MANAGING WATER, SANITATION AND HYGIENE (WASH) FACILITIES IN BASIC SCHOOLS WITHIN THE MFANTSEMAN MUNICIPALITY, GHANA

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BY

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APRIL 2022

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature ……..…… Date ……

Name: Kingsford Kobina Annan

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Supervisor's Signature ……..…… Date ……..….

Name: Professor Simon Mariwah

ABSTRACT

Inadequate Water Sanitation and Hygiene (WASH) facilities in schools has serious health implications on children, especially girls and students living with disabilities (UNICEF & WHO, 2020), which may contribute to unequal learning opportunities (Adams et al., 2009). Hence, it is important to ensure effective school hygiene interventions and strategies to protect the lives of these children. This study seeks to examine the management of WASH facilities in basic schools within the Mfantseman Municipality of Ghana which is ranked among the least in terms of access to WASH facilities and academic performance (UNICEF & CDD-Ghana, 2018). The theoretical basis for this study was the Sanitation Behaviour Change Framework (SaniFOAM).

The pragmatic philosophy, convergent parallel mixed method and descriptive design were employed. A total of 368 students, with four stakeholder heads and 16 head teachers (as key informants) were selected for the study. The data was analyzed with Statistical Product and Service Solutions (SPSS) version 22.0, and supported by manual analysis of the themes from the in-depth interviews and field observations. The findings revealed that pupils have satisfactory hygiene behaviour just that the WASH facilities are inadequate. Also, the findings indicated that Ghana Education Service (G.E.S) provides the logistics to schools for maintenance and teachers supervise the students to clean the facilities, based on a duty roster and sometimes as punishment to offenders. It is recommended that G.E.S, parents, teachers, government, and all stakeholders should ensure adequate provision of WASH infrastructure and interventions in schools to promote healthy and satisfactory sanitary practices of the pupils at all times.

KEY WORDS

Hygiene

Sanitation

School Health Education

Water

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DEDICATION

To my mentor, Professor Simon Mariwah and my siblings, Mr. Joseph Kweku Annan and Mrs. Alice Gyamfi

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LIST OF ACRONYMS

CDD-Ghana	Ghana Centre for Democratic Development
EMIS	Education Management Information System
GES	Ghana Education Service
GOG	Government of Ghana
GSS	Ghana Statistical Service
JMP	Joint Monitoring Programme
MDG	Millennium Development Goal
MSWR	Ministry of Sanitation and Water Resource
SDG	Sustainable Development Goal
SMC	School Management Committee
SHEP	School Health Education Programme
UN	United Nations
UNICEF	United Nations Children Emergency Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

Background to the Study

Every individual has the privilege to safe drinking water and improved sanitation (Appiah-Effah, Duku, Azangbego, Aggrey, Gyapong-Korsah, & Nyarko, 2019). Inadequate water quality and unsanitary hygiene activities, on the other hand, affect the greater degree to which people suffer from sanitation-related diseases like diarrhoea, typhoid fever, cholera, and other viral infections. Thus, inadequate water, sanitation and hygiene facilities have several negative health implications especially for women, girls, and children (Campbell, Benova, Gon, Afsana, & Cumming, 2015). This awakened proactive responses from international organizations such as the United Nations (UN) to curb the negative issues associated with water, sanitation, and health (World Bank, 2021). As such, in 2000, such considerable efforts on global interventions on water and sanitation issues were enshrined in the Millennium Development Goals (MDG) (World Bank, 2021). The Sustainable Development Goals (SDG) six seeks to ensure access to adequate and inclusive sanitation and hygiene, and the elimination of open defecation.

In spite of efforts in promoting access to safe drinking water and sanitation by the UN, about 2.4 billion people still lack access to basic sanitation globally, and around 673 million people, mostly poor, still defecate in the open (World Bank, 2021). The population practicing open defecation is mostly practiced in rural areas, which is the home of about 91% and 72% of the people who defecate in the open and without basic sanitation respectively (World Bank, 2021). Globally, about 62 nations have a high open defecation

rate with only 18 countries on track to achieve open defecation free status by 2030 (World Bank, 2021). In developing countries, 91% of the population practice open defecation while 72% are without access to basic sanitation (World Bank, 2021). In Sub-Saharan Africa, only 28% had basic sanitation, making the situation in Africa even more alarming. (Appiah-Effah et al., 2019). Yet, only 27% of the world's population has access to hand washing facilities (World Bank, 2021). Furthermore, 165 million people still lack access to safe water supplies (UNICEF, 2019). On a global scale, sanitation lags behind water, with only 68 percent of the world's population with access to basic sanitation compared to 88.5 percent with basic water services. (Appiah-Effah et al., 2019).

Ghana is among the least ranked country regarding access to improved sanitation among the lower-middle-income nations in the world (Samiwu, 2017); due to adequately manage waste, which has consequences on environmental quality and public health (Samiwu, 2017). Although access to basic drinking water has improved to an estimated 79%, representing 93% in urban areas and 68% in rural areas of Ghana [Ghana Statistical Service, 2018, GSS (2018)]. Mariwah (2018) reported that there was little progress in improving sanitation in Ghana, as current sanitation coverage of Ghana is still 21% below the Sustainable Development Goal (MDG) sanitation target, implying that adequate sanitation has not been achieved in Ghana. Statistically, only one in every five Ghanaian households has access to improved sanitation. (GSS, 2018). The current sanitation trend depicts that, more than 13 million people in Ghana signifying 45% use shared toilet

facilities with most people living in low-income urban areas and few in rural areas (Appiah-Effah et al., 2019).

About 22% of Ghanaians still practice open defecation (Appiah-Effah et al., 2019). It is widespread in rural areas, with 4.2 million Ghanaians accounting for 31% rural population and 1.8 million Ghanaians accounting for 11% urban population; implying that open defecation is rampant in rural communities. According to WHO (2019) shared sanitation is common in Ghana, where compound dwellings, home to a substantial proportion of low-income residents, that serve more than half of the population due to financial constraints and a lack of space (Antwi-Agyei, Adjei, Dwumfour-Asare, Kweyu, Sheillah and Simiyu, 2020). This situation is not different in the Mfantseman Municipality, as evidence from the Ghana District League Table II (2018/19) by UNICEF & CDD-Ghana (2018) that the Municipality has poor sanitation coverage in Ghana. This situation is alarming and therefore calls for extensive applied research to curb its negative consequences.

Moreover, it is evident that, every year, around 525,000 children die due to diarrhoea, out of 1.7 billion cases globally according to Bhatt, Budhathoki, Lucero-Prisno, Shrestha, Bhattachan, Thapa, Sunny, Upadhyaya, Ghimire, and Pokharel, (2019). It is estimated that every year around 842,000 people die from diarrhoea and other diseases linked to poor water, sanitation, and hygiene, with children under the age of five suffering the brunt of the burden (WHO, 2018). Poor sanitation causes diseases such as schistosomiasis, diarrhoea, and cholera (Hotor, 2017). Open defecation, poor hygiene, and inadequate water and sanitation systems are the main causes of child morbidity and mortality (UNICEF, 2019). The first thousand days of life,

according to Verdeja, Thomas, Dorsan, Hawks, Dearden, Stroupe, Hoj, West, Crookston, Ezekial, and Hall (2019), is a very crucial period of child's development and important to the health, behavioral development and growth, and during this development period, WASH (water, sanitation, and hygiene) are crucial for good health and illness prevention. Therefore, it is necessary to avoid negative health implication resulting from water, sanitation and hygiene in the house, schools, public spaces.

However, the effects of water, sanitation and hygiene are enormous in schools; because in many nations, there is substantial and increasing evidence of inadequate access to potable water, sanitation, and hygiene at schools in low- or middle-income nations (Adams, Bartram, Chartier, & Sims 2009). UNICEF (2012) found about 51% of schools with adequate water supply and 45% with adequate sanitation in low and middle income countries (Cissé, Erismann, Guéladio, Koju, Odermatt, Schindler, Sagar, Sharma, Shrestha, & Utzinger, 2017), implying that WASH facilities in schools, are still inadequate with associated detrimental effects on health and school attendance (Mcmichael, 2019).

Research on the global scale, showed that less than two third schools had basic sanitation (UNICEF & WHO, 2020). It was projected that 19% of schools globally had no sanitation service and in these schools, children and teachers either use unimproved facilities, like hanging latrines/ bucket latrines, pit latrines without a slab or platform, or have no sanitation service at all (UNICEF & WHO, 2020). An estimated 367 million children go to school where there is no sanitation facilities (UNICEF & WHO, 2020). Central and Southern Asia is the two Sustainable Development Goal (SDG) regions which

are home to more than half of these children; with 200 million children; and Sub-Saharan Africa with 213 million children as cited in a report by UNICEF & WHO (2020).

However, there have been gains in school sanitation in some countries: Between 2015 and 2019, the quantity of schools with basic sanitation in Bhutan and Nigeria improved by 3% points every year. While in South Sudan the quantity of schools without sanitation facilities decreased by 4% points every year within the same period (UNICEF & WHO, 2020).

Notwithstanding, it is established that a lot of rural schools within sub-Saharan African had toilets which did not satisfy acceptable, quality, or accessible requirements (UNICEF & WHO, 2020). Children with disabilities, female staff and students are the most affected; as such need a convenient facility during period of menstrual hygiene (UNICEF & WHO, 2020). About two thirds of toilets in schools were not easily reached by children with disabilities in sub-Saharan Africa (UNICEF & WHO, 2020). Even though most countries have national sanitation policies and strategies, few have sufficient financial and human resources for their implementation. Hence, To achieve universal access to basic sanitation facilities in schools by 2030, progress must be five times faster than it is now (UNICEF & WHO, 2020).

Also, about 69% of schools had access to basic drinking water globally (UNICEF & WHO, 2018); 12% schools had limited drinking water supply, 19% were without drinking water, and approximately 570 million students had no basic drinking water at school (UNICEF & WHO, 2018). About half of the schools in Sub-Saharan Africa did not have drinking water (UNICEF & WHO, 2018). In almost all countries, rural schools lacked access to basic drinking

water services than urban schools (UNICEF & WHO, 2018). One out of every four primary schools and one out of every six secondary schools lacked access to drinking water. (UNICEF & WHO, 2018).

More so, approximately 900 million students had no basic hygienic services at school worldwide (UNICEF & WHO, 2018). Only 53% of schools in the world had access to hygiene service; 11% had a limited hygiene service, and 36% had none at all (UNICEF & WHO, 2018). In Sub-Saharan Africa, only few schools had basic hygiene services (UNICEF & WHO, 2018). Oppong, Yang, Amponsem-Boateng and Duan (2019) asserted that, in Ghana, the hand is the major means through which faeco-oral microbes transfer occur among children. However, they attributed this bad practice to inadequate hand hygiene facilities like water washing basin, soap and water at vantage points. According to Oppong et al., (2019) human microbial usually accommodate in the human palm and hence there is the need to ensure adequate hand washing practices among people. Good and regular hand hygiene is the best means to control the spread of COVID-19 (Blake, Glaeser, Haas, Kriticos & Mutizwa-Mangiza, 2020). Therefore, it will be important that hand washing practice is encouraged through the provision of adequate hand hygiene facilities like soap and water, and washing basin at vantage points.

In 2009, about 11,140 basic schools were available in Ghana, and out of these, 5360 (48%) and 7075 (63.5%) had toilet and water facilities respectively; implying that majority of schools lacked access to adequate WASH facilities (GES, 2014a; as cited in Aladago, Luguterah, and Tiswin, 2019). The resultant effects of inadequate WASH in schools are a threat to health and well-being. More specifically, “schools with unsafe and inadequate

water, sanitation and hygiene conditions, and intense levels of person-to-person contact, are high-risk environments for children and staff, and exacerbate children's health"; "and boys or girls may be influenced differently, resulting in unequal educational prospects (Adams et al., 2009). For example, in rural schools, girls are the greatest gender disparity as compared to their male counterparts (UNICEF, 2015). Many girls' lives are significantly impacted by misconceptions and insufficient information on menstrual health and hygiene (Adams et al., 2009). For example, with inadequate WASH facilities, when a girl is menstruating, she may skip school (Sommer, Figueroa, Kwauk, Jones, & Fyles, 2017), which may contribute to unequal learning opportunities (Adams et al., 2009). Therefore, the study seeks to examine the management of WASH facilities within the public basic schools and suggest recommendations to improve utilization and facilitate equal learning opportunities for both males and females.

Problem Statement

Inadequate WASH facilities in schools has serious implications on the health of children, especially girls and students living with disabilities (UNICEF & WHO, 2020), which may contribute to unequal learning opportunities (Adams et al., 2009). For example, without adequate WASH facilities, when girls are menstruating, they may miss school. (Sommer et al., 2017).

Therefore, in 2010, the Ghana Education Service (GES) developed the School Health Education Programme (SHEP) Policy and Strategy Framework, aimed at providing strategic direction and good context for school health and WASH programming. WASH comprises four (4) main components which

include “disease prevention and control, skills-based health education, food safety and nutrition education, and a safe and healthy school environment”. The safe and healthy school environment focuses on three main interventions, namely “Safe water and sanitation, healthy psychosocial school environment and safe physical environment”.

However, despite these efforts, about 58% and 35% of public schools in Ghana still lack access to water supply and toilet facilities respectively [Ghana Education Management Information System report (EMIS report, 2019)]. A study by Aladago et al., (2019) found that even for those who have access to WASH facilities in school, most were in bad shape. Thus, little attention was paid to utilization and management of WASH facilities to support effective hygiene practices in schools. This raises many numbers of questions about access to, and management of, WASH facilities in schools in Ghana. Therefore, this study seeks to examine the management of WASH facilities in basic schools within the Mfantseman Municipality, which is ranked among the least in terms of access to WASH facilities and academic performance in Ghana (UNICEF & CDD-Ghana, 2018).

Purpose of the Study

The purpose of the study is to examine the management of WASH facilities in basic schools within the Mfantseman Municipality of Ghana.

The objectives for this research are to:

1. Assess sanitation and hygiene practices in public basic schools in Mfantseman Municipality.
2. Examine operations and maintenance of WASH facilities in public basic schools in Mfantseman Municipality.

3. Explore the challenges in managing WASH facilities in public basic schools in Mfantseman Municipality.
4. Explore strategies to improve utilization and management of WASH facilities in public basic schools in Mfantseman Municipality.

Research Questions

1. What are the sanitation and hygiene practices in public basic schools in Mfantseman Municipality?
2. How are WASH facilities operated and maintained in public basic schools in Mfantseman Municipality?
3. What are the challenges in managing WASH facilities in public basic schools in Mfantseman Municipality?
4. How can stakeholders improve the utilization and management of WASH facilities in public basic schools in Mfantseman Municipality?

Significance of the Study

The study findings will help Mfantseman Municipal assembly stakeholders with information on current water, sanitation, and hygiene practices in the basic schools to improve on School Health Education Programme (SHEP) Policy and Strategy Framework in the Municipality. It will be useful to the government and other development actors, such as non-governmental organizations, whose primary goal is to supply water and sanitation facilities to underserved rural schools and communities in Ghana and beyond. It will also be used as a reference material for future research investigations by researchers in sanitation and health related fields.

Delimitation of the Study

Geographically, the study is limited to some selected communities in the Mfantseman Municipality who were randomly selected. The study focused on the sanitation and health issues in these selected schools to examine student's sanitation and hygiene behaviour, since academic performance in the Municipality is nothing to write home about. Hence, the study seeks to assess the management of WASH facilities in basic schools within the Mfantseman Municipality; looking at where they defecate, whether students wash their hands with soap and water or only water after visiting the toilet or urinal, where they throw their rubbish after sweeping, the types of sanitation facilities used in schools, and how these facilities are cleaned and managed, and to find out whether poor sanitation has negative implication on the student's academic performance.

Limitations of the Study

In terms of the study's findings, a number of limitations in the data collection process should be noted.

1. The study was limited to 16 selected localities, and even though it is meaningful, the results might not be a true reflection of all public schools in the other localities within the Municipality.
2. Data collection exercise prolonged because some schools were not willing to use their class period for the researcher to conduct the study unless free periods or scheduled date and time.

Organization of the Study

The research is divided into five chapters. The first chapter is the introduction, which provides the study's background, the problem statement,

and research objectives and questions, scope of the study, rationale for the investigation, and organization of the study. The second chapter deals with Literature review including theoretical and conceptual Framework. Chapter three consists of the Methodology including a description of the methods used, study area and the various data collection methods, data analysis and ethical considerations used in the study. The fourth chapter is dedicated to the analysis and discussion of the findings while chapter five presents the summary, conclusion, and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter aims to situate the study in the scholarly context by reviewing the literature on water, sanitation, and hygiene (WASH) facilities in basic schools which is related to the study's objectives. This is based on a review of published works such as reports, books, journals, and internet sources, to gain insight on WASH facilities in schools within the Mfantseman Municipality.

Definition of Terms

Water

Water is a chemical compound that contains hydrogen and oxygen and exists in three states: gaseous, liquid, and solid. (Zumdahl, 2021) It's one of the most common and vital substances on the earth. It is a tasteless and odorless liquid with the critical capacity to dissolve a wide range of other chemicals at room temperature according to Zumdahl, (2021). However, in the context of this study water is a chemical element made of two molecules of hydrogen and an oxygen component and it is colorless, tasteless, and odorless and can change form as solid, liquid, and gas.

Humans require water as their basic nutrient to survive (Howard and Bartram, 2003). Gleick, (2003), proposed several uses of water which include domestic purpose (cooking, drinking and cleaning), agricultural purpose, maintaining plants temperature, and hydroelectric power. Kılıç (2020); opines that water is a biological solvent to mankind.

Sanitation

Sanitation as defined by the Joint Monitoring Programme (JMP) (WHO/UNICEF JMP, 2017), is the mechanism for separating human faeces from human contact in a sanitary manner (Thus; ventilated improved pit latrines (VIP), flush toilets, piped sewage systems, septic systems and composting toilets). However, in the context of this study, sanitation refers to the ability to improve one's ecological condition to enhance the health, social, economic, and physical well-being to boost the quality of life of the individual.

Basic service

This study adopts the definition of basic service as defined by UNICEF & WHO,(2020); as an improved single-sex sanitary facilities at school that are currently functional (Thus; warrant availablity, functionality, and well-maintained facilities).

Limited service

Limited service is an "improved sanitation facilities at the school that are either not single-sex or not useable at the time of the survey (UNICEF & WHO, 2020)". In the context of this study, limited-service refers to inadequate sanitation facilities in the school which do not meet the desired quality of student's choice and satisfaction.

No service

"No service refers to unimproved sanitation facilities or no sanitation facilities at the school" (UNICEF & WHO, 2020). In the context of this study, no service refers to the absence of sanitation facilities in schools.

Hygiene

Hygiene is a method of reducing diarrheal diseases by the broad use of safe aseptic practices that draws on what local people already know, do, and desire (UNICEF, 1999). Hygiene, in the context of this study, refers to the process of ensuring adequate prevention of illness and death through proper handling of waste and disease prevention.

The need for School Hygiene Education

The importance of cleanliness about oneself, the environment, and hygiene, are emphasized in school (Dongre, Deshmukh, Boratne, Thaware, & Garg 2007). School enrolment, and continued participation and accomplishment in school, are dependent on one's health (Ghanim, Dash, Abdullah, Issa, Albarazi, & Al Saheli, 2016). According to Agun (2021), pupils make up about half of the population of developing nations. Hence, it is important to ensure effective school hygiene interventions and strategies to protect the lives of these children.

The teacher serves as the pupils' guardian in school, whose activities and engagement influence the pupils' sanitary and hygiene behaviour as the preventative process (Deb, Dutta, Dasgupta, & Misra, 2010). Pupils obtain knowledge and skills, on hygiene practices (ALBashtawy, 2015; and, Lopez-Quintero, Freeman, & Neumark, 2009), and they then act as the agents of change and future leaders when enlightened on these basic hygiene practices as the appropriate means of influencing their household and the society they belong (Adams et al., 2009). Therefore, emphasizing hygiene education in school is one of the best practices for ensuring good hygiene behavior among people.

Availability, Functionality, and utilization of sanitation facilities in schools

According to Fink, Günther, and Hill, (2011), and Weisz, Meuli, Thakwalakwa, Trehan, Maleta, and Manary, (2011), the state of sanitation and hygiene facilities in schools around the world is appalling. Poor and inadequate WASH facilities are a typical occurrence in the school setting, in Sub-Saharan Africa, with girls facing a lot of challenges in managing menstrual hygiene (Jewitt & Ryley, 2014).

Research by Aladago et al., (2019) in Ghana, found that, even for those who have access to WASH facilities in school, most were in bad shape implying that; most WASH facilities in basic schools are not up to the desired quality standards for acceptability and are insufficient as well. The study by Okyere-Kwakye (2013), Ahmed, Wong, Chua, Hydrie, and Channa (2021) also found that basic schools had toilet facilities but are inadequate. Likewise, Chinyama, Chipungu, Rudd, Mwale, Verstraete, Sikamo, Mutale, Chilengi, and Sharma, (2019), found available but inadequate toilet facilities in the school. In addition, a study on school WASH in Nicaragua found that schools lacked adequate sanitation and handwashing facilities, and hence, students result to other means of disposing off waste, (Jordanova, Cronk, Obando, Medina, Kinoshita, & Bartram 2015).

Similar observations were made in South Africa, where it was found that many schools had unhygienic toilet facilities and one water tap was far from the toilet facilities (Sibiya & Gumbo, 2013). In addition, Cissé, Erismann, Gerold, Koju, Odermatt, Sagar, Sharma, Schindler, Shrestha, and Utzinger (2017) conducted a study on school WASH facilities in Nepal and

discovered that school toilets were in poor condition and without vital hygiene materials, and no school had separate handwashing stations closer to the sanitation facilities purposely for handwashing, indicating unhygienic practices among students. They further highlighted that pipe stand/water points were far away from latrines in schools, making pupils travel to other locations for water due to the inadequate drinking water at schools. Nonetheless, Acquah, Acquaye, and Eshun (2014) found that; most basic schools in the Sefwi Akontmbra district in the Western North Region of Ghana did not have toilet facilities.

Duah, Bofa, Apraku, and Fenteng (2019), found that pupils in schools without toilet facilities; defecate in the open or use a nearby public toilet. It is in line with, Jordanova et al., (2015), who also found that in schools without adequate sanitation infrastructures, students resort to other means of disposing off the waste. However, Njue and Muthaa (2015); and Ahiatrogah (2020), found that majority of public basic schools had toilet facilities. Also, the study by Ghanim et al., (2016), found adequate toilet facilities in schools.

Studies by Acquah et al., (2014), and Ahiatrogah (2020); found that K.V.I.P. is the type of toilet facility mostly used in basic schools. Also, Acquah et al., (2014), found unisex toilet facilities in schools (male and female students use the same toilet facilities), while Shrestha, Shrestha, Ito, Kobayashi, Nishida, Futaba, and Malla, (2021), found separate toilet facilities in schools for male and female students.

Similarly, Duah et al., (2019); and Coppens (2005); found that schools have dust bins for waste collection on the school compound, in consistence with Thakadu, Ngwenya, Phaladze, and Bolaane, (2018); and Bah, Diallo,

Bah, and Li (2020); who also found dust bins available in schools. However, their findings oppose that of Acquah et al., (2014), who found that basic schools did not have dust bins on the school compound.

