

Assessment of Post COVID-19 Lockdown Hand Washing Practices among Junior High School Boys in the Krobo Area of Ghana

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Abstract Water, Sanitation and Hygiene is one of the Sustainable Development Goals (SDGs) which places emphasis on Clean Water and Sanitation. The importance of Water, Sanitation and Hygiene was highly recognized in the context of the COVID-19 pandemic. There has been decline in COVID-19 cases in Ghana resulting in the lessening in restrictions as announced by the Government. Therefore, hand washing behaviour is also slowly reducing among the people. This study seeks to assess the hand washing practices among the school adolescent boys. This study adopts cross sectional design and uses questionnaire to analyze the hand washing practices among school going boys (228) from eight schools in two districts in the Eastern Region of Ghana. The study reveals that only half of the respondents wash their hands with soap before eating, after urinating, after playing, and after returning home and two thirds of the respondents wash their hands with soap after visiting the restroom. One-fifth of the students do not wash their hands at school for a variety of reasons including 'it is not necessary,' 'laziness,' 'no time,' and 'no water or soap available to wash'. Significant variables influencing hand washing practice were age of students less than 14 years, in lower forms (form 1 and 2), living in rural areas and as well as availability of veronica buckets always at the schools.

The study recommends students' hand washing behaviour must be monitored and educated on a regular basis targeting the identified variables.

Keywords Hand Washing Practices, COVID-19 Post Lockdown, Junior High School Boys

1. Introduction

Water, Sanitation and Hygiene is one of the Sustainable Development Goals (SDGs) which places emphasis on Clean Water and Sanitation. According to UN statistics "Worldwide, one in three people do not have access to safe drinking water, two out of five people do not have a basic hand-washing facility with soap and water and more than 673 million people still practice open defecation" (UN Sustainable Development Goals). The importance of Water, Sanitation and Hygiene was highly recognized in the context of the COVID-19 pandemic. Hand washing becomes prominent and crucial to fight the virus. The availability and accessibility of water is much more important to prevent people from the infections. UNICEF

emphasized on the basic water, sanitation and hygiene facilities to reach the girls and boys who are living in remote areas. During COVID-19 pandemic, the World Health Organization (WHO) emphasized on hand hygiene through washing with running water and soap or rubbing hands with alcohol-based sanitizers. Like every other nation, Ghana, has also taken interventions for containing the spread of virus such as frequent use of alcohol-based sanitizers, the use of nose masks, physical distancing and frequent hand washing with soap under running water. Veronica buckets with washing soaps become common in public places including schools, churches, workplaces etc. People adapted to this new normal and practiced it to contain the virus. However, ensuring availability and access to water and sanitation in rural places is crucial that has a great impact in water, sanitation and hygiene (WASH) practices. Therefore, it is necessary to assess the availability and access to water and sanitation on one side and the hand washing behaviour among the people on the other. During the time of COVID-19 pandemic, it was visible that people wash their hands before they enter any premises or use alcohol-based sanitizer. It became their habitual practices but due to the decline in number of cases in the country in the post pandemic period, the hand washing practices are slowly reducing among the people. Therefore, this study seeks to assess the hand washing practices among the school adolescent boys. The authors acknowledge that though several studies have been done in the area of hand washing in schools [1-4] there has not been any study that specifically addresses hand washing among only boys in schools. The choice of boys as respondents for this study stems from a widely held assumption and findings from the previous studies that men and for that matter boys practice hand hygiene less than their female counterparts [5-8].

