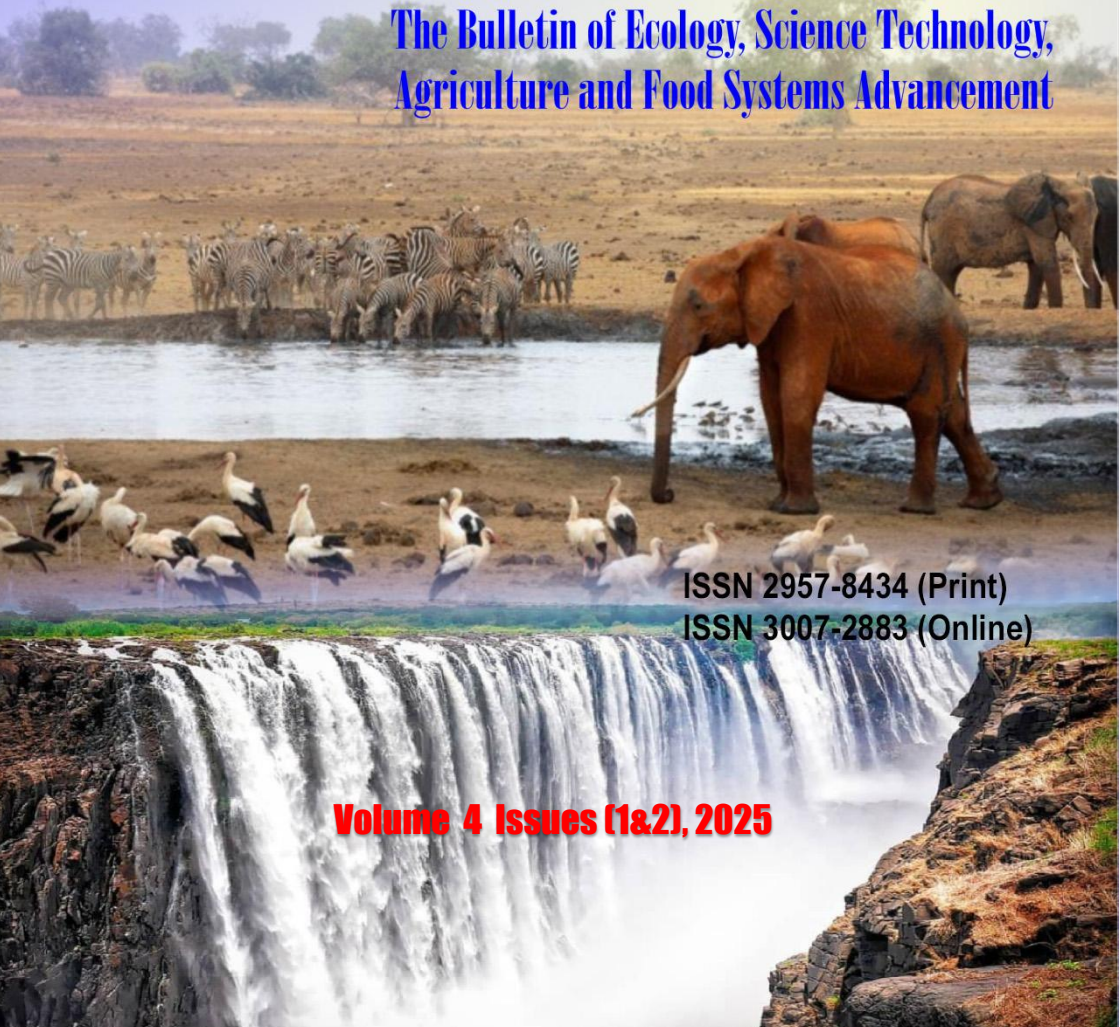




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WATER, SANITATION AND HYGIENE PRACTICES AMONG PUPILS IN BASIC SCHOOLS IN THE MFANTSEMAN MUNICIPALITY, GHANA