Availability, Functionality, and utilization of water facilities in schools

On the availability, functionality, and utilization of water in schools, studies by Ahiatrogah (2020); and Jasper et al., (2012), found the availability of water in basic schools. However, Bah et al., (2020) found that in schools where no water is available, pupils fetch water from individual homes closer to the school environment. It was in support of Ahiatrogah (2020) who also found that in basic schools that do not have water, pupils fetch water from houses near the school compound, bring water from their houses, or buy from vendors. Duah et al., (2019) also attested to the fact that in schools without access to water, pupils are asked to carry water along from home to school.

History of hand washing

"Handwashing is the act of cleaning one's hands to remove filth (Dajaan, Addo, Ojo, Amegah, Loveland, Bechala, & Benjamin, 2018)". According to the World Health Organization (2009), proper handwashing involves massaging both hands with soap for about 20 seconds and washing under running water and afterward you dry the hands. Steiner-Asiedu et al. (2011), also affirm that good hand washing involves fully wetting the hands, lathering them with soap to eliminate grime, and then scrubbing them for about 20 seconds.

Handwashing dates back to two prominent pioneers, Ignaz Semmelweis in the 1800s and Florence Nightingale in the 1940s. Ignaz created handwashing by establishing a link between handwashing avoidable diseases affecting women

who keep dying at his clinic, the hygiene of his clinic's employees, and a high rate of maternal death during labour and delivery due to pollutants from cadaverous particles through scientific observation. He then instructed his staff to use chlorine to wash their hands before entering the maternity unit, an idea that proved successful in lowering maternal death rates and launching the handwashing revolution that continues to this day (Global Handwashing Partner, 2017).

Also, in a military hospital in Italy, Nightingale instituted handwashing and other hygiene measures to stop a foul odor known as miasma from developing infections. These procedures achieved what Nightingale sought, which was to minimize the rate at which individuals contracted infection (Maxworthy, 2008, as cited in Agun 2021).

Unfortunately, Semmelweis and Nightingale's hand hygiene recommendations were not generally embraced. For almost a century, the promotion of handwashing came to a halt. The United States Centers for Disease Control and Prevention did not recognize hand cleanliness as an important approach to prevent the spread of infection until the 1980s when several foodborne outbreaks and healthcare-related infections became public worry. It was then they became the first to launch national hand hygiene guidelines, and many more have since followed (Global Handwashing Partner, 2017).

Knowledge on Handwashing

A study by Banu, Sharmin, Yasmin, and Khanom (2014), reported that handwashing awareness may not necessarily imply high levels of practice, whether there are available or lack of handwashing apparatus in schools.

Oyibo (2012), poised that our hands are the most prevalent channel for infection transmission since they come into close touch with the eyes, mouth, and nose. Unwashed and contaminated hands encounter, transfer the majority of infectious diseases such as diarrhoea and acute respiratory infection (Oduntan, 2010; as cited in Nwajiuba, Ogunji, Uwakwe, & David 2019). Agun (2021), poised that, water alone is typically insufficient to remove lipids, and other organic soils components, or prevent disease-causing organisms. It is crucial to use soap in the hand-washing procedure since it is a less expensive approach, and the best means of preventing bacteria from spreading from the hands to the mouth (Biswas, Saboo, Dasgupta, Preeti, Amitavakumar, & Das, 2015).

Assefa and Kumie (2014), found in Northern Ethiopia that, students had insufficient information about handwashing and do not wash their hands properly. Also, Gawai, Taware, Chatterjee, and Thukar (2016) found that pupils in Mumbai, Maharashtra, India, lacked basic information on hand hygiene. Another study in Indonesia found that pupils had insufficient knowledge on hand hygiene, hence had poor handwashing practices (Nazliansyan, Wichaikull, & Wetasin 2016; as cited in Kgosimotho, 2019). Oppong, et al., (2019) also asserted that, in Ghana, the hand is the major means through which fecal-oral microbes transfer occurs among children. They attributed it to inadequate hand hygiene apparatus like water, soap, and washing basin at vantage points, especially in schools.

However, a study in China by Monney, Bismark, Isaac, and Yaw, (2014), found pupils to have enough hygiene knowledge on hand washing. Also, Shereen, Aziz, and Abdulla (2012), found that pupils have sufficient

handwashing knowledge and practices. Another study by Chittleborough, Nicholson, Young, Bell, and Campbell (2013) in England found pupils with sufficient handwashing knowledge and practices. More so, Ekeleme, Egwuonwu, Iwuoha, and Ogunsola (2018), also found that pupils hold better handwashing knowledge, and the study by Dajaan et al., (2018), in Ghana, found pupils to have enough hygiene knowledge on handwashing with good hygiene practices, in consistence with this study's findings that students have adequate and satisfactory hygiene practice.

Availability, Functionality, and utilization of handwashing facilities in schools

Aremu, (2012), highlighted that adequate hand washing apparatus with soap and water in schools are necessary for influencing students' handwashing behavior positively. Dajaan et al. (2018), poised that soap, towels, water, disinfectant, and bowls are all included in handwashing facilities. The study by Ahiatrogah (2020) found the availability of handwashing facilities in the basic schools in the Dzodze community in the Ketu North Municipality in the Volta Region of Ghana. Also, Duah et al., (2019), found veronica buckets as the main hand washing facilities in public basic schools. It was similar to Ahiatrogah (2020), who also found that veronica buckets are the main hand washing facilities in the basic schools.

However, studies by Nwajiuba et al., (2019), and Steiner-Asiedu et al., (2011) found that most public basic schools did not have handwashing facilities in the school, which opposes this study's findings that found available handwashing facilities in the public basic schools.

Critical times for washing hands

According to Quinn, (2019); Ali, (2008), and the Global Hand Washing Day guide report (2017) [GHWD, 2017], washing hands after using the toilet, after playing with toys or touching animals, and before touching food are regarded as critical times for washing hands. Therefore, to ensure adequate handwashing practices, humans have to frequently observe hand hygiene at these critical periods.

Sibiya et al., (2013); and Dulal, (2016), found that most students wash their hands after visiting the toilets. Also, studies such as Steiner-Asiedu et al., (2011), Thakadu, Ngwenya, Phaladze, and Bolaane, (2018); and Ghanim et al., (2016), found that the majority of students always wash their hands with soap before eating and after visiting the toilets. However, it was opposed by Bah et al., (2020), who found that the majority of students do not always wash their hands with soap before eating and after visiting the toilets, indicating poor hygiene behavior on the part of these children.

Impacts of hand washing

According to Khan, Ashraf, Iftikhar, and Baig-Ansari (2021), hand hygiene is viewed as a critical component of infection prevention. Nwajiuba et al (2019), asserted that in developing nations, hand washing has been recognized as one of the best methods for reducing infectious diseases spread by dirty hands. Also, Curtis et. al., (2003) was with the view that hand washing is used as a protective way of reducing the burden of illness.

It also reduces the rate of direct and indirect spread of diseases through hand contacts or food preparation [Centers for Disease Control and Prevention (CDC), 2012]. A good and regular hand hygiene is the best means that can

help to control the spread of COVID-19 (Blake, Glaeser, Haas, Kriticos & Mutizwa-Mangiza 2020).

Sanitation and Hygiene practices in Basic Schools

Many countries have substantial and growing evidence of insufficient access to safe water, sanitation, and hygiene in schools in low- or middle-income countries (Adams et al., 2009). On the global scale, research showed that basic schools that had basic sanitation were less than two-thirds (UNICEF & WHO, 2020). It was projected that 19% of schools globally had no sanitation service and in these schools, students and teachers depend on unimproved facilities, like bucket latrines or hanging latrines, pit latrines without a slab or platform, or have no sanitation service at all (UNICEF & WHO, 2020). Globally, a school with no sanitation facilities, 367 million children attend (UNICEF & WHO, 2020). UNICEF (2012) found 51% of schools with adequate water supply and 45% with adequate sanitation in low and middle income countries (Cissé et al., 2017), implying that WASH facilities in schools are inadequate with associated detrimental effects on health and school attendance (Mcmichael, 2019).

Many schools in rural areas of Sub-Saharan African countries, had toilets that did not satisfy acceptable, accessible, or high-quality criteria (UNICEF & WHO, 2020). Children with disabilities, female staff, and students are the most affected; and as such need a convenient facility during the period of menstrual hygiene (UNICEF & WHO, 2020). About two-thirds of toilets in schools were not easily reached by children with disabilities in sub-Saharan Africa (UNICEF & WHO, 2020). Only 35% of public schools had access to good and safe toilet facilities in Ghana (EMIS report, 2019).

Also, 69% of schools had basic drinking water globally (UNICEF/JMP & WHO, 2018). According to UNICEF/JMP & WHO (2018), 12% of schools were with limited drinking water service, 19% of schools did not have drinking water service, and approximately 570 million students lacked access to basic drinking water at school. UNICEF (2012) found only 51% schools with adequate water supply, implying that access to water for WASH facilities in schools is inadequate with several health implications and affects school attendance (Mcmichael, 2019). UNICEF/JMP & WHO (2018) found that almost half of all schools in Sub-Saharan Africa lacked access to safe drinking water services. Schools in rural areas across most countries had lesser coverage in terms of basic drinking water services compared to urban schools (UNICEF/JMP & WHO, 2018). One in four basic schools had no drinking water service (UNICEF/JMP & WHO, 2018). In Ghana, only 58% of public basic schools have an adequate water supply (EMIS report, 2019).

Approximately, 900 million students were in schools with limited access to basic hygiene services worldwide (UNICEF/JMP & WHO, 2018). 53% of schools were with basic hygiene services worldwide; 11% of schools had limited hygiene services while 36% of schools did not have hygiene services (UNICEF/JMP & WHO, 2018). In Sub-Saharan Africa, basic hygienic services available in schools were below 50% (UNICEF/JMP & WHO, 2018). Oppong et al., (2019) asserted that, in Ghana, the hand is the major means through which fecal-oral microbes transfer occurs among children. However, they attributed this bad practice to inadequate hand hygiene facilities like soap, washing basin and water, at vantage points, especially in schools. According to Oppong et al., (2019) human microbes

usually accommodate in the human palm and hence there is the need to ensure adequate handwashing practices among pupils. A good and regular hand hygiene is the best means that can help to control the spread of COVID-19 (Blake et al., 2020). Therefore, it will be important that hand washing practice is encouraged through the provision of adequate inadequate hand hygiene facilities like soap, washing basins, and water, at vantage points across schools in Ghana.

Operations and Maintenance of WASH Facilities in Basic Schools

Most nations have national sanitation policies and strategies in dealing with WASH situations, especially in schools but only a few are with sufficient financial and human resources to execute them (UNICEF & WHO, 2020). An analysis of 140 low and middle-income countries, released in 2016 by World Bank and later revised in 2017, estimated that the annual cost of achieving collective sanitation globally; was US$105 billion between 2017 and 2030 (UNICEF & WHO, 2020). A US$1.5 billion yearly capital outlay would be expected to eradicate open defecation alone, with considerably higher operating and maintenance costs of about US$3.9 billion per year due to the daily replacement of latrines (UNICEF & WHO, 2020). However, the cost to securely control sanitation differs significantly across regions. Sub-Saharan Africa has the largest costs, of an estimated $25.7 billion capital expenditure per year, backed by an extra US$13.2 billion in operation and maintenance costs annually (UNICEF & WHO, 2020). The high cost of productive operation and maintenance costs is also not well expected and thus not properly budgeted, resulting in failures and reversals (UNICEF & WHO, 2020).

In 2019 alone, the Government of Ghana (GOG) budgeted for about 4,978,883 million Ghana Cedis for water resource management and 64,090,296 million Ghana Cedis again for Sanitation Management (solid waste, liquid waste, and Environmental health sanitation) according to the Ministry of Sanitation and Water Resource |MSWR|, (2019) with the main aim of operating and maintaining good WASH services in the country to minimize the spread of disease and improve on the citizens' well-being, especially in schools (Adams et al., 2009). However, there is more to be done since Ghana as a nation is still struggling to achieve its SDG 6. To improve school WASH facilities and interventions, it is necessary to know the cost involved for efficient and effective policies and interventions. This is because Alexander, Mwaki, Adhiambo, Cheney-Coker, Muga, and Freeman (2016), asserted that even when there are adequate water supply and toilet facilities, maintenance of the infrastructure for proper hygienic practices and sanitation behaviours in schools, are still challenges in low-income settings.

Alexander et al., (2016), found that an estimated cost of 3.03 US dollars is required for operating and maintaining standardized school WASH facilities per student per year. In another study in Bangladesh, found that, schools need an average of 1.40 US dollars for operating and maintenance of school WASH facilities per student per year **(**UNICEF, 2015; as cited in Alexander et al., 2016). The cost of setting up school WASH facilities amounts to 18,916 US dollars per school, in a school with an average number of 400 students. Thus 4.92 USD yearly per student, while the estimated cost found by a study in Bangladesh indicated that an amount of 10 US dollars per student is needed (Alexander et al., 2016).

Mathew, Zachariah, Shordt, Snel, Cairncross, Biran, and Schmidt (2009), and Njuguna et al., (2008) indicated that the use of toilet facilities in schools is related to the level of its cleanliness. Other studies also revealed that properly maintained and clean toilets are with the ability to reduce absenteeism among pupils (Pengpid and Peltzer, 2012). However, some studies established that WASH interventions in schools do not impact students' attendance regardless of gender (Caruso et al., 2014, Oster and Thornton, 2009).

With regards to operations and maintenance of the facilities, Acquah et al., (2014), reported that in public basic schools, students are responsible for cleaning school WASH facilities based on duty roster and sometimes as punishment to offenders. It is similar to Duah et al., (2019), who also found that students clean the WASH facilities in schools based on duty roster and sometimes as punishment to offenders.

The study by Wuni, Agyeman-Yeboah, and Boafo, (2018), found that public basic schools in Ghana mainly depend on G.E.S capitation grants and/or other internal means. It is also similar to Duah et al., (2019) who found that the G.E.S capitation grant is the main source of funding to maintain the school WASH facilities. These are in support of Ghanim et al., (2016), who found that government is the entity responsible to ensure adequate hygiene information and promotion in schools.

Duah et al., (2019) found that pupils are not provided with toilet rolls in schools; hence they find their means for doing anal cleansing, in consistence with this study which also found that school children are not

provided with toilet rolls/paper unless they find their own means of doing anal cleansing.

Challenges in managing WASH Facilities in Basic Schools

Primary school children in 2004, were projected to be the adults of 2015, therefore, the national and sectorial policies and budgets prioritized School Sanitation and Hygiene Education, according to the Global Wash Forum held in Dakar in December 2004 (Nahar & Ahmed 2006). Adams et al., (2009) further highlighted that, children are the agents of change and future leaders and when they are enlightened on basic hygiene practices, would be an appropriate means of influencing their household and the society they belong; and hence supported School Sanitation and Hygiene Education.

However, even in recent times, many rural schools still lack access to adequate WASH facilities (UNICEF & WHO, 2020). "Morgan, Bowling, Bartram, and Kayser, (2017), in Ethiopia, Kenya, Mozambique, Rwanda, Uganda, and Zambia, for example, conducted a cross-sectional study of WASH intervention receiver schools and found that just 23% of rural schools fulfilled WHO's recommended student-to-latrine ratio". School WASH facilities are inadequate, particularly in low-income nations, with severe health and school attendance effects (Mcmichael, 2019). This challenge was attributed to insufficient WASH facilities in schools (Mcmichael, 2019) and a lack of separate school WASH facilities, especially for girls during the age of menstruation (UNICEF, 2015).

These challenges of inadequate water, sanitation and hygiene issues in schools, lead to unequal learning opportunities (Adams et al., 2009). Girls are mostly affected as compared to their male counterparts (UNICEF, 2015).

More so; Dorgbetor, (2015) also attributed these challenges to restrictions, exclusion, and humiliation given to female students during the period of mensuration, making them reluctant to attend the school which leads to unequal learning opportunities as compared to their male counterparts. While, Duijster, Monse, Dimaisip-Nabuab, Djuharnoko, Heinrich-Weltzien, Hobdell, and Benzian, (2017), also attributed these WASH challenges to unchanged behavior and attitude of students. Therefore, affecting school children's health and school attendance (Mcmichael, 2019). Furthermore, Acquah et al., (2014) attributed this challenge of WASH facilities to invasion by community members; whilst Chinyama et al., (2019) attributed these school WASH challenges to bad odour coming from the facilities.

A study by Aladago et al., (2019) in Ghana, also found that, even for those who have access to WASH facilities in school, most of them were in bad shape implying that WASH facilities in Ghana schools are not up to the desired quality standards for acceptability and are insufficient. In addition, Grimason et al., (2014) asserted that; poor sanitary and hygiene behavior is not only attributed to insufficient WASH facilities but, it can be linked to where they are placed and how they are designed.

Sibiya and Gumbo (2013) found a lack of a separate waste bin for menstrual hygiene management in school. It was in line with Chinyama et al., (2019) who found that; WASH facilities in schools do not support menstrual hygiene management. In this wise, Adams et al., (2009), Dorgbetor, (2015), Jasper et al., (2012), and Chinyama et al., (2019) asserted, insufficient WASH facilities affects girls' attendance to school.

A study by Curtis (2003), revealed that despite countless efforts by government and non-governmental organizations in the provision of water and sanitation facilities, hygiene promotion, and health education, very little improvement had been attained in reducing water, sanitation, and hygiene-related diseases, in Ghana. Implying that, there is a challenge with attitudinal change with regards to hygiene promotion in Ghana, especially in the basic schools.

Studies by Adams et al., (2009), UNICEF, (2010a), Temu, (2015) and Aladago et al., (2019) established that the ability of students to study in school is largely affected by the state and condition of WASH facilities available in those schools. Implying that, the state and condition of WASH facilities in schools affect students' academic performance and future success. It is in line with the study by, Campbell, Benova, Gon, Afsana, and Cumming, (2015) who found that inadequate water, sanitation and hygiene facilities in schools have several negative health implications on students especially, girls and children.

Information by the District League Table II (2018/19) for Ghana (UNICEF & CDD-Ghana, 2018) on sanitation and academics depict the least performance and bad sanitation for Mfantseman Municipality which affirm the claim by (Adams et al., 2009, UNICEF, 2010a, Temu, 2015, Mills & Cumming 2016 & Aladago et al., 2019), that academic performance could be affected by the state of sanitation.

Strategies for improving utilization and management of WASH Facilities

The right to water and sanitation is the foundation to achieve several Sustainable Development Goals (WHO, 2018). Globally WASH programmes

in schools seek to, decrease the occurrence of diarrhea and its related hygiene diseases; increase school enrolment, efficiency, and attendance; and influence parents' and siblings' hygiene habits, with children as change agents in their homes and communities (Mcmichael, 2019). According to WHO (2018), to accomplish the SDGs, a toilet alone is insufficient; instead, a system that is safe, sustainable, and well-managed is needed.

A systematic review of literature by Mcmichael, (2019), found that WASH interventions in schools services have both positive and negative effects on children's health. Duijster, et al., (2017), also affirmed that WASH interventions in school services do not always lead to disease reduction and prevention if students still hold on to the old behavior and ways of life. Advancing WASH interventions in schools is critical for improving children's chances of a healthier future because it helps to create a safe, healthy, and conducive learning environment for teachers and students to cultivate and practice good hygiene habits; (Duijster et al., 2017; Lupele, Kakuwa, & Banda, 2017). Therefore, WASH strategies and interventions in schools, are critical but can be relevant only when students are willing to accept and change from their old and unsanitary hygiene practices.

Institutional Structure

Several strategies and interventions in the form of regulations, policies, and programmes have been enacted by many institutions for initiating development from the Central government to the unit committees at the grass-roots level (Mariwah 2012). These institutions include; the Metropolitan, Municipal, and District Assemblies (MMDAs), Ministry of Education, Ministry of Health, Ministry of Sanitation and Water Resource**,** Ministry of

Environment, Science and Technology (MEST), or by the school/local authorities.

The Local Government Act of 1994, Act 462, the Environmental Assessment Regulations of 1999, the Environmental Protection Agency Act (1994), Act 490; and (LI 1652 Environmental Sanitation Policy of Ghana (1999) are a few policies for managing sanitation in Ghana. All of these rules and regulations originate from the National Environmental Action Plan. The Ministry of Local Government and Rural Development (MLGRD) published the Ghana National Environmental Action Plan Ministry of Sanitation and Water Resource (1991), which directs Metropolitan, Municipal, and District Assemblies to incorporate particularly adequate sanitary practices and management. These strategies/interventions from the institutions help in managing WASH activities in Ghana.

For example, Mfantseman Municipality enacted Environmental Sanitation Byelaws (1995) to protect the natural environment and improve the health of its citizens. Traditional norms/practices, information disclosure requirements, market mechanisms, environmental assessment, and public policies are all examples of ways to promote or improve sanitation and protection against the spread of diseases. The Mfantseman Municipality's Byelaws include the following:

- Mfantseman Municipality (House Owners and Occupier) Byelaws, 1995.

This Byelaw explains the duties of households and property owners in keeping their environment clean and determines the punishment that would be meted out to the offenders of the Byelaws.

- Mfantseman Municipality (sanitation) Byelaws, 1995.

This law aims to improve sanitation within a settlement. It outlines the responsibilities of both pedestrians and property owners in terms of maintaining a clean environment. It also specifies the penalties that will be imposed on those that cause environmental damage.

In 2010 the Ghana Education Service (GES) also came up with School Health Education Programme (SHEP) Policy and Strategy Framework, aimed at providing strategic direction and good context for school health and WASH programming. WASH comprises four (4) main components which include "disease prevention and control; skills-based health education; food safety and nutrition education; and a safe and healthy school environment". The safe and healthy school environment focuses on three main interventions, namely "Safe water and sanitation; healthy psychosocial school environment and safe physical environment". All these are several strategies aimed at improving school WASH.

Theoretical Framework

The theoretical basis for this study is the Sanitation Behaviour Change Framework (SaniFOAM) developed by Jacqueline Devine in 2008 (Figure 1). It states that before changing sanitation behaviours of people, it demands that we first understand them. The author coined the acronym SaniFOAM to represent Sanitation, Focus, Opportunity, Ability, and Motivation; to assist programme managers and implementers to understand individual's behaviour on why and how they behave in a certain way before that behaviour can be changed. The concepts help in understanding students' sanitation and hygiene behaviour. It also helps to define the nature and characteristics of students and

their sanitary behaviour to things around their surroundings which will either motivate them to perform a certain action or hinder their ability to perform any action. Thus, the theory is important to the study because it gives more insights into understanding students' sanitation and hygiene behaviour in their school environment/community.

However, the proponent of the SaniFOAM framework failed to account for challenges that may affect focus even if the other conditions/concepts exist. This shortcoming is however addressed in this study because I sought to fill the gap by accounting for challenges that may affect focus even if the other conditions/concepts exist, and outline utilization strategies to help curb the sanitary problems.