With the above contextual background, this research focused on the WASH practices among school adolescent boys among Yilo and Lower Manya Krobo in the context of COVID-19 and Post COVID-19 pandemic with the following objectives:

1. To assess the hand washing practices among adolescent boys in schools of Lower Manya and Yilo Krobo districts during the post COVID-19 pandemic situation
2. To compare the hand washing practices among public and private school boys
3. To investigate the availability and accessibility of WASH facilities at public and private school premises

2. Theoretical Underpinning and Empirical Literature Review

The theory of planned behavior (TPB), postulated by Ajzen [9,10] has been used to explain hand washing practices in different settings [11-13] to explain factors that ease or hamper hand washing behaviours. The theory

proposes that human conduct is influenced by three types of contemplations: behavioral, normative and control beliefs. Behavioral beliefs are the merits or demerits of attitudes (eg. hand washing), normative beliefs are the perceived influence by others (eg. school authorities) to engage in a particular behaviour and control beliefs are the perceived effortlessness or complexity of undertaking the behaviour under consideration. Using the TPB model, it is apparent that students, and for the purposes of this study male students, will practice hand washing if they understand its health benefits in terms of the spread of COVID-19, school authorities encourage the practice and also measures are in place in the schools to make the practice easy for them to perform.

Cavill *et al.* [14] assert that deliberations about gender in WASH frequently center on the tasks, situations, or effects on women and girls with minimal attention to men and boys. They acknowledge that the essence of a gendered attachment to issues of WASH is as a result of women bearing the brunt though mostly exempted from inception to implementation due to patriarchal predispositions. Cavill *et al.* [14] posit that the involvement and promotion of men and boys in sanitation and hygiene activities could serve as a conduit for the consideration of impartial gender relationships.

According to Bolon [15], a lack of understanding of personal hygiene, adherence, and behaviors toward proper hand hygiene all contribute significantly to the prevalence of communicable diseases COVID-19 inclusive- which has a negative impact on the long-term development of schoolchildren. In Kazakhstan, Toleubekov *et al.* [16] undertook their study to evaluate WASH access in urban schools within the COVID-19 pandemic era amidst the observance of preventive procedures. They note that providing water and related services in schools not only addresses the spread of COVID-19, but also tackles the achievement of some SDG targets especially SDGs 4 and 6. However, the study discovered that parents and school management lacked a strong appreciation for the importance of WASH, which is responsible for uncoordinated frequent checks, limited compliance with hygienic principles, and negative consequences affecting children's wellbeing and schooling.

In accordance with the COVID-19 worldwide procedures for the reopening of school, which emphasized a focus on WASH, Afkar *et al.* [2] conducted a situational appraisal of WASH amenities, standards and activities in Indonesian schools, as well as scrutinize the policy implications for achieving WASH access in schools by 2030 under the SDGs. Their study employed both qualitative and quantitative methodologies as well as an examination of appropriate regulations to perform an analysis of WASH amenities in the country. The policy gaps identified in their research were in relation to the present Indonesian COVID-19 policies and requirements, their written regulations and execution, laid down

educational principles and activities as well as domestic and global standards. Consequently, they recommend that these gaps can be addressed by ensuring that hand washing amenities are made available in schools to deter infections, financial allocation for WASH amenities, engage stakeholders and revise domestic and global standards.

According to Almoslemet al. [17] a lack of understanding about proper hand washing procedures has caused significant worry for humans, particularly in terms of the threat of various infectious diseases. Their goal therefore was to investigate the awareness level, attitudes and habits of 271 school going children above fourteen years of age in Saudi Arabia's Eastern Province while applying a cross sectional survey research approach. Their research found that knowing the importance of hand washing and putting it into practice is a good way to reduce the spread of infectious diseases like COVID-19. The authors acknowledge that their study can provide the foundation for the promotion of hand washing education and behaviours awareness curricula in the face of infectious diseases such as COVID-19 and other pandemics. However, they recommend more research to appreciate hand washing is performed in homes and schools, as well as how it relates to the transmission and risk of communicable diseases.

3. Materials and Methods

This study used a descriptive, cross-sectional design in assessing the hand washing practices among the school going adolescent males after the COVID-19 pandemic situation.

The Study was carried out among male students in Junior high School (Grade 7, 8 and 9) in the conveniently selected private and public schools from two districts namely Yilo Krobo Municipality and Lower Manya Krobo districts of Ghana. This study covered a total 8 schools, four of which were private and four of which were public. A total of 240 students were randomly selected (30 students from each school covering grade 7,8&9) and given a self-administered questionnaire to assess the hand washing practices during the post pandemic period of COVID-19, with 228 responses being used for analysis due to incomplete information from the rest of the respondents.