KINGSFORD K. ANNAN¹ AND SIMON MARIWAH²

Abstract

Access to safe water, sanitation and hygiene (WASH) is critical for health and academic performance. Yet, many schools in sub-Saharan Africa, including Ghana, face significant challenges in providing adequate WASH facilities, leading to profound implications for students' health and academic performance. This study evaluates WASH practices among pupils in basic schools in the Mfantseman Municipality, Ghana, using a mixed-method approach involving 368 pupils from 16 schools. Findings reveal that while most schools have access to water and sanitation facilities, many are partially functional or non-operational, particularly in rural areas. Although handwashing facilities are widely available, only 30.2% of pupils consistently wash their hands with soap before meals, despite higher rates (63.3%) after toilet use. The study highlights the lack of separate facilities for menstrual hygiene management, disproportionately affecting female students. These findings underscore the need for improved WASH infrastructure and behaviour change interventions. This study contributes to the literature on WASH in schools. Based on the study's findings, it is recommended that the Ghana Education Service, Teachers and Parents should ensure infrastructure improvement while implementing behaviour change interventions in the basic schools.

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Keywords: basic schools, school health education Basic Schools Ghana/ Sub-Saharan Africa Academic Performance Menstrual Hygiene Management (MHM) Behaviour Change Interventions WASH Infrastructure

Introduction

Access to safe drinking water, improved sanitation and basic hygiene (WASH) are fundamental human rights recognised by various scholars (Appiah-Effah *et al.*, 2019). However, inadequate water quality, poor sanitation and poor hygiene practices contribute significantly to the spread of diseases such as diarrhoea, typhoid fever, cholera and other viral infections, particularly affecting vulnerable groups like women, girls and children (Adams *et al.*, 2009; Ghanim *et al.*, 2016). Despite global efforts, a significant portion of the world's population still lacks access to basic sanitation and safe water. According to the World Health Organisation and UNICEF (2021), 2.4 billion people lack basic sanitation facilities, with 673 million practising open defaecation and 165 million lacking access to safe water supplies. Sub-Saharan Africa faces particularly severe challenges, with only 28% of the population having access to basic sanitation and 37% practising open defaecation (Ghana Statistical Service, 2021). Mariwah (2018) reports that there was little progress being made in improving sanitation in Ghana, as current sanitation coverage of Ghana is still 21% below the 54% Millennium Development Goal (MDG) sanitation target and about 22% of Ghanaians still practise open defecation (Appiah-Effah *et al.*, 2019); implying that adequate sanitation has not been achieved in Ghana. 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. According to the WHO (2019); shared sanitation is common in Ghana, where compound dwellings are home to a substantial proportion of low-income residents serving more than half of the population due to financial constraints and a lack of space (Antwi-Agyei *et al.*, 2020). This situation is not different in the Mfantseman Municipality, as evidenced by the Ghana District League Table II (2018/19), which shows that the municipality has poor sanitation coverage (UNICEF and CDD-Ghana, 2018). This situation is alarming

and, therefore, calls for extensive applied research to curb its negative consequences.

In the educational sector, the lack of adequate WASH facilities has profound implications for students' health and academic performance. UNICEF (2015) reports that schools without adequate WASH facilities experience lower academic performance among students, as poor sanitation and hygiene lead to increased absenteeism due to illness. Globally, 19% of schools lack basic sanitation services, forcing children and teachers to use sub-standard facilities or practise open defaecation (Jordanova *et al.*, 2015). In sub-Saharan Africa, the situation is even worse, with two-thirds of schools lacking proper sanitation facilities and many toilets being inaccessible to children with disabilities (Thakadu *et al.*, 2018). This lack of infrastructure disproportionately affects girls, who often miss school during menstruation due to the absence of separate facilities for menstrual hygiene management (Aladago *et al.*, 2019).