Conceptual Framework

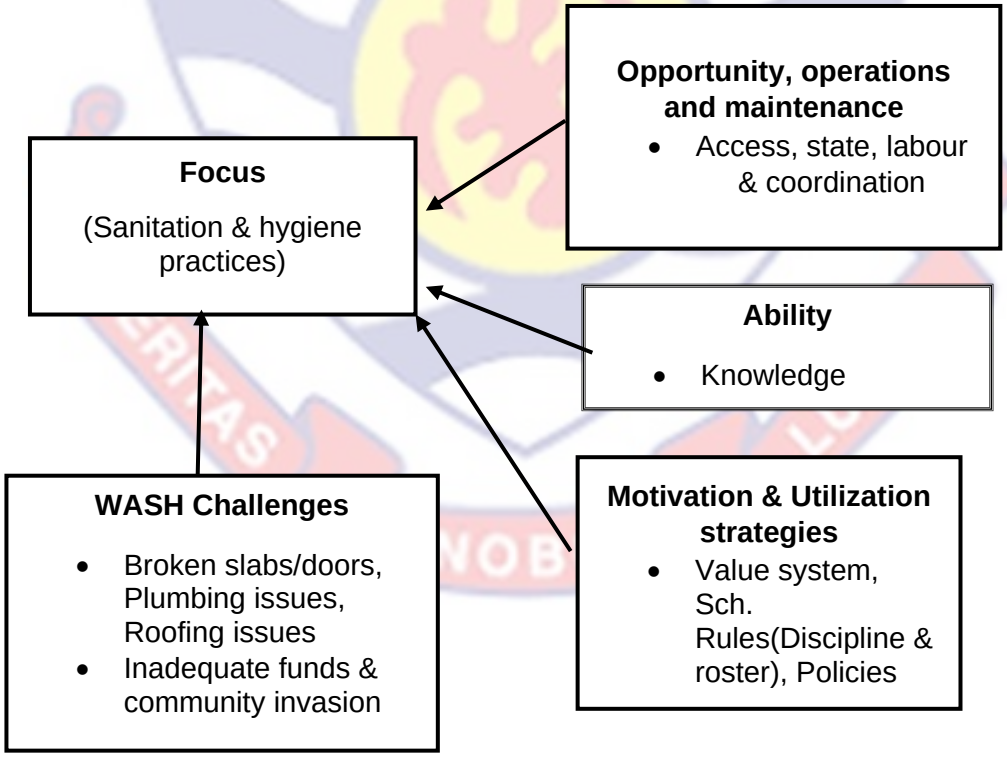

Figure 1:Sanitation Behavior Change Framework (SaniFOAM)

Source: Adapted from SaniFOAM (Devine, 2009)

This study adapted the SaniFOAM framework with concepts such as WASH challenges, motivation and utilization strategies, opportunity, operations, and maintenance, but maintained focus and ability. Linking these concepts to the study, **focus** answers my first objective. In this study, the focus is the junior high students in the public basic schools within Mfantseman Municipality. However; **focus**, in this context, is influenced by ability, motivation and utilization strategies, WASH challenges, opportunity, operations, and maintenance. The study seeks to assess the students' sanitation and hygiene practices. **Focus**, as the pivot factor, helps to address the first objective (Assess sanitation and hygiene practices in basic schools). **Opportunity** is linked to operations and maintenance to answer the second objective (Examine operations and maintenance of WASH facilities in basic schools). WASH challenges address the third objective (Explore the challenges in managing WASH facilities in basic schools), while motivation and utilization strategies answer the last objective (Explore strategies to improve utilization and management of WASH facilities in basic schools).

Mfantseman Municipal schools, having access to these WASH facilities, indicate **opportunity** because the opportunity looks at accessibility and therefore, the SaniFOAM concepts are applicable. Students and their sanitary behaviour depict **focus**, students' knowledge on sanitary-related issues depict **ability** while regulations and common belief systems of the students on sanitation depict **motivation**. Hence, this study links the SaniFOAM concepts to ensure adequate school hygiene and sanitary education among the general populace, and more specifically students.

Focus

Focus, as a behaviour change determinant, is concerned with the target group of interest and the desired behaviour to be changed. In the context of this study, J.H.S students are the target population. Sanitation and hygiene practices/behaviour of the students are influenced by four factors, which are ability, motivation and utilization strategies, WASH challenges, opportunity, operations, and maintenance. The **focus** (students) is influenced by situations and conditions around their school environments. Nonetheless, the determinant of **focus** is explained below.

Ability

Ability in the context of this study is concerned with students' knowledge of sanitation issues. How knowledgeable a student is, concerning issues related to sanitation and hygiene directly or indirectly affects his/her behavior. The ability to perform certain actions is influenced by the student's knowledge of the consequences of his/her behaviour (Devine, 2009). Students with better knowledge of sanitation and its related consequences will have the ability to avoid unsanitary practice than a student who has no idea about the consequences of his/her sanitary behavior. Therefore, awareness of sanitation implications influences the actions and behavior of students.

Opportunity, Operations, and Maintenance

Opportunity is linked to operations and maintenance. Opportunity as behaviour change determinant looks at accessibility of WASH facility, and products attribute (state of the facilities). Accessibility of WASH facilities deals with the availability of toilets, urinals, and handwashing facilities in schools, whether functional or not. It looks at the students-latrine ratio by

comparing school enrollment to available facilities. In a situation where the facilities are not up to school enrollment, students are more likely to use other means to dispose of their waste when the facilities are full. However, in a school where the latrines are many compared to school enrollment, students are more likely to use the facilities if they are well kept than if it's not properly maintained.

Products attribute on the other hand, (state of the facilities) looks at the current state/nature of the facilities, thus; how neat or smelling and the quality of the facilities. Students are more likely to utilize school WASH facilities if they are well kept and in good shape than when they are in bad shape or unkempt. This is a major contributing factor to student sanitary behaviour.

Operations and Maintenance is concerned with the usage, labour, coordination, and daily upkeep of the facilities. These explain how effective the facilities are being used and maintained for the general well-being of both the teachers and students. It takes into consideration the general cleanliness, adequate logistics, labor, coordination, and usage of the facilities. The aspect of maintenance is concerned with daily upkeep, cleanliness, and a conducive environment for the proper disposal of waste. Operations also look at labour and coordination. It's concerned with who appoints whom to do the cleaning and on what basis are these individuals/students are recruited to ensure maintenance of the facilities. Whether these individuals are employed or recruited to do the cleaning or whether it's viewed as a form of punishment or duty for the students to tidy up the environment and the facilities. As well as individuals/agencies responsible for providing adequate logistics for the

maintenance of the facilities. All these concepts help to identify whether the facilities are being used for their intended purpose or are being abandoned.

Adequate logistics to maintain facilities in schools are a major determinant of students' sanitary behaviour. The absence of basic logistics such as detergent, brooms, scrubbing brush, etc., propel students to use other means of disposing of their waste. Situations where the facilities are available but lack adequate logistics for its maintenance; will push the students to result to other means of disposing of waste if they feel the facilities are not properly maintained. If students feel that after visiting the toilet, they feel smelly; it will discourage them from using the facilities. Again, students will be reluctant to patronize school facilities with broken slaps and crack toilet facilities. Therefore, poor maintenance of school facilities leads to low patronage and vice versa.

Motivation and Utilization strategies

Motivation is the driver that encourages or discourages students to behave in a particular way. It's explained by the student's attitude and beliefs (perception), value system as well as emotional/social/physical drivers. Attitudes and beliefs tell a person's perceptions and understanding concerning issues on sanitation. Therefore, holding a positive attitude towards sanitation implies good intentions and beliefs regarding issues relating to sanitation and vice versa. Students with a better idea and positive attitude about the consequences of improper sanitation are more likely to adhere to better hygiene than a student with no idea of sanitary implications. The behaviour seen as deviant regarding sanitation expels students from engaging in it whiles

an action/behavior seen as normal encourages students to indulge in it since it's seen as a daily routine.

Emotional, social, and physical drivers may impact positively or negatively on the behavior of the students depending on the locality (school environment) he/she belongs to considering how a certain behavior is viewed as normal or deviant. Emotional, social, and physical drivers such as self-esteem, comfort, and safety either motivate or expel students to exhibit certain lifestyles. A school where defecating in the open is seen as deviant, will discourage students from engaging in it since they might be punished or disgraced. However, in a school where defecating in the open is normal to the students, their actions are seen as normal to them, and may motivate them to act irresponsibly and unhygienic because it is not deviant to them.

WASH strategies in the context of this study are concerned with regulations and institutional policies regarding access to adequate sanitation. Regulations are concerned with the school rules on proper sanitary behavior as a reward or punishment for their (students) actions. Strict and suitable regulations and policies prevent students (**focus**) to react in a better way. A school with efficient and effective policies and regulations is more likely to reduce the irresponsible behaviour of students compared to schools with no strict sanitary rules and regulations on school hygiene education. Strategies can be in the form of policies from agencies and ministries on adherence to school health and sanitation protocols. These policies are usually enacted by various institutions which include, Ministry of Health, Metropolitan, Municipal, and District Assemblies, Ghana Education Service (SHEP), Ministry of Sanitation and Water Resources, etc. These policies are directed to

ensure proper hygiene and sanitation protocols among citizens, and as such; if they are not effectively managed, would not achieve their intended purpose which aims to examine the management of WASH facilities in public basic schools with Mfantseman Municipality.

Chapter Summary

This chapter emphasized on literature review. It was based on a review of published works such as reports, books, journals, and internet sources, to gain insight on WASH facilities in schools within the Mfantseman Municipality. The theoretical basis for this study was from Sanitation Behavior Change Framework (SaniFOAM) which helped in understanding the students and their sanitary practice.

CHAPTER THREE

METHODOLOGY

Introduction

The study's methodology is presented in this chapter. It is organized into the following headings: research philosophy, research design and approach, study area, population and target population, sample size and sampling technique, data source, research instruments, pre-testing and data collection, data processing and analysis, and ethical consideration.

Research Philosophy

The study employed a pragmatic philosophy because it involves both quantitative and qualitative data collection procedures. Thus, it made use of both the positivism (objectiveness) and interpretivism (subjectivism) paradigms (Creswell, 2012). Positivism is a school of thought that explains social phenomena using natural and hard science principles and processes (Uddin & Hamiduzzaman, 2009). Positivist paradigm asserts a monopoly of knowledge in science, and with the view that authentic knowledge is founded on a direct sense of experience (Uddin & Hamiduzzaman, 2009). Positivism holds that the world is objective, compromising individual conduct, and that the consequences of that action can be viewed and documented objectively, using generally agreed-upon criteria (Quantitative approach).

However, interpretivists look at particular situations to trace the evolution of phenomena in order to better grasp knowledge (Moon & Blackman, 2014). According to the interpretivist research philosophy, the social reality can be viewed subjectively. The goal here is to learn more about

how people engage with the social world. This philosophy is based and depends on the researcher's interests (Qualitative approach).

Creswell and Creswell (2018) encouraged researchers to use both approaches to understand a phenomenon, instead of focusing on one philosophical paradigm that looks at a phenomenon from only one angle. The research problem, according to pragmatism, is the most important factor in deciding on a research philosophy. Pragmatists say that rather than sticking to one approach, a phenomenon should be studied using a variety of methodologies or mixed method (Creswell, 2009; Moon & Blackman, 2014). To address the research objectives, pragmatism is used to obtain information from both the objective and subjective point of view. Each paradigm has its own weakness, so combing the two approaches (Qualitative and Quantitative), would help to cater for each other's weakness. This research philosophy was adopted because it would help to clarify the research problems and objectives.

Research Design

Research design, according to Creswell and Plan Clark (2017), is the technique for systematically collecting, analyzing, interpreting, and reporting data in a study. Basically, research designs serve as models for research studies and are important since they guide the data types, methods and decisions that researchers must make during their studies as well as the systematic approaches which researchers use to interpret their study (Creswell & Plan Clark, 2017).

The Convergent parallel mixed methods design coupled with descriptive design will be used for this study. Convergent parallel mixed methods are the type of mixed method design where the researcher converges

or combines quantitative and qualitative data at the same time in order to provide a thorough understanding of the research problem (Creswell, 2003).

In this approach, the researcher gathers both quantitative and qualitative data separately but at the same time, and then incorporates the information in the overall results interpretation. This design explains or probes contradictions or unrelated findings (Creswell, 2003). The design allows qualitative data like interviews and observations to be combined with quantitative data from instrument data such as questionnaires (interview schedule) at the same time.

Descriptive research design was employed because it is an inductive approach for discovering, describing, and explaining in words the students' actions and behaviors (Silverman 2010 as cited in Gyimah et al., 2019). The design was selected because it enables for a thorough and statistical examination of people's attitudes, views, and behaviors (Gyimah et al., 2019). Therefore, to understand the sanitary behavior and actions of the students within the study area, descriptive design was employed.

Study Area

Mfantseman Municipality is the study area for this research. It is located between latitude 5˚ 07′N and 5˚ 20′N and longitude 0˚44′W and 1˚ 11′W. The Municipality shares boundaries with Adjumako-Eyan-Essiam District to the north-east, Abura-Asebu-Kwamankese District to the west, Ekumfi District to the east and Gulf of Guinea to the south (Figure 2). The Municipality has a total land area of 300.662 sq.km. According to the GSS (2021), Mfantseman Municipality had a population of about 168,905, with 53.8% being females and 46.2% being males. Majority of the residents are

Akan, mostly Fantes, though there are other tribes like Ga and Ewe, living in the Municipality. Fishing is the major occupation for the coastal towns and villages while those in the hinterlands are engaged in cash and crop farming.

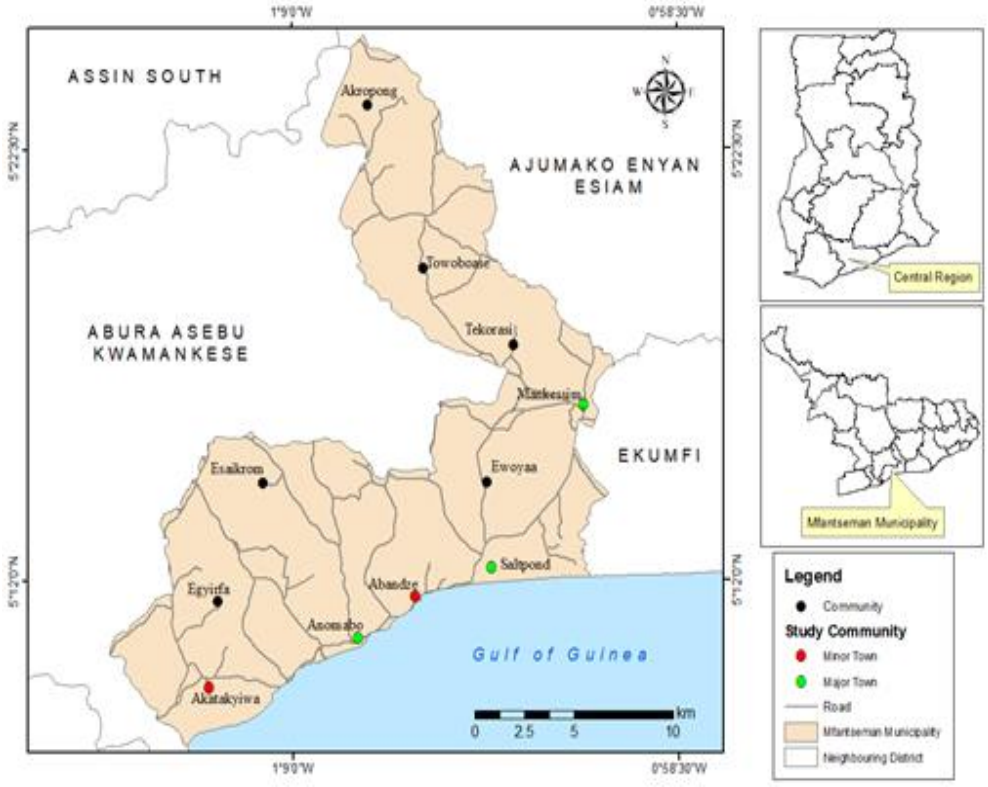

***Figure 2**:* Map of Mfantseman Municipality showing some minor and major vicinity.

Source: Department of Geography and Regional Planning, 2021.

Population

In the conduct of research, there are a group of persons or individuals or organizations who matter in the research interest (Asiamah, Mensah, & Oteng-Abayie, 2017). The study population, according to Degu and Yigzaw (2006), is the population from which the sample is obtained. The study's population was the entire students in the public basic schools within the Mfantseman Municipality.

Target Population

Target population of a research study is the entire set of units, thus individuals, group of persons or organizations, through whom the research data are collected and used to make interpretations (Cox & Lavrakas, 2008). A target population is the group of entities or organizations who bear some characteristics of interest by researchers for a particular study (Asiamah et al., 2017). A well-chosen target population is important because it helps others assess the sample's trustworthiness, sampling technique(s), and research findings (Asiamah et al., 2017).

The study's target population comprised J.H.S students and head teachers in the selected public basic schools, as well as the heads from Health Directorate, Environmental Health and Management Unit, Ghana Education Service (SHEP Coordinator) and Public Works Department within Mfantseman Municipality.

Research has established that inadequate WASH facilities in schools affect the health and performance of school children (Sommer et al., 2017 & UNICEF & WHO, 2020), and since evidence from the Ghana District League Table II (2018/19) by UNICEF & CDD-Ghana (2018) revealed that the Municipality has poor sanitation and academic performance in Ghana, it necessitated for this study to be conducted in Mfantseman Municipality to examines the management of WASH facilities in the public basic schools, since the EMIS report (2019) indicated that there are insufficient WASH facilities across the public basic schools in Ghana.

Only J.H.S students were included in this study because the evidence from the Ghana District League Table II (2018/19) by UNICEF & CDD-Ghana (2018) revealed that the Municipality has poor sanitation academic performance in Ghana; and J.H.S students were the students who sat for the Basic Education Certificate Examination (B.E.C.E) but not those in the primary school. Therefore, the study purposively selected J.H.S students because their responses were best seen to help achieve the research objectives.

Head teachers in each of the selected basic schools were also included in the study because they were those who oversaw the overall development and welfare of students and the school they headed. The study purposively selected the head teachers because they supervise school sanitary conditions, the various effort made and being made to support school health education at the basic level, whether the efforts were encouraging or not. Hence, they are deemed to possess vital information due to their knowledge and experience in their field, which helped to achieve the research objectives.

Also, stakeholders such as heads of Health Directorate, Environmental Sanitation and Health Management Unit, Ghana Education Service (SHEP Coordinator) and Public Works Department within Mfantseman Municipality were included since they possessed information because of their experiences and knowledge in the field of education, health, sanitation, and water related issues within the Municipality. The study purposively included stakeholders and head teachers because, they posed vital information which helped to achieve the objectives.

Sample Size and Sampling technique

The Multi-phase sampling procedure was employed in this study. Firstly, the localities were grouped into urban and rural strata. Secondly, 16 schools were randomly picked from both urban and rural localities. Lastly, students were randomly sampled from the selected schools.

There are 86 basic schools within the Mfantseman Municipality with about 8,424 junior high school enrollments according to data from Ghana Education Service Office in Mfantseman as at February 2021. However, with the help of Hotjar's online sample calculator at 95% level of confidence and 5% margin of error, a sample size of 368 students were selected. With regards to the selection of the schools and students, the schools in the Municipality were grouped into two strata: urban and rural schools, with the aim of comparing students' sanitation and hygiene behaviour in the urban and rural community areas within the Municipality.

However, after grouping the localities, in each of the rural and urban stratum, eight (8) localities were randomly selected. Thus, the names of each locality were written on cards, and then put in a basin, and then eight (8) localities were picked randomly in each stratum, making 16 selected localities in all. The urban localities included Anomabo, Biriwa, Mankessim, Saltpond, Yamoransa, Baifikrom, Egyase, and Abonko, while the rural localities involved Kormantse, Asafora, Egya No 1, Kuntu, Akatakyiwa, Abandze, Taido and Hiini.

Furthermore, in each selected locality, one school was randomly selected for the study. Thus, one school was selected from each locality. In cases where there was more than one school in a locality, the names of the

schools were written on cards, put in a basin, and one (1) school was selected randomly from each locality. Only one school was selected from each locality because, while some localities have more than one school, others have only one school available at the time of conducting the study; implying that to ensure fair selection of schools', only one school could be selected for equity and comparison.

Likewise, for the selection of the students, the total desired sample size (368) was divided by the 16 selected schools to obtained 23 desired sample sizes (students) to be selected in each chosen school. The chosen schools were, Anomabo Anglican "B" Basic School, Biriwa Methodist "A" Basic School, Edumadze "B" M/A Basic School (Mankessim), Saltpond T.I Ahmadiyya Basic School, Yamoransa M/A Basic School, Baifikrom M/A Basic 'B', Eguase Anglican Basic School, Abonko Methodist Basic School, Kormantse M/A Basic, Asafora Catholic Basic School, Egyaa M/A Basic School, Abandze Methodist Basic 'A' School, St. Michael's Catholic Basic (Akatakyiwa), Kuntu Methodist Basic School, Taido M/A Basic School, and Hinii M/A Basic Schools.

The researcher therefore used the students' class register and assigned numbers to each corresponding student from J.H.S one to three. The students' names and their corresponding number were written on a card, and drawn randomly until the 23 students were obtained from each of the 16 selected schools.

In addition, 16 head teachers at the selected schools and four (4) stakeholder institutions were involved in the study. Purposive sampling was used to select every head teacher in the selected public basic schools. In

addition, the purposive sampling procedure was also used to select the heads of Health Directorate, Environmental Sanitation and Health Management Unit, Ghana Education Service (SHEP Coordinator), and Public Works Department within Mfantseman Municipality. These key informants were purposefully chosen for the study because they were in a suitable position to supply the essential information that the study required, based on their knowledge, and experience.

More so, direct observation for the general school environment, concerning the availability, types, state, and condition of WASH facilities was conducted with the help of an observation checklist.

Data Sources

The study mainly used primary data. The primary data was collected using an interview schedule, interview guide, and an observation checklist. However, the study also made used of information from existing literature from the internet, books, journals, and reports.

Data Collection Instruments

This study used a questionnaire (interview schedule), structured interview guide and observation check list to solicit information from respondents and participants. The interview schedule was administered to students to solicit their views concerning school WASH and hygiene behaviour. Interview schedule was used since the target population included some individuals who could not respond to questions without further guidance and explanation by the researcher. The interview schedule encompassed close and open-ended questions and was divided into five sections (A to E).

Section A comprised of demographic background of respondents to know their background characteristics, Section B sought to investigate students' sanitation and hygiene behaviour looking at where they defecate, whether students wash their hands with soap and water or only water after visiting the toilet or urinal, and where they throw their rubbish after sweeping. Section C talked about the operations and maintenance of WASH facilities in basic schools; the objective was to find out the types of sanitation facilities used in schools, and how these facilities are cleaned and managed. Section D sought to explore the challenges that hindered the provision of logistics in maintaining these WASH facilities in a safe manner, while section E was concerned with strategies to improve utilization and management of WASH facilities in basic schools within the Mfantseman Municipality.

The interview guides were administered to head teachers at the selected schools, and the heads from Health Directorate, Environmental Sanitation and Health Management Unit, Ghana Education Service (SHEP Coordinator), and Public Works Department, within Mfantseman Municipality to solicit their views on the research topic. The interview guide was divided into five (5) sections from A to E. Section A comprised demographic background of respondents. Section B was concerned with sanitary conditions of WASH in basic schools within the Mfantseman Municipality. Section C talked about the roles and support by the institutions in the operations and maintenance of the WASH facilities in basic schools within the Municipality. Section D focused on the challenges faced and measures in promoting WASH in schools while section E focused on the measures in promoting WASH in basic schools.

The study also used observation checklist to seek information concerning the way pupil reacted to sanitation and hygiene protocols in the public basic schools within the Mfantseman Municipality. Non-participant observation technique was used to observe and record whatever took place within the study period. The study investigated the students' sanitation and hygiene behaviour by looking at where they defecated, whether students wash their hands with soap and water or only water after visiting the toilet or urinal, where they threw their rubbish after sweeping, the types of sanitation facilities used in schools, and how these facilities are cleaned and managed.