The questionnaire was developed based on literature and expert opinion. To ensure internal validity and reliability, pre-testing was done to determine the appropriateness of the questions and thereafter the questionnaire was revised accordingly.

Data was collected in March 2022 in 2 weeks duration. The questionnaire was administered to the respondents in their separate classrooms during their scheduled classes by the researchers.

There are three sections to the survey tool. Section 1 contains demographic data such as age, class, religion, residence, facilities at home and educational status of

parents. Section 2 had questions related to hand washing practices during the post COVID-19 pandemic situation and section 3 had questions related to facilities available at school.

The data were collected using a paper-based questionnaire and then entered into EPI Data platform. Statistical Package for Social Sciences (SPSS) version 22 was used to conduct the data analysis. Data cleaning by way of identifying missing values and checking for consistency among variables were carried out by running frequencies and cross tabulations. Descriptive statistics was used to describe hand washing practices and presented as frequency count, percentages and mean values.

The level of hand washing practices was measured using a scoring method and each practice received a score ranging from 0 to 2. Best hand washing practice involved hand washing with water and soap and assigned 2; fair hand washing practice represented hand washing with only water and assigned 1; and poor hand washing practice represented no washing of hands and assigned 0. These scores were counted and recorded for each respondent. Which means that the higher the score, the better the practice. Scores of more than 75 percent were deemed good, scores of 50 to 74 percent were regarded fair, scores of 0 to 49 percent were considered poor.

Bivariate analysis was carried out to determine the relationship between the students' characteristics (independent variables) and the hand hygiene practice score (dependent variable) using Chi-square analysis for categorical data. Also, a multivariate analysis using a logistic regression was used to determine the association between hand washing practice score (dependent variable) and students' characteristics (independent variables). Furthermore, a logistic regression was used to determine the association between hand washing practice score (dependent variables) and availability of water and sanitation facilities in school (independent variables). All tests with a p-value of less than 0.05 were considered statistically significant at a 95% level.

3.1. Ethics Statement

As part of the ethical considerations, permission was requested from the respected school Heads to conduct this study. Each questionnaire came with a written informed consent form which the respondents were required to sign before they could answer the questions, indicating their understanding and willingness to participate in the study.

4. Results and Discussions

4.1. Students' Characteristics

The study comprised 228 students from eight different schools (four private and four public). There were 111 (49%) public school students and 117 (51%) private school

students. There were 70 Grade 7 students, 78 Grade 8 students and 80 Grade 9 students. The students ranged in age from 12 to 18 years old, with about one quarter falling between the ages of 14 and 17 years (Table 1), with the mean age 14.69 ± 1.345 .

Table 1. Demographic characteristics (n=228)

Variable	Nos.	Percent
Age		
Early adolescents (12 to 13)	51	22.4
Middle adolescent (14 to 17)	170	74.6
Late adolescent (18 years)	7	3.1
Class studying		
Grade 7	70	30.7
Grade 8	78	34.2
Grade 9	80	35.1
Type of School		
Public	111	48.7
Private	117	51.3
District		
Yilo Krobo	112	49.1
Lower Manya Krobo	116	50.9
Religion		
Christianity	221	96.9
Islam	6	2.6
Traditional	1	0.4
Residence		
Rural	72	31.6
Urban	156	68.4

Table 2. Hand Washing Practices during Post COVID-19 pandemic (n=228)

Hand Washing practice	Nos.	Percent
Wash hands with water	13	5.70
Wash hands with water and soap	123	53.95
Use sanitizer to clean my hands	92	40.35
Frequency of hand washing	Nos.	Percent
Zero to 2 times	70	30.70
Three to 4 times	87	38.16
More than 5 times	71	31.14

4.2. Hand Washing Practices during Post COVID-19 Pandemic Situation

Of the total, 123 (54%) of the boys said they washed their hand with water and soap after COVID-19 pandemic and 92 (40%) of them used hand sanitizer to clean their hands (Table 2).