Ghana has made progress in improving access to basic drinking water, but significant challenges remain, particularly in rural areas (Hotor, 2017). The Ghana Education Service (GES) introduced the School Health Education Programme (SHEP) in 2010 to address these issues, but evidence suggests that many basic schools still lack adequate WASH facilities (Duah *et al.*, 2019; Ahiatrogah, 2020). The consequences of poor WASH practices in schools are severe, leading to increased rates of waterborne diseases and negatively impacting students' academic performance (Jasper *et al.*, 2012). The United Nations Sustainable Development Goal 6 (SDG 6) aims to achieve universal access to basic sanitation and hygiene by 2030, emphasising the importance of improved infrastructure and behaviour change (UNICEF, 2015; UNICEF, 2021).

Despite the growing body of literature on WASH practices in schools, there is a lack of detailed studies focusing on the functionality and utilisation of WASH facilities in basic schools in Ghana, particularly in the Mfantseman Municipality. Existing studies have focused primarily on the availability of WASH facilities, with limited attention to their operational status and the behavioural practices of students (Aladago *et*

al., 2019; Ahiatrogah, 2020). Unlike previous studies that primarily document facility availability and accessibility, this study examines both functionality and utilisation, providing a more comprehensive assessment to understand students' sanitary behaviour within the municipality.

Methodology

This study was conducted in the Mfantseman Municipality in the Central region of Ghana, utilising a mixed-method approach to gather quantitative and qualitative data. The mixed-method approach was chosen because it looks at phenomena from two different perspectives to balance out each other's flaws (Creswell and Creswell, 2018). A convergent mixed-method design and descriptive design were used for the study. A convergent mixed method allows researchers to converge or combine quantitative and qualitative data to provide a thorough understanding of the research problem (Creswell, 2003; Creswell and Creswell, 2018). On the other hand, the descriptive design is appropriate for discovering, describing and explaining pupils' actions and behaviours (Okyere-kwakye, 2013). A sample size of 368 students from 16 schools was determined using a multi-stage sampling technique. Questionnaires, interviews and observations were used to collect data, which were then analysed using SPSS, Microsoft Excel and manual thematic analysis.

At the time of the study (February 2021), there were 86 basic schools within the Mfantseman Municipality, with 8 424 students. Using Hotjar's online sample calculator, at a 95% level of confidence and 5% margin of error, a sample size of 368 students was estimated. Since most social scientists agree that a 5% margin of error is ideal for social science research, a 95% degree of confidence and a 5% margin of error were taken into consideration. This means that the study was reasonably certain that findings would reflect the true population parameters within this margin. The multi-stage sampling technique was employed in this study using stratified, simple random and purposive sampling techniques. Firstly, the localities were grouped into urban and rural strata, where 8 rural and 8 urban schools were randomly selected. In each school, simple random sampling (lottery method) was used to

select the pupils. In addition, purposive sampling was used to select key informants such as the head teachers of all the selected schools and the heads of the relevant institutions, including the Health Directorate, the Environmental Health Unit, the SHEP Coordinator of GES and the Public Works Department.

The study developed a questionnaire to collect data from the students and an interview guide to collect data from the key informants. At the same time, an observation checklist was used to observe the WASH behaviour patterns of the respondents and the general school environment, including the availability, accessibility, types and functionality of WASH facilities. The analysis of the data were done systematically based on the study objectives. The data from the questionnaire were analysed using Statistical Package for Service Solutions (SPSS) version 22.0 and Microsoft Excel version 15, where descriptive (frequencies and percentages) and inferential (Chi-square) statistics were used to present the results. The responses from the interview guide were transcribed and analysed manually, based on the emerging themes and used in support of the quantitative data.

Study area

Mfantseman Municipality is the study area for this research, located between latitude 5° 07'N and 5° 20'N and longitude 0°44'W and 1° 11'W. The municipality shares boundaries with Adumako-Eyan-Essiam District to the north-east, the Abura-Asebu-Kwamankese District to the west, Ekumfi District to the east and Gulf of Guinea to the south (Figure 1). The municipality has a total land area of 300 662 km². According to the GSS (2021), Mfantseman Municipality had a population of 168 905, made up 78 033 males and 90 872 females.