Validity and Reliability

The degree to which a research instrument measures the variables under investigation is known as its validity (Mugenda, & Mugenda, 1999). Also, Johnson (2017) defines reliability as the uniformity and consistency of measuring instrument from one period to the next. The research instruments were carefully reviewed by my supervisor and the suggestion and corrections were done considerably. This was to ensure that the instruments achieve the intended purpose. Right after this, the researcher did a pilot study to test the research instruments before the actual data collection exercise.

Pre-testing of the Instruments

The instruments were pre-tested before they were used for the actual data collection exercise at the study area. The pre-testing exercise took place at Apewosika Basic School in the Cape Coast Metropolis on 15th September 2021 at exactly 10:20am and lasted for about five hours. Also, interview guide was administered to the head teacher in the school (J.H.S Head teacher). On the next day, which was 16th September 2021, interview guides were

administered to the heads of the District Health Directorate, Environmental Sanitation Management Unit and Ghana Education Service (SHEP Coordinator), and Community Water and Sanitation Agency in Cape Coast Metropolis. The pre-testing exercise helped the researcher to delete irrelevant questions to pave way for other additions and shaping of the various questions; to achieve the said research objectives.

Data Collection Procedure

Data was collected using an observation check list, interview guide and structured interview schedule. A team of 6 research assistants helped in the data collection exercise. The data collection lasted for about two weeks before the entire data collection exercise successfully came to an end. Colleague graduate students were the other researchers that supported the lead researcher in the conduct of the data collection process. The researchers divided themselves into two groups and departed to different schools to conduct the exercise. However, the two groups met at the end of each day to discuss how the exercise went and the way forward on how to prepare for the next data collection exercise. This was done to adequately ensure that the data collection exercise achieved and addressed the said objectives.

Also, interview guide was administered to solicit information from the head teachers of the selected schools, the heads of Health Directorate, Environmental Sanitation and Health Management Unit, Ghana Education Service (SHEP Coordinator), and Public Works Department within Mfantseman Municipality to express their views on the research topic. Participants were briefed on the purpose of the study and the in-depth interviews were done on appointment basis. As such the key informants were

pre-informed about the study and then sought their permission, with scheduled date and time before the interview was successfully conducted. Interview with these key informants lasted for about an hour each.

An observation checklist on the other hand was used to assess the availability, accessibility, conditions, types, functionality, and maintenance of WASH facilities in each selected school. An observation check list was used by the researcher to understand the behaviour patterns of the respondents and the general school environment.

Data Processing and Analysis

The analysis of the data collected was done systematically based on the study ‘s objectives. The data gathered with the interview schedules and guides was analyzed quantitatively and qualitatively. The interview schedule and observation check list were analyzed with Statistical Package for Social Sciences (SPSS) version 22.0 and the findings were designed using Microsoft Excel version 15, and then descriptive (frequencies and percentages) and inferential (Chi-square) were performed quantitatively. The responses gathered with the help of interview guide were analyzed by a verbatim transcription using Microsoft word 15. It offered the opportunity to classify the data into summary themes using Q.D.A Miner. By selecting the emerging themes, the qualitative data analysis combined the summary views of the respondent with captured scenes and annotations which were taken from the transcribed text. The findings from the qualitative data (interviews and observations) were further used to confirm or contrast the findings from the quantitative data.

Ethical Consideration

Padgett (2011) defines ethics as the moral standards that show the degree to which research techniques are compatible with participants' professional, legal, and societal obligations. To protect the participants' involvement, ethical issues were considered. This was done to assure the participant concerning their confidentiality and anonymity.

Once ethical clearance was taken from the Institutional Review Board of the University of Cape Coast with ID (UCCIRB/CHLS/2021/78), the researcher sent letter to Ghana Education Service office in Mfantseman Municipality which was approved. The researcher then, sent letters to all selected schools, informing the head teachers about the purpose of the study. All participants were assured of the issue of anonymity and confidentiality, and that no participants or respondents will be identified with particular responses and the information given was only for academic purpose. All respondents and participants agreed and the study was successfully conducted ethically.

Chapter Summary

In summary, this chapter presented the methodology. The pragmatic research philosophy, the convergent parallel mixed method and the descriptive design were employed. The pragmatic philosophy was used because such methods are appropriate to balance each other's defects. Thus, both the quantitative and qualitative research approaches were employed for the study. Primary data was collected through structured interview schedules, in-depth interviews, and observations checklist. Ethical issues, data collection procedure and analysis are all presented in this chapter.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the empirical results generated from the study. The first section deals with the descriptive statistics of the variables used in the study, while the other section discusses the empirical results using chi-square to explain the objectives of this study.

Response Rate

The study collected data from all the 368 students, 16 headteachers, and 4 stakeholder heads of some selected institutions within the Mfantseman Municipality. One hundred percent response rate was achieved because all the participants and respondents responded to the study, implying that adequate representation of the target population was achieved.

Socio-Demographic Characteristics of Respondents

Information on the socio-demographic characteristics of respondents such as gender, age, and level of education are presented in Table 1.

Table 1: Socio-demographic characteristics of respondents

Variables	Rural		Urban		Total		ASYM.SIG.
Gender							
	Freq.	%	Freq.	%	Freq.	%	.251
Male	85	46.2	96	52.2	181	49.2	
Female	99	53.8	88	47.8	187	50.8	
Age							
10-15	77	41.8	82	44.6	159	43.2	.442
16-20	96	52.2	88	46.7	182	49.5	
21-25	11	6.0	16	8.7	27	7.3	
Educational Qualification							
JHS 1	47	25.5	62	33.7	109	29.6	.063
JHS 2	74	40.3	78	42.4	152	41.3	
JHS 3	63	34.2	44	23.9	103	29.1	
Total	184	100	184	100	368	100	

Source: Field data (2021)

A total of 368 pupils from 16 schools participated in the study, 181 male students representing 49.2%, and 187 female students representing 50.8%. There were 85 (46.2%) male students, and 99 (53.8%) female students in the rural schools, and 96 (52.2%) male students and 88 (47.8%) female students in the urban schools.

The study findings indicated that in the rural schools, the majority (96) of the students representing 52.2% are between ages 16-20, 77 students representing 41.8% are between ages 10-15 and 11 students' representing 41.8% are between ages 21-25. In the urban school, the majority (86) of the students representing 46.7% are between ages 16-20, 82 students representing 44.6% are between ages 10-15 and 16 students representing 8.7% are between ages 21-25.

The study findings further revealed that, out of a total of 368 respondents from both the rural and urban schools, 109 pupils are in junior high school one (JHS1) representing 29.6%, 152 pupils are in junior high school two (JHS 2) representing 41.3% while 103 pupils are in junior high school three (JHS 3) representing 29.1%. Thus, in the rural schools, the majority (74) of the students representing 40.3% are in junior high school two (JHS2), 63 students representing 34.2% are in JHS 3 and 47 students' representing 25.5% are in JHS 1. While in the urban school, the majority (78) of the students representing 42.4% are in JHS 2, 62 students representing 33.7% are in JHS 1 and 44 students' representing 23.9% are in JHS 3.

Linking the SaniFOAM theory to the study findings, focus as explained earlier is the target population of interest with desired behavior/action to be changed. In this study, the focus is the Junior High

students in the public basic schools within Mfantseman Municipality whose sanitation and hygiene behaviors are being studied. Focus is influenced by some internal and external factors within and outside the school environments. These determinants are ability, motivation and utilization strategies, WASH challenges, opportunity, operations, and maintenance. These factors either push or restrict students from engaging in some behavioral lifestyle. Focus as the pivoted factor helps to address the first objective (Assess sanitation and hygiene practices in basic schools).

Sanitation and hygiene practices in basic schools

Research shows that many basic schools in Sub-Saharan African countries lack safe water, sanitation, and hygiene; especially in rural areas (UNICEF & WHO, 2020). This situation is similar in Ghana, as only 35% and 58% of public schools had access to a safe toilet and adequate water supply respectively (EMIS report, 2019). Oppong et al., (2019) also asserted that, in Ghana, the hand is the major means through which faeco-oral microbes' transfer occurs among children. They attributed this to inadequate hand hygiene apparatus like water, soap, and washing basin at vantage points, especially in schools. Therefore, to ensure proper sanitation and hygiene practices in basic schools, it is appropriate to have access to adequate facilities to aid school health and hygiene promotion. As such the study collected and presented information on availability, functionality, and utilization of toilets, water, and hand washing facilities in the basic schools within Mfantseman Municipality to assess students' sanitation and hygiene practices.

Availability, functionality, and utilization of toilet facility

This section presents information on the availability, functionality, and utilization of toilet facilities in basic schools within Mfantseman Municipality. The findings were based on the views of the respondents and later supported by in-depth interviews.

Table 2: Availability, functionality, and utilization of toilet facility

Variables					
Availability of toilet facility					
	Yes	No	Total		ASYMP.SIG
Rural	175 (95.1%)	9 (4.9%)	184 (100%)		.010
Urban	161(87.5%)	23(12.5%)	184 (100%)		
Where pupils defecate in schools without toilet					
	Bush	Beach	Public Toilet	Total	
Rural	1(11.1%)	6 (66.7%)	2 (22.2%)	9 (100%)	.241
Urban	0 (0)	19 (82.6%)	4 (17.4%)	23 (100%)	
Functionality of toilet facility					
	Fully used	Partially used	Not in use	Total	
Rural	117 (66.9%)	39 (22.3%)	19 (10.9%)	175 (100%)	.000
Urban	109 (67.7%)	4 (2.5%)	48 (29.8%)	161 (100%)	
Type of toilet facility					
	KVIP	W/C		Total	
Rural	140 (80%)	35 (20%)		175 (100%)	.000
Urban	90 (55.9%)	71 (44.1)		161 (100%)	
Whether male and female students use same or separate toilet facility					
	Same	Separate	Don't know	Total	
Rural	23 (13.1%)	148 (84.6%)	4 (2.3%)	175 (100%)	.631
Urban	23 (14.3%)	137 (85.1%)	1 (0.6%)	161 (100%)	

Source: Field Survey (2021)

With regards to the availability and functionality of toilet facilities in public basic schools, the study revealed that 175 pupils representing 95.1% and 161 pupils representing 87.5% said they have a toilet in their schools in both rural and urban areas respectively. The findings indicate that most public basic schools in the rural and urban areas within Mfantseman Municipality have toilet facilities. The p-value of 0.01 indicates that there is a statistically significant difference between rural and urban areas when it comes to the availability of toilet facilities. The study is in line with Njue and Muthaa (2015) who found that majority of public primary schools had toilet facilities. The study also confirms the research by Ahiatrogah (2020) who also found available toilet facilities in the basic schools in the Dzodze community in the Ketu North Municipality in the Volta Region of Ghana. Again, the study findings are consistent with that of Ghanim et al., (2016), who also found available toilet facilities in schools. However, the result is contrary to that of Acquah et al., (2014), who found that; most schools in Sefwi Akontmbra district in the Western North Region of Ghana did not have toilet facilities. The study findings are supported by the in-depth interview as follows;

> *Toilet facilities are available but they are inadequate and we will be glad if the government could build more [46-year-old head teacher from rural school]*
>
> *As you can see toilets are available in the school but most of them are damaged and pose threat to the lives of the pupils [43-year-old head teacher from rural school]*

We have toilet facilities in the school, just that they are not adequate at all looking at the school enrollments [49-year-old head teacher from urban school].

There are toilets in the school but most are broken and need maintenance but we don't have the funds to do so [56-year-old head teacher from urban school]

The interviews with the head teachers support Okyere-Kwakye (2013), and Ahmed, et al., (2021) who also found that basic schools had toilet facilities but are inadequate. More so, the outcome from the interviews is consistent with Chinyama et al., (2019), who also found toilet facilities available but inadequate in schools. However, out of those who said they do not have toilets in their schools, the majority defecate at the beach, while others defecate in the bush and public toilets. Thus, 6 pupils representing 66.7% in rural schools defecate at the beach as against 19 pupils representing 82.6% in urban schools, also defecate at the beach. The p-value of 0.241 indicates that there is no statistically significant difference between rural and urban areas when it comes to where pupils defecate in schools without toilet facilities. The findings indicate that most students who do not have a toilet in their schools defecate at the beach because the schools are located in fishing communities within the Municipality. The findings are in line with that of Duah et al., (2019) and Jordanova et al., (2015) who also found that in schools without adequate sanitation infrastructures, students defecate in the bush or use a nearby public toilet.

The study findings are supported by the in-depth interview as follows;

> *Toilet facilities are available but only a few are functioning so the students go to the beach to ease themselves since the school is closer to the beach [46-year-old head teacher from rural school].*
>
> *Some students go to the beach while others use the bush since the toilets are not in good shape [48-year-old head teacher from urban school]*

Meanwhile, the findings from the study revealed that the majority of the toilets in both the rural and urban schools are functional and fully used. Thus, about 117 pupils representing 66.9% and 109 pupils representing 67.7% were of the view that the toilet facilities are functional and fully used in rural and urban schools respectively.

The study findings are supported by the in-depth interview as follows;

> *Yes, the facilities are fully in use but they are not adequate looking at the school enrollment [53-year-old head teacher from urban school]*
>
> *Comparing the total number of students in this school, it can be said that, the toilet facilities are inadequate to meet the school population [46-year-old head teacher from rural school]*

However, some of these toilet facilities are available in the schools but are either partially used or not at all because they are not of their desired quality and in bad shape. As seen in Table 2; 39 pupils representing 22.3% said the toilets are partially used and 19 pupils representing 10.9% said the toilets are not in use in rural schools. While in the urban schools, 4 pupils

representing 2.5% and 48 pupils representing 29.8% said the toilets are partially used and not in use respectively with the reason that they are not in good shape for use. The p-value of 0.000 indicates that there is a statistically significant difference between rural and urban areas when it comes to the use of toilet facilities. The study is consistent with the research by Aladago et al., (2019) in Ghana, which found that, even for those who have access to WASH facilities in school, some were in bad shape implying that; some WASH facilities in Mfantseman public basic schools are not up to the desired quality standards for acceptability and are insufficient as well.

Furthermore, the study findings indicate that majority of the schools in both the rural and urban areas use K.V.I.P (Plate 1). Table 1 shows that in the rural schools, 80% use K.V.I.P in schools, while 20% use water closets (W/C). In urban areas, more than half (55.9%) use K.V.I.P while 44.1% use water closets (W/C) in the urban schools. The result revealed that even though both the rural and urban schools mainly use K.V.I.P, many urban schools use water closets than the schools in the rural areas. The p-value of 0.000 indicates that there is a statistically significant difference between rural and urban areas when it comes to the type of toilet facilities use in schools. The study findings are in line with the research by Acquah et al., (2014), that K.V.I.P. is the type of toilet facility mostly used in basic schools. Also, the study findings are similar to the research by Ahiatrogah (2020) who also found that the basic schools in the Dzodze community in the Ketu North Municipality in the Volta Region of Ghana mainly use K.V.I.P.

The study findings further revealed that male and female students mostly use separate toilet facilities in both rural and urban schools. Thus; 148

pupils in the rural schools representing 84.6% said both male and female students use separate toilet facilities while in the urban schools 137 pupils representing 85.1% also said both male and female students use separate toilet facilities. The findings indicate that there is privacy in the basic schools with regards to access and use of toilet facilities. The p-value of 0.631 indicates that there is no statistically significant difference between rural and urban areas when it comes to the use of unisex or separate toilet facilities for male and female students. The result is similar to Shrestha et al., (2021), who also found separate toilet facilities in schools for males and female students. The findings oppose the study by Acquah et al., (2014), who found unisex toilet facilities in schools (male and female students use the toilet same facilities).

The study findings are supported by the in-depth interview as follows;

> *There is privacy because the pupils use separate toilet facilities [46-year-old head teacher from rural school].*
>
> *There are separate toilet facilities for both male and female students for use in the school, they don't share the same facilities [49-year-old head teacher from urban school].*

Linking the SaniFOAM theory to the study findings the concept of motivation was adopted. Motivation (M), as explained, refers to the drivers that encourage or discourage students to behave in a particular way. It is explained by the student's intentions, attitude and beliefs (perception), and value system. The perception and value system of students have a direct or indirect influence on their sanitary and hygiene behaviour. The study found that students in schools without toilet facilities mostly defecate at the beach and it is seen as normal behaviour. The students' sanitary and hygiene practice

is influenced by the value system (orientation) in and around the school environments. Students defecate at the beaches because they are from fishing communities where defecating at the beach is seen as a normal lifestyle. Therefore, the absence of toilet facilities pushes them to use other means. Meanwhile, because they are from fishing communities; it propels them to use the beach since it is a daily routine and not considered a deviant behaviour. Hence, they are encouraged by the belief system held by the community's members which directly or indirectly influenced the students' sanitary and hygiene behaviour.

The picture below shows a type of WASH facilities used in the basic schools. It typically shows K.V.I.P, as the main toilet facilities used in most basic schools within the Municipality.

Plate 1: Type of toilet facility used in schools (K.V.I.P)

Source: Field data (2021)

Availability, Functionality, and utilization of water facility

This section presents information on the availability, functionality, and utilization of water facilities in basic schools within Mfantesman Municipality. The findings were based on the views of the respondents and supported by in-depth interviews.

Table 3: Availability, Functionality, and utilization of water facility

Variables				
Availability of water facility				
	Yes	No	Total	ASYMP.SIG
Rural	138 (75%)	46 (25%)	184 (100%)	.000
Urban	92 (50%)	92 (50%)	184 (100%)	
Where students fetch water in schools without water facility				
	Open stream	public pipe	Private ind.	From home	Total	
Rural	6 (13%)	40 (87%)	0 (0)	0 (0)	46 (100%)	.000
Urban	0 (0)	43 (46.7%)	3 (3.3%)	46 (50%)	92 (100%)	
Type of water facility available in schools						
	Pipe	Well	Bole hole	Polythank	Total	
Rural	115 (83.3%)	0 (0)	0 (0)	23 (16.7%)	138 (100%)	.000
Urban	68 (73.9%)	23 (25%)	1(1.1%)	0 (0)	92 (100%	
Functionality of water facility						
	Fully used	Partially used	Not in use	Total		
Rural	97 (70.3%)	41(29.7%)	0 (0)	138 (100%)		.000
Urban	69 (75%)	0 (0)	23 (25%)	92 (100%)		

Source: Field Survey (2021)

With regards to the availability and functionality of water facilities in public basic schools, the study findings revealed that 75% of pupils in the rural schools said they have water in their schools while 50% of those in the urban

schools said they have water. The results indicate that most schools in both the rural and urban areas have access to water in their schools. However, it was observed that most rural schools had access to water in schools than those urban schools. Further probing revealed that most rural schools had water through their internally generated means of gathering money from their worship services, fire wood and charcoal selling business, and/or payment of levy by parents or guardians. Hence, they use the money obtained from these means to settle the water bills or buy more water facilities. The p-value of 0.000 indicates that there is a statistically significant difference between rural and urban areas when it comes to the availability of water facilities in basic schools. The findings are consistent with Jasper et al., (2012), who also found access to water in schools. The study findings also confirm the research by Ahiatrogah (2020) who also found the availability of water in the basic schools in the Dzodze community in the Ketu North Municipality in the Volta Region of Ghana. The study findings are supported by the in-depth interview as follows;

> *Water facilities are available, so water is not a problem in the school [46-year-old head teacher from rural school]*
>
> *There are pipe and a water storage plastic tank (polytank) all available for proper hygiene in the school [48-year head teacher from urban school]*

However, out of those who said they do not have water in their schools, the majority fetch water from the public pipe stands or from their houses to their schools. Thus; 40 pupils representing 87% fetch water from

public pipe stand in rural schools and; 43 pupils representing 46.7% fetch water from public pipe stand to their schools in urban areas.

Also, others fetch water from private individuals closer to their schools or bring water along to school from their homes. Thus, 3 pupils representing 3.3% fetch water from private individuals closer to their schools; and 46 pupils representing 50% fetch water from their homes to school in urban areas. This confirms the findings of Bah et al., (2020) who found that in schools where no water is available, pupils fetch water from individual homes closer to the school environment. More so, the findings are in support of Duah et al., (2019) who found that in schools without access to water, pupils are asked to carry water along from home to school.

Again, some pupils fetch water from any open streams available in the community. Thus; 6 pupils representing 13% in rural schools' fetch water from an open stream. The p-value of 0.000 indicates that there is a statistically significant difference between rural and urban areas when it comes to where pupils fetch water in schools without water.

The study findings are supported by the in-depth interview as follows;

> *There are no water facilities available, so the students are asked to carry water along to school every day [49-year-old head teacher from urban school].*
>
> *We buy water from the public pipe stand in the community to clean the WASH facilities in the school [53-year-old head teacher from urban school]*
>
> *The opinion leaders told us to fetch water from the public pipe stand in the community at no cost to the school since water is*

not available in the school [38-year-old head teacher from rural school]

On the type of water facilities available in schools, the study observed that the majority of the schools in both the rural and urban areas use pipe. Thus, in the rural schools, the majority (115 pupils) representing 83.3% said they use pipe (Plate 2) in schools, and 23 pupils representing 16.7% said they use a water storage plastic tank [polytank] (Plate 3). In urban schools, 68 pupils representing 73.9% said they use pipe, while 23 pupils representing 25% use well. The result revealed that even though both the rural and urban schools mainly use pipe; some schools make use of well, a water storage plastic tank (polytank), or bole holes as a means of storing water for cleaning. The findings are consistent with Tesfaye, Mulatu, and Hussen, (2021), who also found pipe as the main water facility in schools. The p-value of 0.000 indicates that there is a statistically significant difference between rural and urban areas when it comes to the type of water facilities use in schools, implying that schools in both rural and urban areas do not use the same water facilities, rather the type differs and it is area specific.

On the functionality of the facilities, 70.3% in rural schools and 75% in urban schools were of the view that the water facilities are functional and fully used. The p-value of 0.000 indicates that there is a statistically significant difference between rural and urban areas when it comes to the functionality of the facilities. The result is similar to Jasper et al., (2012), who also found available and functional water facilities in schools.

The picture below shows a type of WASH facilities used in the basic schools. It typically shows a stand pipe as the main water facilities used in most basic schools within the Municipality.

Plate 2: Type of water facility in schools (Stand pipe)

Source: Field Survey (2021)

The picture below shows a type of WASH facilities used in the basic schools. It typically shows a water storage plastic tank (polytank) as other water facilities used in most basic schools within the Municipality.

Plate 3: Type of water facility in schools [a water storage plastic tank (polytank)]

Source: Field Survey (2021)

Availability, Functionality, and utilization of hand washing facilities

Dajaan et al. (2018) posit that soap, towels, water, disinfectant, and bowls are all included in hand washing facilities. Aremu, (2012) further highlighted that adequate hand washing apparatus with soap and water in schools are necessary for positively influencing students' hand washing behaviour. Hence, this section presents information on the availability, functionality, and utilization of hand washing facilities in the public basic schools within Mfantseman Municipality.