Of all the participated students, 180 (79%) students wash their hands with soap and water at school. However, 47 (21%) of the students said they do not wash hands at school for a variety of reasons such as 'it is not necessary,' 'no time to wash,' 'no water available,' 'no soap available,' 'always forget' and 'laziness' (See Table 3). This is in line with research by Dajaan et al. [18], Wada & Oloruntoba [4], and Bolatova et al. [19], who conducted studies in Ghana, Nigeria, and rural Kazakhstan, respectively, and found that the absence of water and handwashing stations in classrooms is a major deterrent to students washing their hands. Likewise, if students do not consider washing their hands as a potential preventive tool against diseases like COVID-19 they will not value doing so [17].

Table 3. Hand Washing Practices at School during Post COVID-19 pandemic (n=228)

Hand Washing at school	Nos.	Percent
With water	1	0.44
With soap and water	180	78.95
Do not wash	47	20.61
Reason for Not Washing at school	Nos.	Percent
It is not necessary	11	22.45
No time to wash	11	22.45
No water available	7	14.29
No soap available	7	14.29
Always forget	4	8.16
Laziness	9	18.37

It has been discovered that using soap is one of the greatest strategies for removing bacteria when compared to simply washing your hands with water [20]. Surfactants in soap help remove bacteria from the skin. It is more vital to wash your hands with soap before eating and after urinating/defecation to prevent bacterial or other microbe infections. More emphasis was placed on hand washing with soap and running water during the COVID-19 pandemic. In this study, hand washing practices at crucial times were examined and it is found that nearly half of the respondents used soap and water for hand washing before meal, after urinating, after playing with friends and after returning home. Furthermore, two third of the respondents wash their hands with soap after visiting the toilet. Similarly, when handling garbage, 59 percent of the students wash their hands with soap. However, another half of the respondents do not wash their hands with soap before eating, after urinating, after playing with friends and after returning home, which is not the effective hand washing practice. Similarly, it is important to note that one third of the boys do not wash their hands with soap after visiting the toilet (Table 4). These findings are consistent with earlier research suggesting that children need frequent reminders of their fundamental hand hygiene practices [21].

It is at this point that teachers, parents, and other adult can encourage children to practice proper hand hygiene.

Dadebo [22] opines that parental expectations for girls' and boys' hand hygiene may be fundamentally different, which may explain for the less compliance in hand washing behavior or practice of boys. While Chen et al. [23] advise that boys in school should be well-supervised to adhere to

hand washing requirements as girls were 1.12 times more likely to practice hand washing, Park et al. [24] also highlighted that there is a strong gender difference in terms of perceptions of hand washing. In Jordan, ALBashtawy [25] found that students' lack of practice was either due to their misconception that hand washing was not necessary or their perception that the facilities were not neat.

Table 4. Hand Washing Practices Post Lockdown

	(N=228)	
	Nos.	Percent
Washing hands before and after eating		
With water before and after eating	110	48.25
With soap before and after eating	118	51.75
Do not Wash	0	0.00
Washing hands after urinating	Nos.	Percent
With water after urinating	77	33.77
With soap after urinating	108	47.37
Do not wash	43	18.86
Washing hands after visiting toilet	Nos.	Percent
With water after visiting toilet	56	24.56
With soap after visiting toilet	150	65.79
Use tissue in absence of water	22	9.65
Washing hands after handling garbage	Nos.	Percent
With water after handling garbage	70	30.70
With soap after handling garbage	135	59.21
Do not wash	23	10.09
Washing hands after playing with friends	Nos.	Percent
With water after playing with friends	65	28.51
With soap after playing with friends	117	51.32
Do not wash	46	20.18
Washing hands after blowing nose/coughing	Nos.	Percent
With water after blowing my nose or coughing	76	33.33
With soap after blowing my nose or coughing	102	44.74
Do not wash	50	21.93
Washing hands after returning home	Nos.	Percent
With water when I return home from outside	61	26.75
With soap when I return home from outside	114	50.00
Do not wash	53	23.25