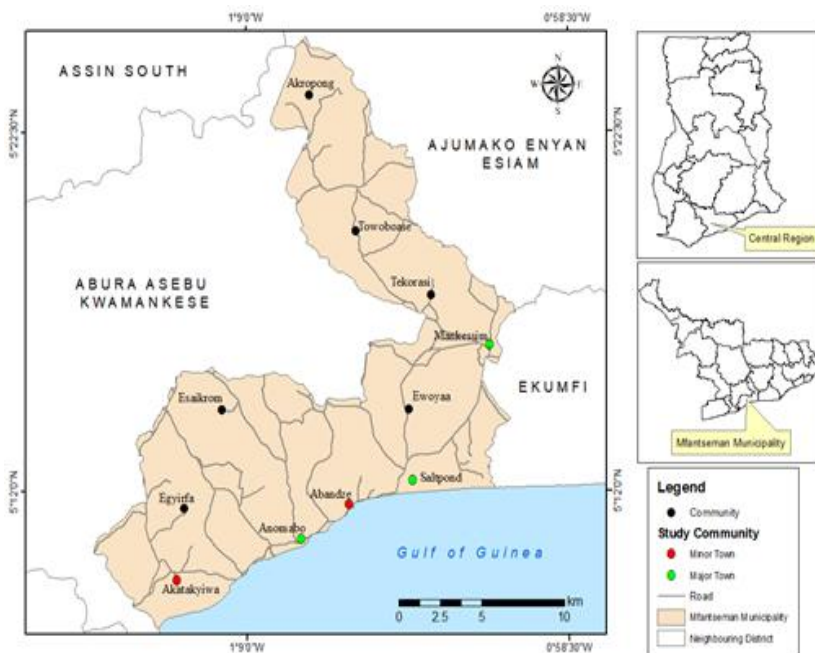


Figure 1: Map of Mfantseman Municipality

Source: Authors' Construct

Ethical Considerations

Once ethical approval was received from the Institutional Review Board of the University of Cape Coast with ID (UCCIRB/CHLS/2021/78), the researchers sent an introductory letter to the Ghana Education Service office in Mfantseman Municipality, seeking approval to conduct a study which was approved. Informed consent was sought from the pupils, in addition to their parents or legal guardians of minors (pupils younger than 18 years old as outlined in Chapter Five, Article 28, Clause 5 of the 1992 Constitution of Ghana) and teachers informing them about the purpose of the study. All participants were assured of their anonymity and confidentiality and they voluntarily agreed and participated in the study.

Results and Discussion

Demographics

A total of 368 pupils from 16 schools participated in the study, with 181 (49.2%) being males and 187 (50.8%) being females (Table 1). Most pupils (49.5%) were between the ages of 16 and 20 and a significant proportion (41.3%) was in Junior High School 2 (JHS 2).

Table 1: Socio-demographic characteristics of respondents

Variables	Urban	Total	ASYM.SIG.		
Rural					
Gender	Freq.	%	Freq.	%	Freq.
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)

Availability and functionality of water facilities

The findings reveal that a majority of pupils in both rural (50%) and urban (75%) schools reported having water in their schools (Table 2), although some facilities were in poor condition. Statistical analysis

indicates a significant difference between rural and urban areas in terms of water facility availability, suggesting variations in quantity. The findings are consistent with those of Jasper *et al.* (2012) and the Ghana Education Management Information System (2019), who also found adequate access to water in basic schools. Further investigation shows that most schools obtained water through internally generated funds, including contributions from worship services, income from selling firewood and charcoal and parental levies, supplementing the Ghana Education Service's Capitation grant. The findings from the pupils are supported by the in-depth interviews.

Water facilities are available, so water is not a problem in the school [Head teacher from rural school].

There are pipes and a water storage tank (polytank) available for proper hygiene in the school [Head teacher from urban school].

On the type of water facilities available in schools, the study observes that the majority of the schools in both the rural and urban areas use pipe-borne water. The findings are also consistent with those of Hotor (2017) and the World Bank (2021), who also found pipes as the main water facility in schools. It was found that most of the available water facilities are functional and fully in use.