Table 4: Availability, Functionality, and utilization of hand washing facility

Variables		
Availability of hand washing facility in school		
	Yes	No
Rural	184 (100%)	0 (0)
Urban	183 (99.5%)	1 (0.5%)
Where students wash their hands in schools without a hand washing facility		
	Public pipe stand	Total
Urban	1 (100%)	1 (100%)
Type of hand washing facility used in schools		
	Veronica bucket	Total
Rural	184 (100%)	184 (100%)
Urban	183 (100%)	183 (100%)

Source: Field survey (2021)

With regards to availability and functionality of hand washing facilities in public basic schools, Table 4 indicates that all the 184 pupils (100%) in the rural schools said they have hand washing facilities in their schools while in the urban schools; 183 pupils (99.5%) said they have hand washing facilities in their schools. The study findings are consistent with the research by Ahiatrogah (2020) who also found availability of hand washing facilities in the basic schools in the Dzodze community in the Ketu North Municipality in the Volta Region of Ghana. However, the study opposed the research by Nwajiuba et al., (2019), and Steiner-Asiedu et al., (2011) who found that most public basic schools did not have hand washing facilities in school. The availability of handwashing facilities in the schools may be the result of the investments and interventions results from the covid-19

pandemic, where the provision of handwashing facilities was a requirement for the reopening of schools in the country. This is because, further probing revealed that previously, handwashing facilities were not available on the various school compounds even though they continuously teach hygiene education as a result of the SHEP programme intervention; but the emergence of the covid-19 pandemic made it a requirement for schools and since then it has become part of the school system.

On the type of hand washing facility, the findings from the study revealed that the "Veronica bucket" (Plate 4) is mainly used in both rural and urban schools. The study findings are in line with the study by Ahiatrogah (2020) and Duah et al., (2019) who also found that veronica buckets are the main hand washing facilities in basic schools.

The picture below shows a type of WASH facilities used in the basic schools. It typically shows "Veronica bucket" as the main handwashing facilities used in most basic schools within the Municipality.

Plate 4: Type of hand washing facility in schools ("Veronica bucket")

Source: Field Survey (2021)

Hand washing Facility with running water

The study collected information to investigate if the hand washing facilities had running water and the results are presented in Table 5.

Table 5: Hand washing facility with running water, soap/sanitizer and/or tissue paper

Variables	Always	Sometimes	Rarely	Never	Total
Hand washing facility with running water					
Rural	106 (57.6%)	78 (42.4%)	0 (0)		184 (100%)
Urban	104 (56.8%)	79 (43.2%)	1 (0.5%)		183 (100%)
Hand washing facility with soap/sanitizer					
Rural	80 (43.5%)	99 (53.8%)	5 (2.7%)	0 (0)	184 (100%)
Urban	115 (62.8%)	68 (37.2%)	0 (0)	1 (0.5%)	183 (100%)
Hand washing Facility with towel/ hand cleaning material (tissue)					
Rural	92 (50%)	86 (46.7%)	6 (1.6%)		184 (100%)
Urban	91 (49.7%)	88 (48.1%)	5 (2.7%)		183 (100%)

Source: Field Survey (2021)

Findings from the study revealed that the majority of the handwashing facilities in both the rural and urban schools always have water for hand washing purposes. In the rural schools, 106 pupils representing 57.6%% said the hand washing facilities always contain running water, and 78 pupils representing 42.4% said only sometimes. In the urban schools, 104 pupils representing 56.8% said the hand washing facilities always have running water while 79 pupils representing 43.2% said only sometimes.

Also, the results show the handwashing facilities in both the rural and urban schools usually have soap/sanitizer. However, it was clear that handwashing facilities in urban schools always have soap available compared

to rural schools. Thus, in the rural schools 43.5% said the hand washing facilities always contain soap/sanitizer, while in the urban schools, 62.8% said the hand washing facilities always have soap/sanitizer.

Furthermore, the study collected information on whether or not the hand washing facilities had hand cleaning materials (tissues) for handwashing purposes. It was observed that the majority of the handwashing facilities in both the rural and urban schools always have tissues. In the rural schools, 50% said the hand washing facilities always contain tissue, 46.7% said only sometimes while 2.7% said rarely do the hand washing facilities contain tissue. In the urban schools, 49.7% said the hand washing facilities always have tissue while 48.1% said only sometimes.

Hand washing with soap at critical periods

According to Quinn, (2019), Ali (2008), and the Global Hand Washing Day guide report (2017) [GHWD, 2017], washing hands after using the toilet, after playing with toys or touching animals, and before touching food are regarded as critical times for washing hands. This made it necessary to investigate the students' hand washing practices at some critical periods. The results are presented in Tables 6, 7, 8, and 9.

Table 6: Hand washing with soap before eating

Variables	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
Always	45	24.5	66	35.9	111	30.2	
Sometimes	106	57.6	90	48.9	196	53.3	.058
Rarely	33	17.9	28	15.2	61	16.6	
Total	184	100	184	100	368	100	

Source; Field data (2021)

The results on sanitation and hygiene practice of pupils at certain critical periods indicate that majority of the pupils in both rural and urban schools, either always or sometimes wash their hands with soap before eating. Besides, pupils in the urban areas practice hand washing with soap before eating than pupils in rural schools. As indicated in Table 6, 24.5% of pupils always wash their hands with soap before eating, while 35.9% of pupils in urban areas wash their hands with soap before eating.

Table 7: Hand washing with soap after visiting the toilet

Variables	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
Always	113	61.4	120	65.2	233	63.3	
Sometimes	67	36.4	60	32.6	127	34.5	.742
Rarely	4	2.2	4	2.2	8	2.2	
Total	184	100	184	100	368	100	

Source; Field data (2021)

The study findings indicate that majority of the pupils in both the rural and urban schools always wash their hands with soap after visiting the toilets (Table 7). As indicated in Table 8, in rural areas, 61.4% of the pupils always wash their hands with soap after using the toilet, 36.4% sometimes wash their hands with soap after visiting the toilet; while only 2.2% rarely wash their hands with soap after using the toilets. However, in the urban schools, 65.2% of pupils always wash their hands with soap after using the toilet, 32.6% sometimes wash their hands with soap after using the toilet, while 2.2% rarely wash their hands with soap after using the toilet.

The result indicated that students have good hand washing practices after using the toilet facility. The finding is in line with the research by Ghanim et al., (2016), Thakadu et al., (2018), Dulal, (2016), and Sibiya and Gumbo (2013) which indicated that the majority of pupils wash their hands after using the toilet. However, the findings are in contrast to Bah et al., (2020), who found that majority of students do not wash their hands with soap after visiting the toilets. The p-value of 0.742 indicates that there is no statistically significant difference between rural and urban areas when it comes to handwashing after using the toilets, implying that the students' hygiene behaviour is almost the same in both rural and urban areas since the majority always wash their hands after vising the toilet.

Table 8: Hand washing with soap after hand shake

Variables	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
Always	5	2.7	14	7.6	19	5.2	
Sometimes	67	36.4	72	39.1	139	37.8	.068
Rarely	112	60.9	98	53.3	210	57.1	
Total	184	100	184	100	368	100	

Source; Field data (2021)

The findings from the study revealed that the majority of the pupils in both the rural and urban schools rarely wash their hands with soap after hand shake. As indicated in Table 8 above, only 2.7% of pupils in rural schools always wash their hands with soap after hand shake, 36.4% sometimes wash their hands while the majority (60.9%) rarely wash their hands with soap after

hand shake. However, in the urban schools, only 7.6% wash their hands with soap always after hand shake, 39.1% sometimes wash their hands while 98 pupils representing 53.3% rarely wash their hands with soap after hand shake. The result indicated that pupils do not have good hand washing practices after hand shake. The p-value of 0. 068 indicate that there is no statistically significant difference between rural and urban areas when it comes to handwashing after a handshake, implying that the students' hygiene behaviour is almost the same in both rural and urban areas since they rarely wash their hands after hand shake.

Table 9: Hand washing with soap after touching animals

Variables	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
Always	0	0	9	4.9	9	2.4	
Sometimes	64	34.8	60	32.6	124	33.7	.016
Rarely	120	65.2	115	62.5	235	63.9	
Total	184	100	184	100	368	100	

Source; Field data (2021)

The findings from the study revealed that the majority of the pupils in both the rural and urban schools rarely wash their hands with soap after touching animals. As indicated in Table 9, in the rural schools, no pupils wash their hands with soap always after touching animals, 34.8% sometimes wash their hands with soap after touching animals, while 65.2% rarely wash their hands with soap after touching animals. More so, in the urban schools, only 4.9% of pupils wash their hands with soap always after touching animals,

32.6% sometimes wash their hands with soap after touching animals while 62.5% rarely wash their hands with soap after touching animals. The result indicated that students have poor hand washing practices after touching animals. The p-value of 0.016 indicates that there is a statistically significant difference between rural and urban areas when it comes to handwashing after touching animals, implying that the students' hygiene behaviour is almost the same in both rural and urban areas since they rarely wash their hands after touching animals.

Linking the SaniFOAM theory to the study findings the concept of ability was adopted. Ability (A), in the context of this study, is concerned with students' knowledge of sanitation and hygiene issues. How knowledgeable a student is; concerning issues related to sanitation and hygiene can directly or indirectly affects his/her behaviour. Devine (2009) asserted that; the ability to perform certain actions is influenced by the individuals' knowledge of the consequences of his/her behaviour. This implies that awareness of sanitation and hygiene implications; influences the actions and behavior of students. Findings from the study revealed that junior high students across the public basic schools in Mfantseman Municipality are knowledgeable about sanitary and hygiene practices as the means of disease reduction and prevention. This confirmed the findings by Curtis et. al., (2003), that hand washing is used as a protective means of preventing illness.

Operations and maintenance of WASH facilities in Basic Schools

Alexander et al., (2016), posited that even when there are adequate water supply and toilet facilities, maintenance of the infrastructure for proper hygienic practices and sanitation behaviors in schools are still challenges in

low-income settings. Therefore, it is necessary to assess the condition of WASH facilities across the public basic schools in Mfantseman Municipality and its influence on the health of pupils. Also, studies by Mathew et al., (2009), and Njuguna et al., (2008) indicated that usage of school toilets is associated with their level of cleanliness. Other studies also revealed that properly maintained and clean latrines can reduce absenteeism among school-aged children (Pengpid and Peltzer, 2012). As such; the study collected and presented information to assess WASH facilities maintenance in the public basic schools within the Municipality.

People responsible for cleaning the toilet facilities

Acquah et al., (2014), reported that in public basic schools, students are responsible for cleaning school WASH facilities. Hence, it was necessary to investigate the current situation in the public basic schools within Mfantseman Municipality. Indeed, the study findings confirmed that of Acquah et al (2014), since students mainly clean the toilet facilities while teachers supervise the cleaning (Table 10).

Table 10: People responsible for cleaning the toilet facility

Variables	Students	Pain worker	Total
Rural	175 (100%)	0 (0)	175(100%)
Urban	158(98.1%)	3 (1.9%)	161 (100%)

Source: Field survey 2021

The findings from the study revealed that 175 pupils representing 100% and 158 pupils representing 98.1% were of the view that they are responsible for cleaning the toilet facilities in both rural and urban schools

respectively. The result is similar to Duah et al., (2019) and Acquah et al (2014) who found that students clean the WASH facilities in schools.

The findings are supported by the in-depth interviews as follows:

> *The facilities are cleaned by the students while the teachers supervise [49-year-old head teacher from urban school]*
>
> *Students do the cleaning while teachers supervise but G.E.S provides the detergents, soaps, and tissue papers to the schools [A 46-years old head teacher from rural school].*
>
> *Students clean the facilities and it is required as their duty and sometimes too as punishment [43-year-old head teacher from rural school]*

How cleaners are recruited for the toilets

Research by Acquah et. al., (2014), revealed that cleaning of school WASH facilities in public basic schools is based on a duty roster for students to do the cleaning. As such the study collected and presented information on how cleaners are recruited to clean the facilities in the public basic schools within Mfantseman Municipality. The findings are illustrated in Table 11.

Table 11: How cleaners are recruited for the toilets

Variables	Punishment	Paid worker	Duty roster	Total
Rural	38 (21.7%)	0 (0)	137 (78.3%)	175(100%)
Urban	38(23.6%)	1 (0.6%)	122 (75.8%)	161 (100%)

Source: Field survey 2021

The findings from the study revealed that students are mainly appointed to clean the WASH facilities based on a dusty roster and sometimes as punishment. Thus, about 137 pupils representing 78.3% and 122 pupils

representing 75.8% were of the view that students are recruited to clean the WASH facilities based on duty roster in rural and urban schools respectively. However, 38 pupils representing 21.7% and 38 pupils representing 23.6% were of the view that students are recruited to clean the WASH facilities as punishment in both rural and urban schools respectively. The study is consistent with the research by Duah et al., (2019) and Acquah et al (2014), that cleaning of school WASH facilities is based on duty roster and sometimes as punishment to offenders.

The findings are supported by the in-depth interview conducted by some head teachers:

> *It is a general norm in this school that, the last Section in the week will clean the facilities, hence the students must do so if their Section is last. [A 46-year-old head teacher from rural school]*
>
> *School health team which is made up of teachers and prefect supervise, while students do the cleaning based on duty roster [53-year-old head teacher from urban school]*

People responsible to fetch and emptying waste water from the hand washing facility

This section presents information on people responsible for fetching and emptying water from the hand washing facilities in the basic schools within Mfantseman Municipality. The findings from the study revealed that students are mainly responsible for fetching and emptying water from the hand washing facilities in schools in both the rural and urban areas. Thus, all 184 pupils representing 100% and 182 pupils representing 99.1% said students are

responsible for fetching water into the hand washing facilities in both rural and urban schools respectively.

Also, the findings presented in Table 12 indicated that students are mainly responsible for emptying water from the hand washing facilities in schools in both the rural and urban areas. Thus; about 183 pupils representing 99.5% and 176 pupils representing 96.2% said students are responsible for emptying water from the hand washing facilities in both rural and urban schools respectively.

Table 12: Responsible people to fetch and empty waste water from the hand washing facility

Variables	Students	Pain worker	Total
Responsible people to fetch water into the hand washing facility			
Rural	184 (100%)	0 (0)	184(100%)
Urban	182 (99.5%)	1 (0.5%)	183 (100%)
Responsible people for emptying waste water from the hand washing facility			
Rural	183 (99.5%)	0 (0)	1 (0.5%) 184(100%)
Urban	176 (96.2%)	7 (3.8%)	0 (0) 183 (100%)

Source: Field survey (2021)

The findings are supported by the in-depth interview with some head teachers:

> *Students fetch water and empty the dirty water after hand washing during and after school hours. [A 49-year-old head teacher from urban school]*
>
> *Selected students fetch water and empty the dirty water after hand washing [A 46-year-old head teacher from rural school]*

People responsible for providing detergents to clean the facilities

Table 13 presents information on responsible agencies or individuals who provide logistics to schools for operation and maintenance of the WASH facilities. The findings revealed that the Ghana Education Service (GES) is responsible for providing detergent to schools in both the rural and urban areas for cleaning purposes, and sometimes through the support from PTA (now P.A), philanthropist and internally generated funds through school worships. Specifically, 80.4% and 72.8% of pupils said GES is responsible for providing detergents to schools in both the rural and urban areas for cleaning purposes. However, some pupils from either rural or urban schools said P.T.A (now P.A), private individuals (philanthropists), and school authorities sometimes provide these detergents, while other pupils said they do not have any idea on who supplies the detergents, used for cleaning the school facilities. The p-value of 0.006 indicates that there is a statistically significant difference between rural and urban areas when it comes to the people responsible for providing detergent for cleaning the facilities, meaning that even though both urban and rural schools obtain them form G.E.S, access to these detergents differ base on other factors.

Table 13: People responsible for providing detergent to clean the facilities

Variables	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
PTA	4	2.2	8	4.3	12	3.3	
GES	148	80.4	134	72.8	282	76.6	.006
P. individual	9	4.9	10	5.4	19	5.2	
Don't know	4	2.2	20	10.9	24	6.5	
Sch. authority	19	10.3	12	6.5	31	8.4	
Total	184	100	184	100	368	100	

Source: Field data (2021)

The findings are supported by the in-depth interview conducted with some head teachers:

> *Mostly the detergents and tissues papers are provided by G.E.S through the capitation grant and at times some philanthropist [56 years head teacher from rural school]*
>
> *Because of Covid-19, the government through G.E.S have been providing tissue paper and detergents often and mostly through the capitation grant as well [49 years head teacher from urban school]*

The result from the in-depth interviews is consistent with findings by Wuni et al., (2018), who found that public basic schools in Ghana mainly depend on the G.E.S capitation grant and/or other internal means. It is also similar to Duah et al., (2019) who found that the G.E.S capitation grant is the main source of funding to maintain the school WASH facilities.

Frequency at which the facilities are cleaned and maintained

Information on regular timelines for cleaning the facilities with soap or as were collected and the views of the respondents are presented in Table 14.

Table 14: Frequency at which the facilities are cleaned or maintained

Variables	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
Everyday	13	7.1	19	10.3	32	8.7	
Most of the days	131	71.2	133	72.3	264	71.7	.420
Rarely	17	9.2	17	9.2	34	9.2	
Sometimes	23	12.5	15	8.2	38	10.3	
Total	184	100	184	100	368	100	

Source: Field data (2021)

The findings from the study revealed that school WASH facilities are cleaned most of the days in the week in both rural and urban schools respectively. Specifically, 71.2% and 72.3% of pupils in both rural and urban schools respectively were of the view that the school WASH facilities are cleaned most of the days in the week.

The findings are supported by the in-depth interviews as follows:

> *The facilities are cleaned with detergents three times a week, and it is a strategy for managing the detergents since we do not know the exact timelines to obtain disinfectants from GES [46-year-old head teacher from rural school]*
>
> *The students sweep the facilities every day but they scrub with detergents and water three times a week [48-year-old head teacher from urban school]*

Linking the SaniFOAM theory to the findings, the concept of Opportunity in the SaniFOAM theory was adopted. Opportunity (O), is related to accessibility, products attributes, social norms, and sanctions. However, before talking about the accessibility of WASH facilities, it is important to first look at the availability of these WASH facilities across the public basic schools within the Municipality. As such, the study asked questions on available WASH facilities in schools and investigated whether these facilities are fully or partially used and/or not in use at all. The study indicated that almost all the basic schools within Mfantseman Municipality had WASH facilities. However, though most of the toilet facilities are fully used, they are not adequate and/or are in bad shape because some are damaged with broken doors/widows and bad roofs as indicated by the pictures taken during the data collection moment (plates 5, 6 & 7). Some of these WASH facilities are not in use at all while others are partially used.

Opportunity is linked to operations and maintenance to answer the second objective (Examine operations and maintenance of WASH facilities in basic schools). The idea is to identify the coordination in terms of labour and operation for the maintenance of the WASH facilities. The concept called product attribute helped to achieve this purpose. Products attributes look at the state, nature, and condition of WASH facilities in the public basic schools within Mfantseman Municipality. Evidence from pictures taken during the study (plates 5, 6 & 7) and outcome from the interviews revealed that some of these WASH facilities are in bad shape; with broken doors, slaps, windows, and bad roofs.

The study found that operation and management of the WASH facilities in the public basic schools within the Municipality are in the hands of the Ghana Education Service (G.E.S), teachers, and the students. The findings revealed that teachers coordinate and get the necessary logistics from G.E.S to schools, and supervise the students to do the cleaning, based on a duty roster. Thus, G.E.S provides the logistics to schools for maintenance and teachers supervise the students to do the cleaning based on a duty roster. Perhaps; cleaning of the WASH facilities is sometimes a punishment to offenders to sanction them from engaging in irresponsible sanitary behavior. Frankly, this is actually how the facilities are managed and operated across the public basic schools within Mfantseman Municipality. This helped to achieve the second objective (Examine operations and maintenance of WASH facilities in basic schools).

Availability of separate facility to change during menstruation

This section sought information on whether there are separate facilities in schools purposely for female students to change themselves during menstruation. The result is presented in Table 18. The findings from the study revealed that no single school in the rural areas had a separate facility purposely for females to change during menstruation while only 1 school (23 pupils representing 12.5%) in the urban areas have a separate facility purposely for females to change themselves during menstruation. The p-value of 0.000 indicates that there is a statistically significant difference between rural and urban areas when it comes to the availability of separate facilities for females to change themselves during menstruation. This implies that in schools without separate facilities, females' menstrual right is limited since

they are not provided with separate facilities to change during the period of menstruation.

The result is similar to UNICEF, (2015) which found that schools lack separate WASH facilities, especially for girls during menstruation. The findings are also consistent with Chinyama et al., (2019) that WASH facilities in schools do not support menstrual hygiene management.

Table 15: Availability of separate facility to change during menstruation

Variables	Yes	No	Don't know	Total
Rural	0 (0)	184 (100%)	0(0)	184 (100%)
Urban	23 (12.5%)	158(85.9%)	3 (1.6%)	184 (100%)

Source: Field survey (2021)

These findings are supported by the in-depth interviews as follows:

> *There is no separate room for females to change themselves during menstruation [46-year-old head teacher from rural school]*
>
> *We do not have any change room for the females during menstruation [38-year-old head teacher from rural school]*
>
> *There is no changing room for the female students to change during menstruation, however, some use the toilets facilities if the need be [49-year-old head teacher from urban school]*

Means of handling sanitary waste at school during menstruation

This section presents information on whether there are any means of handling menstrual cycle waste at school. The views of the students are

presented in Table 16. The purpose was to find out how female students handle menstrual waste in school.

Table 16: Means of handling sanitary waste at school during menstruation

Variables	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
Separate bin	3	1.6	2	1.1	5	1.4	
No bin	165	89.7	173	94	338	91.8	.459
Use usual bin	7	3.8	3	1.6	10	2.7	
Don't know	9	4.9	6	3.3	15	4.1	
Total	184	100	184	100	368	100	

Source: Field data (2021)

The findings from the study revealed that there are no separate bins for storing menstrual hygiene waste at schools in both the rural and urban areas. Thus, about 165 pupils representing 89.7% and 173 pupils representing 94% in both rural and urban schools respectively were of the view that there are no separate bins in schools for handling menstrual hygiene waste. The findings are consistent with Sibiya et al., (2013) who found a lack of separate waste bins for menstrual hygiene management in school. Also, the findings are in support with Chinyama et al., (2019), that; WASH facilities in schools do not support menstrual hygiene management.

Whether female students miss classes during the menstrual period

Several studies like Adams et al., (2009), Dorgbetor, (2015), Jasper et al., (2012), and Chinyama et al., (2019) assert that insufficient school WASH facilities affect girls' attendance at school. As such the study sought to find out the situation among female students in the basic schools in Mfantseman

Municipality. The study found the situation to be different across schools in Mfantseman since the majority of the respondents said female students do not miss classes when menstruating (Table 17). Further probing revealed that due to the SHEP initiative and intervention, females have been educated on menstrual hygiene management; as such they have adequate menstrual hygiene knowledge to effectively ensure menstrual hygiene management. This contributed to them (female students) not missing classes when menstruating.

Table 17: Whether female students miss classes during the menstrual period

Variables	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
Yes, they do	14	7.6	12	6.5	26	7.1	
No, they don't	131	71.2	136	73.9	267	72.6	.832
Don't know	39	21.2	36	19.6	75	20.3	
Total	184	100	184	100	368	100	

Source: Field data (2021)

Level of satisfaction in maintenance and operation of WASH facility

Studies by Mathew et al., (2009), and Njuguna et al., (2008) indicated that usage of school toilets is associated with their level of cleanliness. Hence, it was appropriate to find out the satisfaction level of pupils regarding the operations and maintenance of the WASH facilities in basic schools within Mfantseman Municipality. The findings revealed that WASH facilities in schools in the urban areas of Mfantseman Municipality are well managed than rural schools. The views of the respondents are presented in Table 18.