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Table 5. Hand washing practice score among public and private school

Level of Practice	Range of Practices Score	Public School		Private School		Total	
		Nos.	%	Nos.	%	Nos.	%
Poor	0 to 10	25	22.5%	21	17.9%	46	20.2%
Fair	11 to 15	45	40.54	38	32.5%	83	36.40
Good	16 to 20	41	36.94	58	49.6%	99	43.4
	Total	111	100.00	117	100.00	228	100.00
	Mean	13.69		14.66		14.19	
Minimum Practice Score is 0 and Maximum Practice score is 20							

Table 6. Association of socio-demographic characteristics and hand washing practices

Students' Characteristics	Hand Washing Practices				P-Value
	Poor	Fair	Good	Total	
Age of the respondents					
Early adolescents (12 to 13)	15.7%	37.3%	47.1%	22.4%	0.559
Middle adolescent (14 to 17)	22.4%	35.9%	41.8%	74.6%	
Late adolescent (18 years)	0.0%	42.9%	57.1%	3.1%	
Total	20.2%	36.4%	43.4%	100.0%	
Type of School					
Public	22.5%	40.5%	36.9%	48.7%	0.157
Private	17.9%	32.5%	49.6%	51.3%	
Total	20.2%	36.4%	43.4%	100.0%	
Grade					
Grade 7	21.4%	38.6%	40.0%	30.7%	0.039
Grade 8	26.9%	39.7%	33.3%	34.2%	
Grade 9	12.5%	31.3%	56.3%	35.1%	
Total	20.2%	36.4%	43.4%	100.0%	
District					
YiloKrobo	25.9%	29.5%	44.6%	49.1%	0.038
Lower Manya	14.7%	43.1%	42.2%	50.9%	
Total	20.2%	36.4%	43.4%	100.0%	
Region					
Rural	36.1%	37.5%	26.4%	31.6%	0.000
Urban	12.8%	35.9%	51.3%	68.4%	
Total	20.2%	36.4%	43.4%	100.0%	

Table 7. WASH facilities at school

Location of hand washing point in school	No.	%
close to toilet	59	25.9
Far away from toilet	169	74.1
Presence of Water supply at school		
Never	0	0
Rarely	7	3.1
Sometimes	101	44.3
Often	20	8.8
Always	100	43.9
Presence of Soap at school		
Never	0	0
Rarely	22	9.6
Sometimes	73	32.0
Often	12	5.3
Always	121	53.1
Presence of Veronica buckets at school		
Never	0	0
Rarely	0	0
Sometimes	31	13.6
Often	0	0
Always	197	86.4
Presence of towel/tissues at school		
Never	27	11.8
Rarely	0	0
Sometimes	105	46.1
Often	20	8.8
Always	76	33.3

4.3. Comparative Analysis of Hand Washing Practices in Public and Private School

Comparative assessment of the students’ hand washing practice indicated that students from private schools scored higher compared to the public schools in good practices however there was a slight difference in the mean score of 0.97 as shown in Table 5. For instance, students in private schools had a significantly higher good scores on hand washing practice (49.6%) than students from the public schools (36.94%). This is expected given that students attending private schools are considered to be from literate and wealthy/good homes and are therefore likely to be well trained in good hygiene.

A bivariate analysis was conducted to assess the relation between students’ characteristics and hand washing

practices. The analysis revealed that there is a significant relationship between the hand washing practices and region, district, and grade (p value<0.05) (Table 6).