However, many pupils who reported a lack of water in their schools resorted to fetching water from public pipe stands or their homes to bring to school. Statistical analysis reveals a significant difference between rural and urban areas regarding where pupils obtained water when their schools lacked water facilities. This confirms the findings of Duah *et al.* (2019), who find that in schools where no water is available, pupils fetch water from individual homes closer to the school environment. The findings from the pupils are supported by the in-depth interview as follows:

There are no water facilities available, so the pupils are asked to carry water to school every day [Head teacher from urban school].

We buy water from the public stand pipe in the community to clean the WASH facilities in the school [Head teacher from urban school].

The opinion leaders told us to fetch water from the public stand pipe in the community at no cost to the school since water is not available in the school [Head teacher from rural school].

Table 2: Availability, functionality and utilisation of water facilities

Variables				
<i>Availability of water facility</i>				
	Yes	No	Total	ASYMP.SIG
Rural	92 (50%)	92 (50%)	184 (100%)	.000
Urban	138 (75%)	46 (25%)	184 (100%)	

<i>Where students fetch water in schools without a water facility</i>					
	Open stream	Public pipe	Private ind.	From home	Total
Rural	6(6.5%)	56 (60.9%)	13 (14%)	17(18.5%)	92 (100%)
Urban	0(0)	30(65%)	6 (13%)	10 (22%)	46 (100%)

<i>Type of water facility available in schools</i>					
	Pipe	Well	Bolehole	Polytank	Total
Rural	68 (73.9%)	13 (14.1%)	1(1.1%)	10 (10.9)	92 (100%)
Urban	115 (83.3%)	0 (0)	0 (0)	23 (16.7%)	138 (100%)

<i>Functionality of the water facility</i>				
	Fully functional	Partially functional	Not functional	Total
Rural	60 (65%)	9 (10%)	23 (25%)	92 (100%)
Urban	97 (70.3%)	31(22.5%)	10 (7.2%)	138 (100%)

Source: Field Survey (2021)

Availability, functionality and utilisation of sanitation facilities

The study found that most public basic schools in the municipality have access to toilet facilities (Table 3), with Kumasi ventilated improved pits (KVIPs) being the major type, followed by water closets (W/C), which is in line with the findings of Aladago *et al.* (2019) and Appiah-Effah *et*

al. (2019). However, there is a significant difference between rural and urban areas regarding the availability of toilet facilities. In schools without toilet facilities, pupils often resort to defaecating at the beach, particularly in fishing communities within the municipality. Despite the availability of sanitation facilities, a considerable percentage of them are either partially functional (22.3% in rural schools and 17% in urban schools) or non-functional (10.9% in rural schools and 2.5% in urban schools), which increases the likelihood of open defaecation. This is in line with the studies of Aladago *et al.* (2019), Ahiatrogah (2020) and the World Bank (2021), who also found available but inadequate toilet facilities in Ghanaian schools and that some toilets are in deplorable conditions (Hotor, 2017). Additionally, some schools have unisex toilet facilities (13.1% of rural schools and 14.3% of urban schools), potentially discouraging female students from using them frequently, which confirms the study by Aladago *et al.* (2019), who found unisex toilet facilities in some schools in Ghana.

Also, the findings indicate that most pupils in schools without toilet facilities defaecate at the beach because their schools are located in fishing communities within the municipality. This is in line Jasper *et al.* (2012) and Wolf *et al.* (2022) who also found that in schools without adequate sanitation infrastructure, students practice open defaecation.