Table 18: Level of satisfaction in maintenance and operation of WASH facility

Variables	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
Very satisfied	5	2.7	12	6.5	17	4.6	
Satisfied	56	30.4	68	37.0	124	33.7	.180
Neutral	40	21.7	38	20.7	78	21.2	
Dissatisfied	68	37.0	52	28.3	48	13.0	
Very dissatisfied	15	8.2	14	7.6	29	7.9	
Total	184	100	184	100	368	100	

Source: Field data (2021)

The study revealed that most students in urban schools are satisfied with the maintenance and operations of the WASH facilities. However, the majority of students in rural schools are dissatisfied with the maintenance and operations of the school WASH facilities (Plates 5 and 6). Hence, the findings from rural schools are consistent with Ghanim et al., (2016), who also found poor WASH facility maintenance in schools. Also, the findings from rural schools are in line with the study by Alexander et al., (2016) that even when there are adequate water supply and toilet facilities, maintenance of the infrastructure for proper hygienic practices and sanitation behaviours in schools, are still challenges in low-income settings.

The findings are supported by responses from some stakeholder heads as follows:

> *I am not satisfied at all with how the facilities in the schools are maintained because government capitation is not adequate however, it is not for facility maintenance alone. Hence,*

inadequate funds sometimes affect our ability to ensure the maintenance of the facilities. [A 36-year-old stakeholder]

I am not satisfied because even though school health education programs are organized frequently with the help of some health personals on their worship days, some students act irresponsibly sometimes and mess up the facilities. [48-year-old stakeholder*]*

No matter how well you clean the place, you will come back to school the following day and realized that the community members have broken the locks and messed up the place. [56-year-old stakeholder]

The picture below shows the state of WASH facilities used in the basic schools. It typically shows a urinal with broken doors, implying a lack of privacy among students when they want to urinate.

Plate 5: State of WASH facilities (urinal with broken doors)

Source: Field Survey (2021)

The picture below shows the state of WASH facilities used in the basic schools. It typically shows a toilet facility with bad roof, implying an uncomfortable feeling among students when they want to ease themselves.

Plate 6: State of WASH facilities (toilet with bad roofing)

Source: Field Survey (2021)

Challenges in managing WASH facilities in basic schools

Several studies including Adams et al., (2009); Dorgbetor, (2015); Acquah et al., (2014); and Aladago et al., (2019), have found challenges in managing WASH facilities in schools. These WASH challenges were related to insufficient WASH facilities in schools (Mcmichael, 2019) and a lack of separate school WASH facilities, especially for girls during the age of menstruation (UNICEF, 2015). Duijster, Monse, Dimaisip-Nabuab, Djuharnoko, Heinrich-Weltzien, Hobdell, & Benzian, (2017), attributed these WASH challenges to unchanged behavior and attitude of students. Dorgbetor, (2015) also attributed these challenges to restrictions, exclusion, and

humiliation given to female students during the period of mensuration, making them reluctant to attend the school which leads to unequal learning opportunities as compared to their male counterparts. Hence, this study examined views from respondents and participants to find out whether there are challenges facing WASH facilities management across the public basic schools in Mfantseman Municipality. The information is presented in the sections below.

Challenges facing WASH facilities management

This part of the study enquired whether the public basic schools in Mfantseman Municipality faced any challenges in managing the WASH facilities. The findings from Table 19 revealed that 91.8% and 84.2% in rural and urban schools respectively said they face challenges in the management of the WASH facilities (Plate 7). The p-value of 0.024 indicates that there is a statistically significant difference between rural and urban areas when it comes to the challenges faced in managing WASH facilities in basic schools.

Table 19: Challenges facing WASH facilities management

Responses	Rural		Urban		Total		ASYMP.SIG
	Freq.	%	Freq.	%	Freq.	%	
Yes	169	91.8	155	84.2	324	88	.024
No	15	8.2	29	15.8	44	12	
Total	184	100	184	100	368	100	

Source: Field data (2021)

The picture below shows the state of WASH facilities used in the basic schools. It typically shows condition toilet facilities, implying an uncomfortable feeling among students when they want to ease themselves.

Plate 7: State of WASH facilities (condition of the toilet in schools)

Source: Field Survey (2021)

Specific challenges in managing WASH facilities

The study solicited the views of respondents and participants to enquire whether some of the specified challenges are prevalent or not in the public basic schools in Mfantseman Municipality (Table 20).

Table 20: Specific challenges in managing WASH facilities

Variables	Rural		Urban		Total		ASYMP.SIG
Lack of support from local institution							
	Freq.	%	Freq.	%	Freq.	%	
SA	51	30.2	71	45.8	122	37.6	
A	94	55.6	80	51.7	174	53.7	.000
D	19	11.2	3	1.9	22	6.8	
SD	5	3	1	0.6	6	1.9	
Lack of proper supervision by the school authority							
SA	0	0	7	4.5	7	2.2	
A	12	7.1	24	15.5	36	11.1	.001

Table 20: Cont.

D	117	69.2	83	53.5	200	61.7	
SD	40	23.7	41	26.5	81	25	
Poor work habit							
SA	2	1.2	7	4.5	9	2.8	
A	26	15.4	52	33.5	78	24.1	.000
D	107	63.3	70	45.2	177	54.6	
SD	34	20.1	26	16.8	60	18.5	
PTA unwillingness to pay							
SA	42	24.9	35	22.6	77	23.8	
A	110	65	101	65.2	211	65.1	.911
D	16	9.5	18	11.6	34	10.5	
SD	1	0.6	1	0.6	2	0.6	
Irresponsible student behaviour							
SA	10	6	10	6.5	20	6.2	
A	72	42.6	77	49.7	149	46	.320
D	68	40.2	47	30.3	115	35.5	
SD	19	11.2	21	13.5	40	12.3	
Community invasion							
SA	91	53.8	57	36.8	148	45.7	
A	61	36.1	75	48.4	136	42	.000
D	17	10.1	11	7.1	28	16.6	
SD	0	0	12	7.7	12	3.7	
Odour							
SA	42	24.8	57	36.8	99	30.6	
A	93	55	90	58	183	56.5	.000
D	29	17.2	8	5.2	37	11.4	
SD	5	3	0	0	5	1.5	
Inadequate water							
SA	65	38.5	40	25.8	105	32.4	
A	56	33.1	79	51	135	41.7	.000
D	34	20.1	31	20	65	2	
SD	14	8.3	5	3.2	19	5.9	
Total	169	100	155	100	324	100	

Source: Field data (2021) [SA=Strongly agree, A= Agree, D= Disagree, SD=Strongly disagree]

With regards to the challenges faced in managing the school WASH facilities, the findings from the study revealed that the majority of students in both the rural and urban areas either strongly agreed or agreed with the fact that there is a lack of support from local institutions to manage the school facilities. Thus, 51 pupils representing 30.2% and 94 pupils representing 55.6% in rural schools either strongly agreed or agreed respectively with the fact that there is a lack of support from local institutions to manage the school facilities. Also, in the urban schools, about 71 pupils representing 45.8% and 80 pupils representing 51.7% either strongly agreed or agreed respectively with the fact that there is a lack of support from local institutions to manage the school facilities. The p-value of 0.000 indicates that there is a statistically significant difference between rural and urban areas when it comes to getting support from local institutions to manage the school facilities. The findings imply that the schools are not getting adequate support from the local institutions within Mfantseman Municipality.

In addition, 69.2% and 23.7% in rural schools either disagreed or strongly disagreed respectively with the statement that there is a lack of proper supervision by school authority in managing the school facilities. In the urban schools, 53.5% and 26.5% either disagreed or strongly disagreed respectively with the statement that there is a lack of proper supervision by school authorities in managing the school facilities. The p-value of 0.001 indicates that there is a statistically significant difference between rural and urban areas in the supervision and management of the school facilities.

On students' behaviour, 42.6% and 49.7% in rural and urban schools respectively agreed with the statement that irresponsible student behaviour is a challenge in managing the WASH facilities. When it comes to community behaviour, 53.8% and 36.1% in rural schools strongly agreed and agreed respectively with the statement that there is community invasion of the WASH facilities. Also, in the urban schools, 36.8% and 48.4% strongly agreed and agreed respectively that community invasion is a challenge in managing WASH facilities in schools. The findings are similar to the study by Acquah et al (2014) who also found that school WASH facilities are invaded by community members. The findings are supported by the in-depth interviews conducted as follows:

> *Our major challenge has been the community member because they keep using the toilet facility after school hours. [51-year-old head teacher from rural school]*
>
> *The community members use the school facilities after school hours, they mess the place always and this is a major challenge [49-year-old head teacher from urban school]*
>
> *Community members living around use the facilities when school closes, they sometimes break through when we lock the facilities. As such all the doors are broken and this is a major problem for us [46-year-old head teacher from rural school]*

Finally, the findings from the study revealed that the majority of students in both rural and urban schools agreed and strongly agreed that there is inadequate water for cleaning the WASH facilities. Specifically, 33.1% and 38.5% in rural schools as well as 25.8% and 51% from urban schools agreed

and strongly agreed respectively to the statement that there is inadequate water in schools for maintenance of the WASH facilities. The variation in responses between the rural and urban schools is statistically significant at a 0.05% confidence level with a p-value of 0.000.

The findings are supported by claims by some of the head teachers as follows:

> *Most schools in the Municipality are really facing challenges in operating and maintenance of facilities but the problem is inadequate funds, and this usually occurs because the common fund for initiating development doesn't come regularly [48-year-old Stakeholder head].*

> *At first government, through the District Assembly, was paying the water bills but they are no more paying, as such the taps are disconnected due to huge debt, hence maintenance of the WASH facilities is a major problem making the facility unhygienic to use [48-year-old stakeholder]*

Linking SaniFOAM theory to the findings, the concept of WASH challenges was adapted. WASH challenges in the context of this study, refer to the conditions beyond the control of school authorities that poses threat to the health of pupils and teachers. This study identified these WASH challenges among the basic schools in the Municipality as the following inadequate funds, community invasion, inadequate infrastructure, bad odour, damaged facilities, and lack of support from local institutions. Findings from the study revealed that most public basic schools lack adequate funding to maintain the WASH facilities (plates 5 &6). The pictures showed schools with broken doors and roof which were later confirmed by the interviews conducted. It was

stated clearly in the study that the major source of funding was through the G.E.S capitation grant which was not only for WASH facilities maintenance. Hence, it was not adequate for WASH facilities maintenance. This assertion was confirmed, by the in-depth interviews that; there are inadequate funds for WASH facilities maintenance.

The study also found that community invasion is a general problem across the public basic schools within the Municipality. This was confirmed by the in-depth interviews that; community members use the school facilities after school session, making the place unattractive or unhygienic. These are challenges that are beyond the control of the school authorities and require appropriate strategies to curb them. This helped to address the third objective (Explore the challenges in managing WASH facilities in basic schools).

Strategies to improve utilization and maintenance of WASH facilities

To address the challenges to managing the WASH facilities in the basic schools, the views of respondents were collected about some measures which can best help to curb the situation. The views are further supported by the in-depth interviews conducted. These views were presented in Likert-scale format (Table 21).

Table 21: Strategies to improve utilization and management of WASH facilities

Variables	Rural		Urban		Total		ASYMP.SIG
Compulsory use of the facility							
	Freq.	%	Freq.	%	Freq.	%	
SA	89	48.4	70	38	159	43	
A	95	51.6	114	62	209	57	.046
Use detergent							
SA	91	49.5	90	48.9	181	49.2	
A	92	50	94	51.1	186	50.5	.598
SD	1	0.5	0	0	1	0.3	
Repair damage facility							
SA	75	40.8	87	47.3	162	44.1	
A	107	58.2	97	52.7	204	55.4	.185
D	2	1	0	0	2	0.5	
Punish students							
SA	82	44.6	97	53	179	48.6	
A	102	55.4	86	46.7	188	51.1	.911
D	0	0	1	0.5	1	0.3	
Improve student-latrine ratio							
SA	85	46.2	91	49.5	176	47.8	
A	99	53.8	88	47.8	187	50.8	.054
D	0	0	5	2.7	5	1.4	
Total	184	100	184	100	368	100	

Source: Field data (2021) [SA=Strongly agree, A= Agree, D= Disagree, SD=Strongly disagree]

With regards to strategies to help improve utilization and management, the findings from the study revealed that the majority of students in both the rural and urban areas either strongly agreed or agreed with the statement that making the facility compulsory for students to use the facility is one of the strategies that can help to improve utilization and management of the school

WASH facilities. Specifically, 48.4% and 51.6% of pupils from rural schools, and 38% and 62% in urban schools either strongly agreed or agreed respectively with the statement that making the facility compulsory for students to use the facility is one of the strategies that can help to improve utilization and management of the school WASH facilities. The findings are in line with the in-depth interview with the stakeholder heads:

> *I believe building enough facilities and making it compulsory to use without any other means of waste disposal at schools will help control unsanitary behaviour among pupils [48-year-old stakeholder head]*

In addition, the study revealed that most students in both rural and urban schools either strongly agreed or agreed with the statement that adequate use of detergent for cleaning is one of the strategies that can help to improve utilization and management of the school WASH facilities. Thus, 49.5% and 50% of pupils from rural schools and 48.9% and 51.1% from urban schools either strongly agreed or agreed respectively with the statement that adequate use of detergent for cleaning is one of the strategies that can help to improve utilization and management of the school WASH facilities. The p-value of 0.0598 indicates that there is no statistically significant difference between rural and urban areas when it comes to the use of detergent for cleaning and maintenance of the school WASH facilities.

The findings are in line with the in-depth interview with the stakeholders and head teachers:

> *We organize school health programs for the basic schools through our professional nurses and we tell them to regularly*

use detergent to clean the facilities to reduce the unhygienic sanitary conditions in the schools [49-year-old stakeholder head]

Regular use of detergent for cleaning is one important means to reduce disease spread and improve sanitation in schools [46-year-old head teacher from rural school]

Lastly, the study revealed that most students in both rural and urban schools, either strongly agreed or agreed with the statement that improving the student-latrine ratio is one of the strategies that can help to improve utilization and management of the school WASH facilities. Specifically, 46.2% and 53.8% of pupils from rural schools as well as 49.5% and 47.8% in urban schools either strongly agreed or agreed respectively with the statement that improving the student-latrine ratio is one of the strategies that can help to improve utilization and management of the school WASH facilities.

Students' responsibility for maintenance of the WASH facilities

This section presents the views collected from pupils about their responsibility to maintain the school WASH facilities (Table 22).

Table 22: Students' responsibility for maintenance of the WASH facilities

Variables	Rural		Urban		Total		ASYMP.SIG
Proper handling of the facility							
	Freq.	%	Freq.	%	Freq.	%	
SA	83	45.1	84	45.7	167	45.4	
A	95	51.6	99	53.8	194	52.7	.160
D	6	3.3	1	0.5	7	1.9	
Cleaning Regularly							
SA	73	40	90	49	163	44.3	
A	111	60	93	50.5	204	55.4	.113
D	0	0	1	0.5	1	0.3	
Flush toilet after use							
SA	84	45.7	84	45.7	168	45.7	
A	99	53.8	98	53.3	197	53.5	.844
D	1	0.5	2	1	3	0.8	
Properly dispose of waste							
SA	66	35.9	94	51.1	160	43.5	
A	117	63.6	84	45.7	201	54.6	.003
D	1	0.5	5	2.7	6	1.6	
SD	0	0	1	0.5	1	0.3	
Report students							
SA	75	40.8	82	44.6	157	42.7	
A	107	58.2	95	51.6	202	54.9	.204
D	1	0.5	6	3.3	7	1.9	
SD	1	0.5	1	0.5	2	0.5	
Weed around							
SA	66	35.9	75	40.8	141	38.3	
A	117	63.6	107	58.2	224	60.9	.508
D	1	0.5	2	1	3	0.8	
Avoid standing on W/C							
SA	77	41.8	74	40.2	151	41	
A	106	57.6	108	58.7	214	58.2	.782
D	0	0	1	0.5	1	0.3	
SD	1	0.5	1	0.5	2	0.5	
Total	184	100	184	100	368	100	

Source: Field data (2021) [SA=Strongly agree, A= Agree, D= Disagree, SD=Strongly disagree]

With regards to students' responsibility for the maintenance of the school WASH facilities, the study revealed that majority of the students in both rural and urban schools either strongly agreed or agreed with the statement that proper handling of the facilities is their responsibility. Specifically; 45.1% and 51.6% of pupils from rural schools as well as 45.7% and 53.8% in urban schools either strongly agreed or agreed respectively with the statement that proper handling of the facilities is their responsibility.

Again, the study revealed that most students in both rural and urban schools, either strongly agreed or agreed with the statement that regular cleaning of the facilities is their responsibility. Thus, 40% and 60% of pupils from rural schools, as well as 49% and 50.5% in urban schools either strongly agreed or agreed respectively with the statement that regular cleaning of the facilities is their responsibility.

On proper disposal of waste, the study revealed that 35.9% and 63.6% of pupils from rural schools, as well as 51.1% and 45.7% from urban schools either strongly agreed or agreed respectively with the statement that properly disposing of waste is one of their responsibilities. The p-value of 0.003 indicates that there is a statistically significant difference between rural and urban areas in this regard.

Teachers' responsibility for maintenance of the WASH facilities

This section presents the views of pupils on what they want the teachers to help maintain the school WASH facilities. The information is presented in the Table 23:

Table 23: Teachers' responsibility to improve utilization and management of the WASH facilities

Variables	Rural		Urban		Total		ASYMP.SIG
Punish students							
	Freq.	%	Freq.	%	Freq.	%	
SA	75	40.8	81	44.1	156	42.4	
A	108	58.7	102	55.4	210	57.1	.818
D	1	0.5	1	0.5	2	0.5	
Increase awareness							
SA	78	42.4	92	50	170	46.2	
A	101	54.9	90	48.9	191	51.9	.215
D	5	2.7	2	1.1	7	1.9	
Provision of adequate logistics							
SA	101	54.9	83	45.1	184	50	
A	81	44	100	54.4	181	49.2	.129
D	2	1.1	1	0.5	3	0.8	
Supervise regularly							
SA	77	41.8	83	45.1	160	43.5	
A	104	56.5	99	53.8	203	55.1	.760
D	3	1.6	2	1.1	5	1.4	
Total	184	100	184	100	368	100	

Source: Field data (2021) [SA=Strongly agree, A= Agree, D= Disagree, SD=Strongly disagree]

With regards to teachers' responsibility to help improve utilization and management of the facilities, findings from the study revealed that 40.8% and 58.7% from rural schools either strongly agreed or agreed respectively with the statement that they expect the teachers to punish their colleague students as a way to help improve utilization and maintenance of the school WASH facilities. In urban schools, 44% and 55.4% either strongly agreed or agreed respectively with the statement that they expect the teachers to do same.

In addition, the study revealed that most students in both the rural and urban schools either strongly agreed or agreed with the statement that they expect the teachers to increase awareness on the importance of hygiene Specifically, 42.4% and 54.9% of pupils from rural schools as well as 50% and 48.9% of urban schools either strongly agreed or agreed respectively with the statement that they expect the teachers to increase awareness on the importance of hygiene.

More so, 54.9% and 44% from rural schools as well as 45.1% and 54.4% of urban schools either strongly agreed or agreed respectively with the statement that they expect the teachers to ensure adequate provision of logistics to improve utilization and maintenance of the school WASH facilities.

Finally, the findings from the study revealed that 41.8% and 56.5% of pupils in rural schools as well as 45.1% and 53.8% of their urban counterparts either strongly agreed or agreed respectively with the statement that they expect the teachers to do regular supervision as means to improve utilization and maintenance of the school WASH facilities.

Communities' responsibility for maintenance of the WASH facilities

This section presents the views of pupils on what they want the community members to do to help maintain the school WASH facilities. The findings are presented in Table 24.

Table 24: Communities' responsibility to improve utilization and management of the WASH facilities

Variables	Rural		Urban		Total		ASYMP.SIG
Provision of Land							
	Freq.	%	Freq.	%	Freq.	%	
SA	20	10.9	41	22.3	61	16.6	
A	29	15.8	39	21.2	68	18.4	.005
D	79	42.9	57	31	136	37	
SD	56	30.4	47	25.5	103	28	
Financial Support							
SA	63	34.2	80	43.5	143	38.9	
A	117	63.6	94	51.1	211	57.3	.026
D	3	1.6	10	5.4	13	3.5	
SD	1	0.5	0	0	1	0.3	
Stop using the facility							
SA	94	51.1	97	52.7	191	51.9	
A	85	46.2	83	45.1	168	45.7	.529
D	3	1.6	4	2.2	7	1.9	
SD	2	1.1	0	0	2	0.5	
Provision of adequate logistics							
SA	73	39.7	78	42.4	151	41	
A	104	56.5	103	56	207	56.3	.346
D	4	2.2	3	1.6	7	1.9	
SD	3	1.6	0	0	3	0.8	
Mobilize Support							
SA	81	44	69	37.5	150	40.7	
A	98	53.3	109	59.2	207	56.3	.498
D	3	1.6	5	2.7	8	2.2	
SD	2	1.1	1	0.5	3	0.8	
Total	184	100	184	100	368	100	

Source; Field data (2021) [SA=Strongly agree, A= Agree, D= Disagree, SD=Strongly disagree]

On the community members' responsibility in the maintenance of the facilities, the findings from the study revealed that most students in both rural and urban schools either disagreed or strongly disagreed with the statement that the community should provide land for building new facilities as means for improving utilization and maintenance of the school WASH facilities. The

p-value of 0.005 indicates that there is a statistically significant difference between rural and urban areas when it comes to their views on communities providing land for building new facilities as means for improving utilization and maintenance of the school WASH facilities.

In addition, the findings indicated that most students in both rural and urban schools either strongly agreed or agreed with the statement that the community should give financial support to improve the utilization and maintenance of the school WASH facilities. Again, the p-value of 0.026 indicates that there is a statistically significant difference between rural and urban areas in terms of their expectations of the communities to provide financial support.

Furthermore, the study showed that most students in both rural and urban schools either strongly agreed or agreed with the statement that the community members should ensure adequate provision of logistics as the means to improve utilization and maintenance of the school WASH facilities.

Linking the SaniFOAM theory to the findings, the concept called utilization strategies was adopted. Utilization strategies in the context of this study are some important measures that can best help in the operations and maintenance of the school WASH facilities across the public basic schools in Mfantseman Municipality. The study identified some utilization strategies like regular cleaning of the facilities with detergents, proper and responsible student's behaviour, increasing importance of hygiene education, adequate provision of logistics for maintenance, punishing offenders, and regular supervision by teachers and compulsory use of the facilities other than any other means. It is believed that these suggested opinions can help to improve

the utilization and maintenance of the WASH facilities across the public basic schools within the Mfantseman Municipal Assembly. This helped to achieve the last objective (Explore strategies to improve utilization and management of WASH facilities in basic schools).

Chapter Summary

This chapter presented the results and discussion. The data were analyzed using both descriptive (percentages) and inferential statistics (chi-square test of difference) to explain the objectives of this study. The similarities and differences that emerged from the study were compared with related studies. The findings also were supported by the outcome of the in-depth interviews.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter presents a summary of the findings, conclusions, and recommendations for further research. The recommendations were based on the key findings and conclusions emanating from the study. The summary reflects the overview of the research, its objectives, target population, sampling techniques, data analysis, and findings from the study, while the conclusions deal with the implication of the findings of the study. The recommendations spell out exact strategies to be implemented by stakeholders based on the conclusions from the study.