4.4. WASH Facilities at School

The health of schools can be improved by effectively influencing schoolchildren's hand washing habits by having enough hand washing facilities available [26]. In order to circumvent the difficulties with hand washing facilities during the pandemic, schools used what is popularly called *Veronica buckets*. A Veronica Bucket is an improvised hand washing device with a bowl at its bottom to collect wastewater and a bucket with a tap fixed at the bottom positioned at hand height [27]. In reference to Table 7, majority of the students (74%) revealed that the

location of hand washing point in their school is far away from the toilet. This means that a student has to walk long distance to get the bucket to wash the hand which can discourage washing of hands. About 44% of the students said they have access to water at school all the time. Soap was available to nearly half of the respondents. Majority of 83% of the students reported that their schools have veronica bucket for water supply.

4.5. Association between Good Hand Washing Practice and Background Characteristics

Table 8 presents multinomial logit regression of Hand washing practice and background characteristics. The results showed that with regards to poor hand washing practices compared to good hand washing practice, the significant variables that influence the level of hand washing practices are age, class of studying and region (living area). For instance, holding all the other variables constant, early adolescent students (less than 14 years) are more likely to practice poor hand washing activities than to practice good hand washing activities. Similarly, students in the lower forms (Form 1 & 2) are more likely to practice poor hand washing activities than to practice good had washing activities. Furthermore, students from the rural areas are more likely to practice poor hand washing activities than to practice good had washing activities. These are expected findings given that the younger

students, students in lower forms and students from rural areas are comparatively naive in knowledge regarding the importance of hand washing practices to protect diseases such as COVID-19.

4.6. Association between Hand Washing Practice and Availability of Facilities at Schools

Table 9 presents multinomial logit regression of Hand washing practice and availability of facilities at schools. The results showed that presence of Veronica Buckets for hand washing is the only statistically significant variable that influences hand washing practice. When Veronica Buckets are only sometimes available at the schools, students are more likely to be involved in poor hand washing practice instead of good hand washing practice. In order words, to achieve good hand washing practice, there is the need to make Veronica Buckets always available at the schools. This is in line with the theory of planned behavior (control beliefs) that explains that if facilities are available, it can positively influence human behaviors [11-13]. In addition, a previous study revealed that providing water and related services in schools can address the spread of COVID-19 [16]. The Veronica Buckets is a low-cost device which can be easily made available in all the schools in Ghana to improve hand washing hygiene and subsequently the spread of diseases such as COVID-19.

Table 8. Multinomial logit regression of Hand washing practice and background characteristics

	Poor hand washing Practice			Fair hand washing Practice		
	Co-efficient	Std Error	P-value	Co-efficient	Std Error	P-value
Age of the respondents (13 to 18)						
Early Adolescent (13)	15.451	0.516	0.000	-0.339	0.874	0.699
Middle Adolescent (14 to 17)	15.938	0	.	-0.015	0.812	0.985
Late adolescent (18)	0 ^b	.	.	0 ^b	.	.
Class Studying						
Form 1	1.36	0.543	0.012	0.761	0.413	0.065
Form 2	1.523	0.5	0.002	0.913	0.385	0.018
Form 3	0 ^b	.	.	0 ^b	.	.
Type of School						
Public	-0.143	0.445	0.748	0.394	0.337	0.243
Private	0 ^b	.	.	0 ^b	.	.
District						
Yilokrobo	0.788	0.414	0.057	-0.36	0.317	0.256
Lower Manya Krobo	0 ^b	.	.	0 ^b	.	.
Region						
Rural	1.997	0.474	0.000	0.564	0.391	0.149
Urban	0 ^b	.	.	0 ^b	.	.

b=Base category, Good hand washing Practice is the comparison group

Table 9. Multinomial logit regression of Hand washing practice and availability of facilities