Table 3: Availability, functionality and utilisation of toilet facilities

Variables				
<i>Availability of toilet facility</i>				
	Yes	No	Total	ASYMP.SIG
Rural	175 (95.1%)	9 (4.9%)	184 (100%)	.010
Urban	161(87.5%)	23(12.5%)	184 (100%)	
<i>Where pupils without a toilet defecate</i>				
	Bush	Beach	Public Toilet	Total
Rural	1(11.1%)	6 (66.7%)	2 (22.2%)	9 (100%)
Urban	8(34.8%)	11 (47.8%)	4 (17.4%)	23 (100%)
				.241

<i>Functionality of toilet facility</i>				
	Fully functional	Partially functional	Not functional	Total
Rural	117 (66.9%)	39 (22.3%)	19 (10.9%)	175 (100%)
Urban	129 (80%)	28 (17%)	4 (2.5%)	161 (100%)

<i>Type of toilet facility</i>			
	KVIP	W/C	Total
Rural	140 (80%)	35 (20%)	175 (100%)
Urban	90 (55.9%)	71 (44.1%)	161 (100%)

<i>Whether male and female students use same or separate toilet facility</i>				
	Same	Separate	Don't know	Total
Rural	23 (13.1%)	148 (84.6%)	4 (2.3%)	175 (100%)
Urban	23 (14.3%)	137 (85.1%)	1 (0.6%)	161 (100%)

Source: Field Survey (2021)

Availability of hand washing facilities

The study found that all rural schools (100%) surveyed had handwashing facilities and almost all urban schools had them (99.5%). The predominant type of handwashing facility in both rural and urban schools was the Veronica bucket (Table 4). This suggests that handwashing facilities are widely available in public basic schools, with the Veronica bucket being the preferred option in both rural and urban settings. This is consistent Adams *et al.* (2009) and Wolf *et al.* (2022), who also found the availability of hand-washing facilities, typically “veronica bucket” in the basic schools. However, the study opposes the research by Nwajiuba *et al.* (2019) and Tesfaye *et al.* (2021), who found that most public basic schools did not have hand washing facilities in the school. Further probing reveals that the availability of handwashing facilities in the schools was due to investments and interventions resulting from the COVID-19 pandemic, where the provision of handwashing facilities was a requirement for the reopening of schools in the country and it has now become part of the school system.

Table 4: Availability, of hand washing facility
Variables

<i>Availability of hand washing facility in school</i>				ASYMP.SIG
	Yes	No	Total	
Rural	184 (100%)	0 (0)	184 (100%)	.317
Urban	183 (99.5%)	1 (0.5%)	184 (100%)	

<i>Where students without a hand washing facility wash their hands</i>		
	Public pipe stand	Total
Urban	1 (100%)	1 (100%)

<i>Type of hand washing facility used in schools</i>		
	Veronica bucket	Total
Rural	184 (100%)	184 (100%)
Urban	183 (100%)	183 (100%)

Source: Field survey (2021)

Availability of a separate facility for menstrual hygiene management

Findings further reveal that no single school in the rural areas had a separate facility purposely for females to change during menstruation, while only one school (that is 23 pupils representing 12.5%) in the urban areas has a separate facility purposely for females to change themselves during menstruation (Table 5). This has serious implications for menstrual hygiene management during school hours. These findings are corroborated by in-depth interviews with head teachers:

There is no separate room for females to change themselves during menstruation [Head teacher from rural school].

There is no changing room for the female students to change during menstruation. However, some use the toilet facilities if the need arises [Head teacher from urban school].

Table 5: Availability of separate facility for menstrual hygiene management

	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%)

Functionality of handwashing facilities

It was revealed that the majority of the handwashing facilities in both the rural and urban schools always have water and soap/sanitizer for hand washing (Table 6). However, more handwashing facilities in urban schools (62.8%) always have soap available compared to rural schools (43.5%). It is also observed that the majority of the handwashing facilities in both the rural and urban schools always have tissues for cleaning hands after washing.