Summary

This study assessed the management of WASH facilities in basic schools within the Mfantseman Municipality of Ghana. Specifically, it assessed the types of WASH facilities used in schools, how these facilities are managed, challenges faced in maintaining the WASH facilities as well as the strategies to improve the utilization and management of WASH facilities within basic schools in the municipality.

The theoretical basis for this study was from Sanitation Behavior Change Framework (SaniFOAM) which helped in understanding the students and their sanitary practice. The pragmatic philosophy was used because such methods are appropriate to balance each other's defects. Thus, both the quantitative and qualitative research approaches were employed for the study. Primary data was collected through structured interview schedules, observations checklist, and in-depth interviews.

The target population was junior high school students in public basic schools. The study made use of the convergent parallel mixed method and descriptive design. With the help of Hotjar's online sample calculator at 95% confidence level and 5% margin of error, the desired sample size of 368 students was selected (368 respondents), with 4 stakeholder heads and 16 headteachers were also interviewed (key informants). Statistical Product and Service Solutions (SPSS) version 22.0 was used for the analysis. The data were analyzed using both descriptive (percentages) and inferential statistics (chi-square test of difference). Interviews conducted were manually transmuted into themes and appropriately used to either support the quantitative data, while the observations were done with an observation checklist and pictures taken to support the findings from interview schedules and the interviews.

Summary of Key Findings from the Study

The key findings from the study based on the research objectives and questions are as follows:

1. There are toilet and water facilities available in most schools in both rural and urban schools but they are inadequate. However, for those who do not have a toilet in their schools, the majority defecate at the beach, while others defecate in the bush and public toilets. Moreover, for those without water facilities in schools, the majority fetch water from the public pipe stands or from their houses to their schools, while others fetch water from private individuals closer to their schools.
2. All schools have handwashing facilities with soap, water, and tissues. The availability of handwashing facilities in the schools may be the

result of the investments and interventions results from the covid-19 pandemic, where the provision of handwashing facilities was a requirement for the reopening of schools in the country.

3. Students in the public basic schools in Mfantseman Municipality are knowledgeable about sanitary and hygiene practices as the means of disease reduction and prevention.
4. The differences in sanitation and hygiene practice in both urban and rural schools differ from pupil to pupil depending on a variety of factors.
5. The operation and maintenance of the WASH facilities in the public basic schools within the Municipality are the responsibility of the Ghana Education Service (G.E.S), teachers, and the students. Teachers coordinate and get the necessary logistics from G.E.S to schools, and supervise the students to do the cleaning, based on a duty roster. Thus, G.E.S provides the logistics to schools for maintenance and teachers supervise the students to do the cleaning based on a duty roster. Cleaning of the WASH facilities is sometimes a punishment to offenders to sanction them from engaging in irresponsible sanitary behaviour.
6. Inadequate funds, community invasion, inadequate infrastructure, bad odour, and lack of support from local institutions are some of the challenges faced in the operation and management of WASH facilities in public basic schools within Mfantseman Municipality.
7. Suggestions on how to improve utilization and maintenance of the WASH facilities across the public basic schools within Mfantseman

Municipal Assembly include regular cleaning of the facilities, proper and responsible behaviour of students, increasing importance of hygiene education, adequate provision of logistics for maintenance, punishing irresponsible students, regular supervision by teachers, and making it compulsory for students to use the facilities other than any other means.

Conclusions

Based on the findings of the study, the following conclusions have been drawn:

1. Pupils in the public basic schools within Mfantseman Municipality have satisfactory hygiene knowledge and sanitary practices, just that some WASH facilities are in a bad state, and sometimes make sanitary conditions in school unsatisfactory.
2. Operations and maintenance of WASH facilities in the public basic schools within Mfantseman Municipality are the responsibility of G.E.S, teachers, and students. Thus G.E.S provides the logistics to schools for maintenance and teachers supervise the students to do the cleaning based on duty roster or sometimes as punishment to offenders.
3. The selected schools in Mfantseman Municipality face challenges in managing the facilities due to inadequate funds, inadequate infrastructure, and community invasion.
4. Regular cleaning of the facilities with detergents, proper and responsible behavior of students, increasing importance of hygiene education, adequate provision of logistics for maintenance, regular

supervision by teachers and making it compulsory for students to use the facilities are some of the suggested measures which can help to improve utilization and maintenance of the WASH facilities across the public basic schools within Mfantseman Municipality.

Recommendations

Based on the conclusions drawn, the following recommendations are made:

1. The Ghana Education Service (G.E.S), School Management Committees (S.M.C), Parents, Teachers, government, and all stakeholders in the education sector should ensure adequate provision of WASH infrastructure and interventions in schools to promote healthy and satisfactory sanitary practices of the pupils at all times.
2. Ghana Education Service (G.E.S), teachers, and students should all play their respective roles well in the operations and maintenance of the WASH facilities. Furthermore, G.E.S should provide adequate logistics to schools for maintenance and teachers should do regular supervision while the students do the cleaning.
3. Again, the government, in collaboration with G.E.S and the municipal assembly, should provide adequate funds for facility maintenance, and also encourage community members to construct toilet facilities in their respective homes and educate them on the implication of their actions on the health of the pupils. This will help to stop invasion of the school facilities by community members.
4. Schools should be fenced to prevent the community members from invading the schools' facilities.

5. Sanitation clubs within the basic schools should be encouraged to positively influence students' sanitary and hygiene behaviour.
6. Incentives in the form of awards should be given to student with adequate sanitary behaviour, to encourage satisfactory hygiene and sanitary behaviour.

Suggestions for Further Studies

It is recommended that further studies should examine the management of menstrual hygiene wastes across the basic schools in Mfantseman Municipality. This is because the study observed that most schools did not have separate facilities or dust bins purposely for menstruation. However, since the study did not focus on only female pupils, it did not go into details on issues of menstrual hygiene management. This requires that, further studies should focus on thorough investigation into menstrual hygiene management within the basic schools for more insight. It should focus on understanding menstrual hygiene knowledge, access and use of menstrual logistics and practices among the pupils.

REFERENCES

Acquah, S., Acquaye, V. N., & Eshun, E. S. (2014). School sanitation and hygiene education: A focus on rural community basic schools in Ghana. *Journal of Education and Practice*, *5*(13), 148-156.

Adams J., Bartram, J., Chartier Y., & Sims J. (2009). Water, Sanitation and Hygiene Standards for Schools in Low-cost Settings. World Health Organization. Geneva, Switzerland.

Agun, O. M. (2021). *Hand washing facilities, Knowledge and Practices among Secondary School students in Akinyele local government area, Oyo state* (doctoral dissertation).

Ahiatrogah, M. D. (2020). *Effects of water, sanitation and hygiene facilities on academic performance of basic school pupils in the Ketu North Municipality* (Doctoral dissertation, University of Cape Coast).

Ahmed, J., Wong, L. P., Chua, Y. P., Hydrie, M. Z. I., & Channa, N. (2021). Drinking water, sanitation, and hygiene (WASH) situation in primary schools of Pakistan: the impact of WASH-related interventions and policy on children school performance. *Environmental Science and Pollution Research*, *29*(1), 1259-1277.

Aladago, A. D., Luguterah, A., & Tiswin, T. N. (2019). Assessing the Types, Condition and Functionality of Water, Sanitation and Hygiene Facilities in Public Primary Schools in the Zabzugu District of Ghana. *UDS International Journal of Development*, *6*(1), 92-101.

ALBashtawy, M. (2015). Personal hygiene in school children aged 6–12 years in Jordan. *British Journal of School Nursing*, *10*(8), 395-398.

Alexander, K. T., Mwaki, A., Adhiambo, D., Cheney-Coker, M., Muga, R., & Freeman, M. C. (2016). The life-cycle costs of school water, sanitation and hygiene access in Kenyan primary schools. *International journal of environmental research and public health*, *13*(7), 637.

Ali, S. H. (2008). Children mark global handwashing day in remote Pakistan village world vision, Pakistan. Retrieved November 19, 2021, from http://meero.worldvision.org/news_article.Php?news ID= 16938 & Country ID=18.

Appiah-Effah, E., Duku, G. A., Azangbego, N. Y., Aggrey, R. K. A., Gyapong-Korsah, B., & Nyarko, K. B. (2019). Ghana's post-MDGs sanitation situation: an overview. *Journal of Water, Sanitation and Hygiene for Development*, *9*(3), 397-415.

Antwi-Agyei, P., Dwumfour-Asare, B., Adjei, K. A., Kweyu, R., & Simiyu, S. (2020). Understanding the barriers and opportunities for effective management of shared sanitation in low-income settlements—the case of kumasi, ghana. *International Journal of Environmental Research and Public Health*, *17*(12), 1–17. Retrieved on March 27, 2019 from https://doi.org/10.3390/ijerph17124528

Aremu A. S. (2012). Assessment of Sanitation Facilities in Primary Schools within Ilorin, Nigeria. Journal of Applied Sciences in Environmental Sanitation, 7(1), 29-33.

Asiamah, N., Mensah, H. K., & Oteng-Abayie, E. F. (2017). General, target, and accessible population: Demystifying the concepts for effective sampling. *Qualitative Report*, *22*(6), 1607–1621.

Assefa M, Kumie. A. (2014). *Assessment of factors influencing hygiene behaviour among school children in Mereb-Leke District, Northern Ethiopia*: A cross-sectional study. BMC Public health. 14 (1000): 1-8

Bah, A., Diallo, A., Bah, A., & Li, F. (2020). Water, Sanitation, and Hygiene (WASH) and the Incidence and Prevalence of Children in Five Public Primary Schools in N'Zerekore, Guinea.

Banu, B., Sharmin, S., Yasmin, F., & Khanom, K. (2014). *Knowledge and Practices of Hand Washing among Secondary School Children:* Bangladesh Experience. South Asian Journal of Population and Health 7:21-32

Bhatt, N., Budhathoki, S. S., Lucero-Prisno, D. E., Shrestha, G., Bhattachan, M., Thapa, J., Sunny, A. K., Upadhyaya, P., Ghimire, A., & Pokharel, P. K. (2019). What motivates open defecation? A qualitative study from a rural setting in Nepal. *PLoS ONE*, *14*(7), 1–15. https://doi.org/10.1371/journal.pone.0219246

Biswas, D., Sahoo, S., Dasgupta, A., & Preeti, P. S. (2015). Amitavakumar Das S. Quantification of Perception Status of Hand Washing Practice Among School Children in a rural area of West Bengal. *Scholars Journal of Applied Medical Sciences (SJAMS)*, *3*(4A), 1683-1687.

Blake, M., Glaeser, A. H., Kriticos, S., & Mutizwa-Mangiza, N. (2020). Water, sanitation, and hygiene policy in the time of COVID-19. *International Growth Centre Policy Brief*.

Campbell, O. M., Benova, L., Gon, G., Afsana, K., & Cumming, O. (2015). Getting the basic rights–the role of water, sanitation and hygiene in maternal and reproductive health: a conceptual framework. *Tropical*

medicine & international health, *20*(3), 252-267.

Caruso, B. A., Freeman, M. C., Garn, J. V., Dreibelbis, R., Saboori, S., Muga, R., & Rheingans, R. (2014). Assessing the impact of a school-based latrine cleaning and handwashing program on pupil absence in Nyanza Province, Kenya: a cluster-randomized trial. *Tropical medicine & international health*, *19*(10), 1185-1197.

Centre for Disease Control and Prevention. 2012. Handwashing: Clean hands saves lives. Retrieved on January 13, 2022, from https://www.cdc.gov/handwashing/index.html

Chinyama, J., Chipungu, J., Rudd, C., Mwale, M., Verstraete, L., Sikamo, C., Mutale, W., Chilengi, R., & Sharma, A. (2019). *Menstrual hygiene management in rural schools of Zambia : a descriptive study of knowledge , experiences and challenges faced by schoolgirls*. 1–10.

Chittleborough, C. R., Nicholson, A. L., Young, E., Bell, S., & Campbell, R. (2013). *Implementation of an educational intervention to improve hand washing in primary schools:* process evaluation within a randomised controlled trial. *BMC Public Health*, *13*(1), 1-11.

Cissé, G., Erismann, S., Gerold, J., Koju, R., Odermatt, P., Sagar, S., Sharma, S., Shrestha, A., & Utzinger, J. (2017). Water quality, sanitation, and hygiene conditions in schools and households in Dolakha and Ramechhap districts, Nepal: results from a cross-sectional survey. *International journal of environmental research and public health*, *14*(1), 89.

Coppens, O. (2005), "Preliminary Literature Study to a School Sanitation and Hygiene Education (SSHE) Strategy". Retrieved on November 19, 2021, from https://www.protos.be/temas-es/PROTOSSSHE strategy. pdf.

Cox, B. G., & Lavrakas, P. J. (2008). *Target Population*.

Creswell, J. W. (2003). A framework for design. *Research design: Qualitative, quantitative, and mixed methods approaches*, 9-11.

Creswell, J. W. (2009). Research Design - Qualitative, Quantitative, and mixed Approaches. In *Research Design qualitative quantitative and mixed methods approaches* (Vol. 3rd, p. 260). Retrieved on September 19, 2021, from https://doi.org/10.1016/j.math.2010.09.003

Creswell, J. W. (2012). *Educational Research: planning, conducting, and evaluating quantitative and qualitative research* (4th ed.).

Creswell, J. W., & Creswell, J. D. (2018). Research Design: Qualitative, Quantitative and Mixed Methods Approaches. In *Sage Publishing* (5th ed., Vol. 84).

Creswell, J. W., & Plan Clark, V. L. (2017). *Designing and Conducting Mixed Methods Research*.

Curtis, V., & Cairncross, S. (2003). Effect of washing hands with soap on diarrhoea risk in the community: a systematic review. *The Lancet infectious diseases*, *3*(5), 275-281.

Dajaan, D. S., Addo, H. O., Ojoh Amegah, K. E., Loveland, F., Bachala, B. D., & Benjamin, B. B. (2018). Hand washing, knowledge and practices among public primary schools in the Kintampo municipality of Ghana. International Journal of Community Med. Public Health, 5, 2205-2216.

Retrieved on November 19, 2021 from https://doi.org/10.18203/2394-6040.ijcmph20182146

Deb, S., Dutta, S., Dasgupta, A., & Misra, R. (2010). Relationship of personal hygiene with nutrition and morbidity profile: A study among primary school children in South Kolkata. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, *35*(2), 280.

Degu, G., & Yigzaw, T. (2006). Research methodology. Gondor: University of Gondor

Devine, J. (2009). *Introducing SaniFOAM: a framework to analyze sanitation behaviors to design effective sanitation programs* (No. 72205, pp. 1-28). The World Bank.

Dongre, A. R., Deshmukh, P. R., Boratne, A. V., Thaware, P., & Garg, B. S. (2007). *An approach to hygiene education among rural Indian school going children. Online J Health Allied Sci*, *6*, 2.

Dorgbetor, G. (2015). Mainstreaming MHM in schools through the play-based approach: lessons learned from Ghana. *Waterlines*, 41-50.

Duah, H. K., Bofa, J. K., Apraku, E., & Fenteng, J. O. D. (2019). Evaluating the Stakeholders' Involvement in the Provision of Water, Sanitation and Hygiene (Wash) Activities in Public Schools, Ghana.

Duijster, D., Monse, B., Dimaisip-Nabuab, J., Djuharnoko, P., Heinrich-Weltzien, R., Hobdell, M. & Benzian, H. (2017). 'Fit for school'–a school-based water, sanitation and hygiene programme to improve child health: Results from a longitudinal study in Cambodia, Indonesia and Lao PDR. *BMC Public Health*, *17*(1), 1-15.

Dulal, R. (2016). *Personal Hygiene and Sanitary Practice of School Children* (Doctoral dissertation, Tribhuvan University Faculty of Education Janata Multiple Campus Department Of Health Education Itahari, Sunsari).

Ekeleme, N. C., Egwuonwu, K. I., Iwuoha, E. C. and Ogunsola, A. S. (2018). *Assessment of hand washing knowledge and practice among secondary school students in Aba*, Abia State. Abia State University Medical Students' Association Journal 11(1).

Environmental Sanitation Policy (1999). Ministry of Local Government and Rural development Environmental Sanitation Policy.

Fink, G., Günther, I., & Hill, K. (2011). The effect of water and sanitation on child health: evidence from the demographic and health surveys 1986–2007. *International journal of epidemiology*, *40*(5), 1196-1204.

Gawai, P. P., Taware, S. A., Chatterjee, A. S., & Thakur, H. P. (2016). A cross sectional descriptive study of hand washing knowledge and practices among primary school children in Mumbai, Maharashtra, India. *Int J Community Med Public Health*, *3*(10), 2958-2966.

Ghana Education Management Information System (EMIS), 2019. "Basic National Level Enrollment Data." International Rescue Committee, World Bank, and Strategic Impact Evaluation Fund, 2019. "Capturing Cost Data". Retrieved on October 17, 2020, from https://pubdocs.worldbank.org/en/994671553617734574/Capturing-Cost-Data-190314.pdf

Ghana Statistical Service (2021). *Population & Housing Census: General Report Volume 3A.*

Ghana Statistical Service (2018). Sn*apshots on key Findings, Ghana Multiple Indicator Cluster Survey (MICS 2017/18), Survey Findings Report.* Accra, Ghana.

Ghanim, M., Dash, N., Abdullah, B., Issa, H., Albarazi, R., & Al Saheli, Z. (2016). Knowledge and practice of personal hygiene among primary school students in Sharjah-UAE. *Journal of Health Science*, *6*(5), 67-73.

Gleick, P. H. (2003). Water use. Retrieved on November 7, 2022 from https://www.researchgate.net/publication/200043175

Global Handwashing Day (2017). Planner's guide. Health in your hands: a public – private partnership. Retrieved on October 15, 2019, from https://www.globalhandwashingday.org/Planners_Guide_Global_Handwashing_Day.pdf.

Global hand washing day. (2017). Our hands our future. USAID. Retrieved on January 12, 2022, from https://www.globalwaters.org/events/global-handwashing-day

Grimason, A. M., Masangwi, S. J., Morse, T. D., Jabu, G. C., Beattie, T. K., Taulo, S. E., & Lungu, K. (2014). Knowledge, awareness and practice of the importance of hand-washing amongst children attending state run primary schools in rural Malawi. *International journal of environmental health research*, *24*(1), 31-43.

Gyimah, P., Mariwah, S., Antwi, K. B., & Ansah-Mensah, K. (2019). Households' solid waste separation practices in the Cape Coast Metropolitan area, Ghana. *GeoJournal*. https://doi.org/10.1007/s10708-019-10084-4

Hotor, S. M. (2017). *Assessment Of Knowledge, Attitudes and Practices Of Sanitation And Health Of Market Users At The Agbogbloshie Market In Accra, Ghana* (Doctoral dissertation, University of Ghana).

Howard G, Bartram J (2003) Domestic Water Quantity, Service Level and Health. Geneva: World Health Organisation. Retrieved on January 5, 2022, from http://whqlibdoc.who.int/hq/2003/WHO_SDE_WSH_03.02.pdf.

Jasper, C., Le, T. T., & Bartram, J. (2012). Water and sanitation in schools: a systematic review of the health and educational outcomes. *International journal of environmental research and public health*, *9*(8), 2772-2787.

Jewitt, S., & Ryley, H. (2014). It'sa girl thing: Menstruation, school attendance, spatial mobility and wider gender inequalities in Kenya. *Geoforum*, *56*, 137-147.

Johnson, L. R. (2017). Community-based qualitative research: Approaches for education and the social sciences. Thousand Oaks, CA: Sage.

Jordanova, T., Cronk, R., Obando, W., Medina, O. Z., Kinoshita, R., & Bartram, J. (2015). Water, sanitation, and hygiene in schools in low socio-economic regions in Nicaragua: A cross-sectional survey. *International journal of environmental research and public health*, *12*(6), 6197-6217.

Kılıç, Z. (2020). The importance of water and conscious use of water. International Journal of Hydrology, 4(5):239–241. DOI: 10.15406/ijh.2020.04.00250

Kgosimotho, A. (2019). *Knowledge and practices of hand washing among primary school children in Kweneng Central Sub-District, Botswana* (Doctoral dissertation).

Khan, S., Ashraf, H., Iftikhar, S., & Baig-Ansari, N. (2021). Impact of hand hygiene intervention on hand washing ability of school-aged children. *Journal of Family Medicine and Primary Care*, *10*(2), 642.

Lopez-Quintero, C., Freeman, P., & Neumark, Y. (2009). Hand washing among school children in Bogota, Colombia. *American Journal of Public Health*, *99*(1), 94-101.

Lupele, J., Kakuwa, B., & Banda, R. (2017). Improving the Quality of Education Through Partnerships, Participation and Whole-School Development: A Case of the WASH Project in Zambia. In *Schooling for Sustainable Development in Africa* (pp. 175-185). Springer, Cham.

Mariwah, S. (2012): Institutional Arrangements for Managing Solid Waste in the Shama-Ahanta-East Metropolis, Ghana. Journal of Sustainable Development in Africa, 14, (6), 15-21. Retrieved from HYPERLINK https://www.researchgate.net/publication/258278452_Institutional_arrangement_for_managing_solid_waste_in_the_Shama-Ahanta East_Metropolis_Ghana

Mariwah, S. (2018). *Sanitation: the neglected Siamese twin of water in achieving the millennium development goals (MDGs) in Ghana. GeoJournal*, *83*(2), 223-236.

Mathew, K., Zachariah, S., Shordt, K., Snel, M., Cairncross, S., Biran, A., & Schmidt, W. P. (2009). The sustainability and impact of school sanitation, water, and hygiene education in southern India. *Waterlines*,

275-292.

Mcmichael, C. (2019). *Water , Sanitation and Hygiene (WASH) in Schools in Low-Income Countries : A Review of Evidence of Impact*. 1–21. https://doi.org/10.3390/ijerph16030359

Ministry of Sanitation and Water resources. (2019). *Programme Based Budget Estimates for 2019*

Mills, J. E., & Cumming, O. (2016). The impact of water, sanitation and hygiene on key health and social outcomes. *Sanitation and Hygiene Applied Research for Equity (SHARE) and UNICEF*, 112.

Monney, I., Bismark, D. A., Isaac, O. M., & Yaw, B. S. E. (2014). Translating hand hygiene knowledge into practice: a study of basic school children in an urban community in Ghana. *Int J Innov Res Develop*, *3*(5), 436-41.

Morgan, C., Bowling, M., Bartram, J., & Kayser, G. L. (2017). Water, sanitation, and hygiene in schools: Status and implications of low coverage in Ethiopia, Kenya, Mozambique, Rwanda, Uganda, and Zambia. *International journal of hygiene and environmental health*, *220*(6), 950-959.

Moon, K., & Blackman, D. (2014). A Guide to Understanding Social Science Research for Natural Scientists. *Conservation Biology*, *28*(5), 1167–1177. https://doi.org/10.1111/cobi.12326

Mugenda, O.M., & Mugenda, A.G. (1999). Research methods: Quantitative and qualitative approaches. Thousand Oaks, CA: Sage

Nahar, Q., & Ahmed, R. (2006). Addressing special needs of girls: challenges in school. *SACOSAN II*.