Independent variables	Poor hand washing Practice			Fair hand washing Practice		
	Co-efficient	Std error	P-value	Co-efficient	Std error	P-value
Location of hand washing point						
Close to toilet	-0.132	0.503	0.793	-0.171	0.404	0.672
Far away from Toilet	0 ^b	.	.	0 ^b	.	.
Presence of Water in the handwashing point						
Rarely	0.41	1.104	0.71	-0.656	1.131	0.562
Sometimes	-0.008	0.423	0.986	-0.279	0.346	0.42
Often	-0.336	0.759	0.658	-0.721	0.666	0.279
Always	0 ^b	.	.	0 ^b	.	.
Availability of soap for hand washing						
Rarely	-0.142	0.773	0.854	-0.152	0.688	0.825
Sometimes	0.786	0.48	0.102	0.849	0.403	0.035
Often	0.665	0.923	0.472	0.555	0.827	0.502
Always	0 ^b	.	.	0 ^b	.	.
Presence of Veronica Buckets for hand washing						
Sometimes	1.255	0.588	0.033	0.987	0.551	0.073
Always	0 ^b	.	.	0 ^b	.	.
Presence of Towels/Paper tissues at hand washing point						
Never	1.522	0.793	0.055	0.991	0.711	0.163
Sometimes	0.057	0.494	0.909	-0.425	0.39	0.275
Often	-0.497	0.8	0.534	-0.926	0.657	0.159
Always	0 ^b	.	.	0 ^b	.	.

b=Base category, good hand washing Practice is the comparison group

5. Conclusions

The study's findings are summarized by the fact that only half of respondents wash their hands with soap before eating, after urinating, after playing, and after going home. Nearly two-thirds of the respondents wash their hands with soap after using the restroom. One fifth of the students do not wash their hands at school for a variety of reasons including 'it is not necessary', 'laziness', 'no time', and 'no water or soap available to wash'. Overall, less than half of the respondents practice good hand washing (ie hand washing with soap and water). The bivariate analysis revealed that there is a significant relationship between the hand washing practices and region, district, and grade (p value<0.05). The results of the multinomial logit regression of hand washing practices with background characteristics and facilities showed that students under the

age of 14, students in lower forms (forms 1 and 2), residents of rural areas, as well as the availability of veronica buckets always at the schools, were the significant variables that influenced the level of hand washing practices. Applying the TPB model, belief in this study is centered on how students perform hand washing behavior. The World Health Organization's COVID-19 recommendations and the Government of Ghana's COVID-19 protocol procedures were implemented at all institutions, including schools, and were normative beliefs that encouraged students to practice hand washing. The spread of COVID-19 increased pressure on the general population, especially students, to behave in a certain way, and institutions were required to comply with the protocols at all of their locations. Control beliefs such as facilities available in schools can make students perform the behaviour better. The results of the current study showed

that, despite widespread awareness of COVID-19 prevention and protocols implemented at all facilities, half of the students did not engage in positive behavior, confirming that the respondents' beliefs did not influence the hand washing behavior. This finding is consistent with a study conducted by Sin and Rochelle [28], who found that attitudes did not predict hand hygiene behavior. Also, our study confirms that the control beliefs have influenced the hand washing behaviour where the facilities available at the premises influenced students to perform the behaviour and therefore, it is recommended that interventions should focus on key variables such early adolescences under 14 years old, students from lower grades, students living in rural areas, as well as making veronica buckets to be always available at the schools. Therefore, the school authorities and policy makers have to focus on the provision of facilities that enable students to perform their hand washing behaviour so as to prevent them from the infectious diseases.

Water, sanitation, and hygiene are essential for the prevention and management of infectious epidemics like COVID-19. In order to protect schoolchildren against these outbreaks, it is crucial to keep an eye on how well they wash their hands. The COVID-19 outbreak is still ongoing, and policymakers and other stakeholders must continue to educate students, particularly boys, about it because numerous studies have shown that girls wash their hands more effectively than boys. Due to social norms, WASH initiatives focus mostly on women and girls while neglecting the actions of men and boys. In order to effectively practice combating COVID-19 or any other future breakouts, it is crucial to give equal attention to both genders.

We would like to acknowledge some limitations of the study. The sample size used for the study is small and the focus was on only boys and therefore has the potential to affect the generalization of the findings. However, given that the study schools have relatively similar characteristics with other schools in the country, we hope that the findings reflect what pertains in those schools. Nevertheless, we suggest that future studies should be considered using a larger sample and not just adolescent boys.

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