Table 6: Functionality of handwashing facilities

Variables	Always	Sometimes	Rarely	Never	Total
<i>Hand washing facility with running water</i>					
Rural	106 (57.6%)	78 (42.4%)	0 (0)		184 (100%)
Urban	104 (56.8%)	79 (43.2%)	1 (0.5%)		183 (100%)
<i>Hand washing facility with soap/sanitizer</i>					
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%)
<i>Hand washing Facility with towel/ hand cleaning material (tissue)</i>					
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)

Handwashing practices in schools

This study investigates the pupils' handwashing practices at some critical periods. Table 7 reveals that only 30.2% of the pupils always wash their hands with soap before eating. The majority (53.3%) only do so sometimes (57.6% for rural pupils and 48.9% for urban pupils). On the other hand, almost two-thirds (63.3%) of the pupils always wash their hands with soap after visiting the toilets, with a slightly higher proportion in urban areas (65.2%) than in rural areas (61.4%), indicating the need to intensify proper hand washing before eating. The finding is in line with the research by UNICEF (2015), Jordanova *et al.* (2015), Gyimah *et al.* (2019) and Tesfaye *et al.* (2021), which indicate that the majority of pupils wash their hands after using the toilet but not before eating.

Again, the findings reveal that the majority of pupils rarely wash their hands with soap after a handshake (57.1%) and after touching animals (63.9%), implying inadequate hygiene behaviour in this regard.

Table 7: Hand washing with soap before eating, after visiting the toilet, after hand shake

Variables	Rural		Urban		Total		ASYMP.SIG
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	

Hand washing with soap after visiting the toilet

	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	

Hand washing with soap after hand shakes

	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	

Hand washing with soap after touching animals

	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	

Source: Field data (2021)

Table 8: Schools and available facilities

Description S.D	N		P-Correlation	Sig. (2-tailed)	Mean	
Schools/students	16/368			8.50	4.616	
	YES	NO				
Toilet facility	336	32	-.126*	.016	.09	.282
Water facility	230	138	-.448**	.000	.38	.485
Hand washing facility	367	1	.040	.448	.00	.052

Source: Field data (*ibid.*)

A correlation matrix was run to compare the availability of facilities in the selected 16 schools with a total of 368 students. The study findings found a statistically significant at $p < 0.05$ for water ($p = 0.000$) at 0.38 and 0.485 mean and standard deviation respectively; and toilet availability ($p = 0.016$) at 0.09 and 0.282 mean and standard deviation, indicating that, there are differences in terms of the existence of toilet and water in the schools. While there was statistically insignificant at $p > 0.05$ for availability of hand washing facility ($p = 0.448$) at 0.00 and 0.052 mean and standard deviation, indicating that there are no differences among the schools in terms of hand washing facilities. Hence, the study indicates that all the schools have access to hand washing facilities, but not all schools have the same access to water and toilet facilities, implying that some schools have toilet facilities but lack water and vice versa. The findings indicate insufficient WASH facilities in schools, which confirms the study by McMichael (year??) which challenges of sanitation and hygiene practices in schools are attributed to insufficient WASH facilities in schools.

Conclusions and recommendations

This study sought to examine sanitation and hygiene practices among pupils in basic schools within the Mfantseman Municipality of Ghana. The findings reveal that while most schools have access to WASH facilities, many are either partially functional or non-functional, particularly in rural areas. The study also found that handwashing practices among pupils are inconsistent, with a significant proportion of students failing to wash their hands before meals, despite improved access to handwashing facilities. These findings underscore the urgent need for improved WASH infrastructure and behaviour change interventions in schools.

The study contributes to the existing literature by providing a detailed analysis of the functionality and utilisation of WASH facilities in basic schools in Ghana, a topic that has received limited attention in previous research. This study offers valuable insights for policymakers and stakeholders working to improve WASH infrastructure in schools, highlighting the challenges schools face in maintaining functional WASH facilities. The findings also emphasise the importance of

addressing the specific needs of female students, particularly in terms of menstrual hygiene management, as the lack of separate facilities for girls remains a significant barrier to their education.

Based on the findings, it is recommended that the Ghana Education Service (GES), in collaboration with the Mfantseman Municipal Assembly, allocate adequate funds for the provision and maintenance of WASH facilities in basic schools. School authorities should also prioritise the regular maintenance of these facilities to ensure their long-term functionality. Additionally, public health interventions and educational programmes should be implemented to promote proper handwashing practices among pupils, particularly before meals. Schools can create a healthier environment that supports both the academic performance and overall well-being of students by addressing these issues.

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