Njue, E.K. and Muthaa, G.M. (2015). *Influence of Availability of Sanitary Facilities on the Participation of the Girl-Child in Public Primary Schools in Garissa County, Kenya*. Open Journal of Social Sciences, 3, 162-169. http://dx.doi.org/10.4236/jss.2015.38018

Njuguna, V., Karanja, B., Thuranira, M., Shordt, K., Snel, M., Cairncross, S., ... & Schmidt, W. P. (2008). The sustainability and impact of school sanitation, water and hygiene education in Kenya. *UNICEF and IRC International Water and Sanitation Centre*.

Nwajiuba, C. A., Ogunji, C. V., Uwakwe, R. C., & David, E. I. (2019). Handwashing Practices Among Children in Public Schools in Imo State, Nigeria. *Global Journal of Health Science*, *11*(14), 1-15.

Okyere-kwakye, E. (2013). *Availability of Supportive Facilities for Effective Teaching.* Multidisciplinary Journal of Educational Research, 3(2), 130-146. http://dx.doi.org/10.4471/remie.2013.09

Oppong, T. B., Yang, H., & Amponsem-boateng, C. (2019). *Hand Hygiene Habits of Ghanaian Youths in Accra*.

Oster, E., & Thornton, R. (2009). *Menstruation and education in Nepal* (No. w14853). National Bureau of Economic Research.

Oyibo, P. G. (2012). Basic personal hygiene: knowledge and practices among school children aged 6-14 years in Abraka, Delta State, Nigeria. *Continental Journal of Tropical Medicine*, *6*(1), 5.

Padgett, D. K. (2011). Qualitative and mixed methods in public health. Thousand Oaks, CA: Sage

Peltzer, K., & Pengpid, S. (2012). Fruits and vegetable consumption and associated factors among in-school adolescents in five Southeast Asian countries. *International journal of environmental research and public health*, *9*(10), 3575-3587.

Quinn, P. (2019). Illinois Early Learning Project. Retrieved January 12th, 2022, from http://illinoisearlylearning.org/tipsheets/ handwashing.htm

Samiwu, N.M. (2017). Poor Sanitation in Ghana. Retrieved on September 15, 2019, from https://www.ghanaweb.com/GhanaHomePage/.../Poor-sanitation-in-Ghana.

Sheren, N. A., Aziz K. F., & Abdulla S. A. (2012). Knowledge and attitudes of pupils in some of primary schools regarding personal hygiene in Erbil city. *kufa Journal for Nursing sciences*, *2*(1).

Shrestha, S., Shrestha, S., Ito, Y., Kobayashi, Y., Nishida, K., Futaba, K., & Malla, R. (2021). Situation of menstrual management facilities in schools of peri-urban areas of Nepal: WASH, privacy, and healthcare. *Journal of Water, Sanitation and Hygiene for Development*.

Sibiya, J. E., & Gumbo, J. R. (2013). Knowledge, attitude and practices (KAP) survey on water, sanitation and hygiene in selected schools in Vhembe District, Limpopo, South Africa. *International journal of environmental research and public health*, *10*(6), 2282-2295.

Sommer, M., Figueroa, C., Kwauk, C., Jones, M., & Fyles, N. (2017). *Attention to menstrual hygiene management in schools:* An analysis of education policy documents in low-and middle-income countries. *International Journal of Educational Development*, *57*, 73-82.

Steiner-Asiedu, M., Van-Ess, S. E., Papoe, M., Setorglo, J., Asiedu, D. K., & Anderson, A. K. (2011). *Hand Washing Practices among School Children in Ghana*. Current Research Journal of Social Sciences, 3(4), 293-300.

Temu, C. E. (2015). *Assesment of water sanitation and hygiene Practices among school children in sengerema District council* (Doctoral dissertation, Mzumbe University.).

Tesfaye, S., Mulatu, G., & Hussen, S. (2021). Hand Washing Practice Before Covid-19 Pandemic and Associated Factors Among Primary School Children at Hawassa City Sidama Ethiopia

Thakadu, O. T., Ngwenya, B. N., Phaladze, N. A., & Bolaane, B. (2018). Sanitation and hygiene practices among primary school learners in Ngamiland district, Botswana. *Physics and Chemistry of the Earth, Parts A/B/C*, *105*, 224-230.

Uddin, M. N., & Hamiduzzaman, M. (2009). The Philosophy of Science in Social Research. *The Journal of International Social Research Volume*, *2*, 131–132. https://doi.org/DOI 10.1007/s10876-009-0255-4

UNICEF (1999). Towards better programming: A manual on hygiene promotion.

UNICEF. (2010). *Narrowing the gaps to meet the goals*. UNICEF.

UNICEF. (2012). Raising even more clean hands: Advancing health, learning and equity through WASH in schools. *New York*.

UNICEF. (2015). *Advancing WASH in schools monitoring*. New York, NY: UNICEF.

UNICEF. (2019). *Water, Sanitation and Hygiene*. Retrieved on September 20, 2020, from: https:// www.unicef.org/wash/3942_3952.html.

UNICEF & CDD-Ghana (2018). 2018/2019 District League Table II with new perspectives and modified methodology.

UNICEF & WHO (2018). *DRINKING WATER , SANITATION AND HYGIENE IN SCHOOLS Global baseline report 2018 WHO / UNICEF JOINT MONITORING PROGRAMME FOR WATER SUPPLY , SANITATION AND HYGIENE*.

UNICEF, & WHO. (2020). *State of the World's*.

Verdeja, M., Thomas, K., Dorsan, G., Hawks, M., Dearden, K., Stroupe, N., Hoj, T., West, J., Crookston, B., Ezekial, M. and Hall, C. (2019) *Water, Sanitation, and Hygiene Factors Associated with Child Illness in Tanzania. Health*, 11, 827-840. doi: 10.4236/health.2019.116066.

Weisz, A., Meuli, G., Thakwalakwa, C., Trehan, I., Maleta, K., & Manary, M. (2011). The duration of diarrhea and fever is associated with growth faltering in rural Malawian children aged 6-18 months. *Nutrition journal*, *10*(1), 1-4.

World Bank (2021). Tackling the Sanitation crisis in rural areas. Retrieved on February 12, 2021, from https://www.worldbank.org/en/ news/infographic

World Health Organization. (2009). *WHO guidelines on hand hygiene in health care* (No. WHO/IER/PSP/2009/01). World Health Organization.

World Health Organization. (2018). *WHO Water, Sanitation and Hygiene Strategy 2018-2025* (No. WHO/CED/PHE/WSH/18.03). World Health Organization.

World Health Organization. (2018). *World health statistics 2018: monitoring health for the SDGs, sustainable development goals*. World Health Organization

World Health Organization. (2019). *Progress on household drinking water, sanitation and hygiene 2000-2017: special focus on inequalities*. World Health Organization.

WHO/UNICEF Joint Monitoring Program (JMP) (2017). *WASH in the 2030 Agenda*: New Indicators for water, sanitation, and hygiene.

Wuni, I. K., Agyeman-Yeboah, S., & Boafo, H. K. (2018). Poor facility management in the public schools of Ghana: Recent empirical discoveries. Journal of Sustainable Development Studies, 11(1), 2201-4268.

Zumdahl, S. S. (2021). *Water*. *Encyclopedia Britannica*. Retrieved on February 20, 2021, from https://www.britannica.com/science/water

APPENDICES

APPENDIX A: INTERVIEW SCHEDULE FOR BASIC SCHOOL STUDENTS

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

INTERVIEW SCHEDULE FOR BASIC SCHOOL STUDENTS

Purpose: This questionnaire seeks to assess **"Managing Water, Sanitation and Hygiene (WASH) Facilities in Basic Schools within the Mfantseman Municipality".** The information you provide is purely for academic purposes. You are therefore being assured of confidentiality and anonymity. Kindly express your candid opinion which would serve as a source of vital information for this study. Please select or type where applicable. Thank you

Name of community: ……

Name of school: …….

GPS location: ……

Interview Schedule number……..

SECTION A: DEMOGRAPHIC BACKGROUND OF RESPONDENTS

1. Sex of respondent a. Male [ ] b. Female [ ]
2. What is your age …….
3. Educational level of respondent a. JHS 1 [ ] b. JHS 2 [ ]
   c. JHS 3 [ ]

SECTION B: SANITATION AND HYGIENE PRACTICES IN BASIC SCHOOLS

4. Is there any available toilet facility in this school?

a. Yes [ ] b. No [ ]

5. If no, where do you defecate? (Tick as appropriate):

a. Open space [ ] b. Bush [ ] c. Beach [ ] d. Public toilet [ ] e. Private individual [ ]

6. If yes, is the toilet facility currently being used in the school? a. Fully used [ ] b. partially used c. Not in use [ ]

7. If yes, which types of toilet facility is available and in use in your school?

a. K.V.I. P [ ] b. Pit latrine [ ] c. Water closest [ ] d. Flush [ ] e. Don't know **[ ]**

8. If toilet available, do male and female students use same or separate toilet facility?

a. Use same facility [ ] b. Use separate facility [ ] c. Don't know[ ]

9. Is there any available water facility in this school? Yes [ ] b. No [ ]

10. If no, where do you fetch water? (Tick as appropriate):

Open stream [ ] b. well [ ] c. Public pipe [ ] d. Private individual [ ]

Other (Specify)……..

11. If yes, which type of water facility is available in the school?

a. Pipe [ ] b. Well [ ] c. Bole hole [ ] d. Polythank [ ] e. Other (Specify)….

12. If yes, is the water facility currently being used in the school?

a. Fully used [ ] b. partially used [ ] c. Not in use [ ]

13. Is there any available hand washing facility in this school?

a. Yes [ ] b. No [ ]

14. If no, where do you wash your hands? (Tick as appropriate):

a. Don't wash my hands [ ] b. Rather sanitize my hands [ ] c. Public pipe stand [ ] d. Other (Specify)….

16. If yes, which type of hand washing facility is available in the school? a. Veronica Bucket [ ] b. Pipe stand [ ] c. Don't know [ ] d. Other (Specify)….

17. Are there dust bins for disposal of waste on the school compound?

a. Yes [ ] b. No[ ] c. Not in use [ ]

18. Does the hand washing facility have the following?

Facility	**Always**	**Sometimes**	**Rarely**	**Never**
Running water				
Soap/sanitizer				
Towel/hand cleaning material				

19. How often do you wash your hands, with soup, at these critical periods?

Statement	**Always**	**Sometimes**	**Rarely**
Before eating			

After using the toilet			
After handshake			
After touching animals			

SECTION C: OPERATIONS AND MAINTENANCE OF WASH FACILITIES IN BASIC SCHOOLS.

20. Where do you empty your dustbins or throw rubbish to?

Waste container [ ] b. Bush [ ] c. Beach [ ] d. Burn it **[ ]**

e. Don't know **[ ]**

21. Which people are responsible for cleaning the toilet facilities?

a. Students [ ] b. Paid workers [ ] c. Zoom lion [ ] d. Other (Specify)….

22. How are the cleaners recruited to do the cleaning?

a. As punishment to student [ ] b. Volunteer work [ ] c. Paid worker(s) [ ] d. Zoom lion [ ] e. Other (Specify)….

23. Which people are responsible for fetching water into the hand washing facilities?

Students [ ] b. Paid workers [ ] c. Zoom lion [ ] d. Don't know **[ ]**

e. Other (Specify)….

24. Which people are supposed to empty the waste water from the hand washing facilities?

Students [ ] b. Paid workers [ ] c. Don't know **[ ]** d. Other (Specify)

25. Which people are responsible for providing detergent to clean the facilities?

a. P.T.A [ ] b. G.E.S [ ] c. Private individuals [ ] d. Don't know **[ ]**

e. School authority [ ] f. Other (Specify)….

26. How often do they provide the detergent?

a. Very often [ ]b. Sometimes/Not often [ ] c. Rarely [ ] d. Don't remember [ ] e. Don't know [ ]

27. How often are the facilities maintained or cleaned?

a. Everyday [ ] b. Most of the days in the week [ ] c. Rarely [ ] d. Some of the days [ ] e. Don't know [ ]

28. Are you provided with toilet roll or papers?

a. Yes [ ] b. No [ ]

29. If yes, who are responsible for providing the toilet rolls or papers?

a. PTA [ ] b. GES [ ] c. Private individuals [ ] d. Community leaders [ ] e. Students [ ] f. Teachers [ ] e. Don't know [ ]

30. Is there a separate facility for females to change themselves during their mensural cycle period?

a. Yes [ ] b. No [ ] c. Don't know [ ]

31. Are there any means for handling menstrual hygiene waste at the school during their mensural cycle period?

a. Yes, separate bin available [ ] b. No, there isn't [ ] c. Use the usual bin for waste collection [ ] d. Don't know [ ]

32. Do female students miss classes/school during their menstrual period ?

a. Yes, they do [ ] b. No, they don't [ ] c. Don't now [ ]

33. Do P.T.A provide support to maintain these facilities in the schools.

a. Yes, in cash [ ] b. No, they are not willing [ ] c. Yes, in kind [ ] d. Other specify…….

34. In your view, what entity has the primary responsibility for maintenance of the school's toilet, urinal and water system? Choose which body has the primary responsibility, whether or not it is successfully maintaining the system. Select one.

a. PTA [ ] b. GES [ ] c. Private individuals [ ] d. Community leaders [ ] e. District Assembly [ ] f. Teachers [ ] Don't know [ ]

35. How satisfied are you with operation and maintenance of WASH facilities in this school?

a. Very satisfied [ ] b. Satisfied [ ] c. Neutral [ ] d. Dissatisfied [ ] f. Very dissatisfied [ ]

SECTION D: CHALLENGES IN MANAGING WASH FACILITIES IN BASIC SCHOOLS

36. Do you currently face challenges in maintaining the WASH facility in this school?

A. Yes [ ] B. No [ ]

37. If yes, thick as applicable whether you agree or disagree to some of these challenges? SA= Strongly agree, A=Agree, D=Disagree, SD=Strongly disagree

Statement	SA	A	D	SD
Lack of support from local institutions				
Lack of proper supervision by school authority				
Poor work habit				
PTA unwillingness to pay to maintain				
Irresponsible student behavior in maintaining the facility				
Community invasion				
Odor				
Inadequate water for flushing the toilet				

38. Do you think the quality of the WASH facilities at the school affect school performance**?**

a. Yes [ ] b. No [ ] c. Don't know [ ]

39. If yes, in what ways are school performance affected? Thick as applicable

a. Increase absenteeism at period of mensuration [ ] b. students miss class to travel a distance ease themselves [ ] c. Causes lateness [ ] d. The smell distract us [ ] e. Other specify …….

40. Do students with disability or special needs, face any challenge in using the facility without any assistance?

a. a. Yes, they do [ ] b. There are no disable students [ ] c. No they don't [ ] d. Don't know [ ]

SECTION E: STRATEGIES TO IMPROVE UTILIZATION AND MANAGEMENT OF WASH FACILITIES IN BASIC SCHOOLS

41. As a student, what strategy do you think should be done to improve utilization and management of the facilities? Thick as applicable whether you agree or disagree to some of these challenges? SA= Strongly agree, A=Agree, D=Disagree, SD=Strongly disagree

Statement	SA	A	D	SD
Compulsory to use the facility other than other means				
Adequately use detergent for cleaning				
Repairing damaged facilities				
Punishing students who act irresponsibly regarding use of facility				
Improving student-latrine ratio				

42. In your view as a student, what are your responsibility for maintenance of the school's toilet, urinal and water system?

Statement	SA	A	D	SD
Proper handling of the facilities				
Cleaning regularly				
Flush after using the facility				
Properly dispose off waste				
Report students who do the wrong things				
Weed around the facilities				
Avoid standing on the W/C seat				

43. In your view as a student, what do you want the teachers in your school to do to improve utilization and management of the facilities. Thick as applicable whether you agree or disagree to some of these challenges? SA= Strongly agree, A=Agree, D=Disagree, SD=Strongly disagree

Statement	SA	A	D	SD
Punish students who use other means to dispose off their waste				
Increase awareness on importance of hygiene				
Provision of adequate logistics				
Supervise regular cleaning of the facilities				

44. In your view as a student, what do you think the community should do to improve utilization and management of the facilities.

Statement	SA	A	D	SD
Provision of lands for building infrastructure				
Financial support for maintenance				
Stop using the school facilities				
Provide adequate logistics to support the school				
Mobilize support from the local institutions to support the school				

Thank you

APPENDIX B: IN-DEPTH INTERVIEW GUIDE FOR KEY HEAD TEACHERS

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

IN-DEPTH INTERVIEW GUIDE FOR KEY HEAD TEACHERS

Purpose: This questionnaire seeks to assess **"Managing Water, Sanitation and Hygiene (Wash) Facilities in Basic Schools within the Mfantseman Municipality".** The information you provide is purely for academic purposes. You are therefore being assured of confidentiality and anonymity. Kindly express your candid opinion which would serve as a source of vital information for this study. Thank you

Interview #: …… Date of interview: ……

Start time: …… End time: ……

Section A: Background Information

1. Name of school: ……
2. GPS location……..
3. Sex……
4. Age ……
5. Educational qualification……
6. Position…….
7. Years of working experience…….

Section B: sanitation and hygiene practices in basic schools

1. What is your opinion on the availability and state of the following sanitary conditions in this school?
    i. Toilet Facilities
    ii. Portable water supply
    iii. School hygiene (Hand washing and general surroundings)
2. Describe the sanitation practices among students in this school. (Probe for where they defecate and his level of satisfaction with the sanitation practices in the school).
3. Describe the hygiene practices of students in this school. Probe for how often they wash their hands, whether with soap and running water etc and his level of satisfaction with the hygiene practices in the school).

Section C: operations and maintenance of WASH facilities in basic schools

4. Describe how the WASH facilities in the school (toilets, handwashing facilities and water supply system) are operated. (Probe for who supervise the facilities to make sure that they are functional, how is toilet paper, soap, detergents etc are acquired and provided in the facilities, etc).
5. Describe how the WASH facilities in the school (toilets, handwashing facilities and water supply system) are maintained. (Probe for how often the facilities are cleaned and maintained; Which people are required to regularly clean the WASH facilities? How are the cleaners

recruited to maintain the WASH facilities? Which specific people are responsible for providing detergents for cleaning the WASH rooms?

6. In your estimation what is the average cost of maintaining WASH facilities in school?
7. How satisfied are you with operation and maintenance of WASH facilities in this school?

Section D: Challenges in improving WASH in basic schools.

8. What challenges does the school authority face in managing the WASH facilities? Probe for poor attitudes of students, lack of cooperation from teachers, inadequate support from PTA and communities, etc
9. Is there any challenge in trying to obtain support from the local institutions to promote school hygiene? justify
10. What are the negative implications of poor WASH facilities on academic performance in this school?

Section E: Strategies for improving WASH in basic schools

11. What specific measures have the school authorities put in place to improve upon the WASH facilities in this school?
12. What are the channels/ opportunities available for both teachers and students to voice their challenges in this school?
13. What do you suggest should be the best means for improving WASH facilities in the school?

Thank You

APPENDIX C: IN-DEPTH INTERVIEW GUIDE FOR KEY STAKEHOLDERS

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

IN-DEPTH INTERVIEW GUIDE FOR KEY STAKEHOLDERS

Purpose: This questionnaire seeks to assess **"Managing Water, Sanitation and Hygiene (Wash) Facilities in Basic Schools within the Mfantseman Municipality".** The information you provide is purely for academic purposes. You are therefore being assured of confidentiality and anonymity. Kindly express your candid opinion which would serve as a source of vital information for this study. Thank you

Interview #: …… Date of interview: ……

Start time: …… End time: ……

Section A: Background Information

8. Name of institution: ……
9. GPS location……..
10. Sex…….
11. Educational qualification……
12. Institution……
13. Occupation……
14. Position…….
15. Years of working experience…….

Section B: sanitation and hygiene practices in basic schools

14. In your estimation, what proportion of basic schools in this municipality have adequate WASH facilities?
15. What is your opinion on the availability and state of the following sanitary conditions in basic schools within this municipality?
    i. Toilet Facilities
    ii. Portable water supply
    iii. School hygiene (Hand washing and general surroundings)
16. How will you describe the sanitation practices among students in this Municipality? (Probe for where they defecate and his level of satisfaction with the sanitation practices in the municipality).
17. How will you describe the hygiene practices of students in this Municipality? Probe for how often they wash their hands, whether with soap and running water etc and his level of satisfaction with the hygiene practices in the municipality).

Section C: operations and maintenance of wash facilities in basic schools

18. Describe how the WASH facilities in the municipality (toilets, handwashing facilities and water supply system) are operated. (Probe for who supervise the facilities to make sure that they are functional, how is toilet paper, soap, detergents etc are acquired and provided in the facilities, etc).
19. Describe how the WASH facilities in the municipality (toilets, handwashing facilities and water supply system) are maintained. (Probe for how often the facilities are cleaned and maintained; Which people are required to regularly clean the WASH facilities? How are

the cleaners recruited to maintain the WASH facilities? Which specific people are responsible for providing detergents for cleaning the WASH rooms?

20. What roles have your institution played in promoting health education in schools within the municipality?
21. How often does your institution provide support to improve health education in schools within municipality?
22. Is there any supervisory role from your institution to ensure health education in schools within the municipality?
23. In your estimation what is the average cost of maintaining WASH facilities in school?
24. How satisfied are you with operation and maintenance of WASH facilities in basic schools within this municipality?

Section D: Challenges in improving WASH in basic schools.

25. What are some of the most reported WASH challenges from the various school authorities within the municipality?
26. What challenges does your institution face in providing support to basic schools in managing WASH facilities?

Section E: Strategies for improving WASH facilities in basic schools.

27. What specific measures have your institution put in place to improve upon the WASH facilities in basic schools within this Municipality?
28. What are the channels/ opportunities available for school authorities to voice out their challenges?
29. What policies are in place by this institution towards improving WASH facilities in basic schools within the municipality?

30. What do you suggest should be the best means for improving WASH facilities in basic schools within the municipality?

Thank You

APPENDIX D: OBSERVATION CHECK LIST

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

OBSERVATION CHECK LIST

Purpose: This checklist seeks to assess **"Managing Water, Sanitation and Hygiene (Wash) Facilities in Basic Schools within the Mfantseman Municipality".**

Section A: Background Information

Name of School: …….

GPS location……..

Section B: Availability and state of WASH facilities in school

State looks at cleanliness and nature of the facility whether with broken slaps/doors and roof issues (Good state or bad state)

Facility	**Available and functional**	**Available but not functional**	**Not available**	**State and condition of facility**
Toilet				
Urinal				
Water facility				
Hand washing facility				

APPENDIX E: ETHICAL CLEARANCE

UNIVERSITY OF CAPE COAST
INSTITUTIONAL REVIEW BOARD SECRETARIAT
TEL: 0558093143 / 0508878309
E-MAIL: irb@ucc.edu.gh
OUR REF: UCC/IRB/A/2016/1315
YOUR REF:
OMB NO: 0990-0279
IORG #: IORG0009096

12TH APRIL, 2022

Mr. Kingsford Kobina Annan
Department of Geography and Regional Planning
University of Cape Coast

Dear Mr. Annan,

ETHICAL CLEARANCE – ID (UCCIRB/CHLS/2021/78)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted Provisional Approval for the implementation of your research **Managing Water, Sanitation and Hygiene (WASH) Facilities in Basic Schools within the Mfantseman Municipality.** This approval is valid from 12th April, 2022 to 11th March, 2023. You may apply for a renewal subject to submission of all the required documents that will be prescribed by the UCCIRB.

Please note that any modification to the project must be submitted to the UCCIRB for review and approval before its implementation. You are required to submit periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

Samuel Asiedu Owusu, PhD
UCCIRB Administrator

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST