

Evaluation of Handwashing Facilities in Basic Schools in Ejura-Sekyeredumase Municipality, Ghana

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Abstract: Hand washing has been recognized as an effective measure against the transmissions of different communicable diseases. This article provided insights into hand washing facilities, students' knowledge, and patronage of the facilities in basic schools in Ejura-Sekyeredumase Municipality of Ghana motivated by the Covid-19 pandemic. We pointed out the current state of handwashing facilities and knowledge of proper handwashing among basic schools in the second Covid-19 hotspot region. The study spanned between November 2019 to March 2020. From pre Covid-19 period to the time (month) Ghana recorded its first case of Covid-19. The study was undertaken using well designed structured questionnaire, observation checklist and interviews. It involved randomly sampling 25 public schools and 5 private schools. From each of these 30 schools, 19 students and a teacher were selected randomly and purposively making a total of 600 respondents. Data obtained from the students and staff were compared for their effective relationships using Statistical Package for Social Sciences (SPSS) Version 20. The Pearson Chi-Square test was used to show the effect size and the strength of relationship between variables. The results showed that the handwashing facilities were not enough for students and teachers. Many students rated availability of handwashing materials as good (66.70%). There was a statistically significant difference ($p < 0.05$) between the availability of hand washing materials and patronage of the facility. Most students claimed water flowed always ($\bar{x}=1.27$) with few reporting intermittent water availability (26.70%, $SD=0.45$). Generally, more students (76.80%) washed their hands with soap and water after visiting the toilet. There was a significant difference between students who knew germs and the number of times they practiced hand washing, $X^2(4, N=546) = 13.26, P=0.01$. However, the effect size was relatively small (*Cramer's V*=0.15). Inadequate handwashing materials (42.13%) and forgetfulness from students (37.07%) were hindrances to effective handwashing. The government through the ministry of education should ensure all year-round provisions of hand washing facilities and materials coupled with continuous education and awareness to strengthen hand washing habit among the students.

Keywords: Basic schools, Covid-19, Ejura-Sekyeredumase Municipality, Germs, Handwashing, Patronage

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1. Introduction

Handwashing has been recognized as an effective measure against the transmissions of different communicable diseases such as cholera, influenza, and pneumonia (Najnin et al., 2017; Wichaidit et al., 2019; Rahman Zuthi et al., 2022). Provision of sufficient amount

of water, soap, towels/tissues, and alcohol-based hand sanitizers enhance students health by truncating the spread of infectious diseases and Covid-19 (Zivich, Gancz and Aiello, 2018; Hadaway, 2020; Leslie, Zhou and Macinga, 2021; Donde et al., 2021). However, substandard provision of hand washing facilities increases the risks of contracting infectious diseases via various pathogenic organisms (Donde et al., 2021). Developing countries

struggle to provide standard handwashing facilities to basic schools. The outbreak of the current Covid-19 pandemic could have pronounced impacts on the basic school students if sufficient handwashing facilities are not provided based on previous evidence of poor handwashing facilities in basic schools in developing countries (Rahman Zuthi et al., 2022).

Covid-19 outbreak began in China in December 2019 in the city of Wuhan. The World Health Organization (WHO) declared it a pandemic and a major threat to health. The Covid-19 main transmission routes are via respiratory droplets from coughing or sneezing from an infected person (Dzator et al., 2022; Ju, Ajaero and Atoma, 2022). According to the WHO, Covid-19 confirmed cases recorded worldwide is more than 663.64 million resulting in above 6.71 million deaths (World Health Organization, 2023). The main preventive measures for the virus are hand washing with soap under running water, use of alcohol-based hand sanitizer, social distancing, and wearing face masks until an effective vaccination is developed (Dzator et al., 2022). Current vaccination against the virus reduces the likelihood of death and does not throw away the preventive measures mentioned above. In many sub-Saharan African countries, handwashing is recommended to be performed under running water for at least 20 seconds, five times daily (Amuakwa-Mensah et al., 2021). Dzator et al., (2022), found a drastic reduction in number of Covid-19 cases when handwashing was practiced effectively by carrying out a detailed analysis of data from 176 countries. Despite the whooping evidence of the effectiveness of handwashing against infectious diseases and Covid-19, developing countries fall short of providing handwashing facilities in basic schools. The challenges that hinder the provision of handwashing facilities are alluded to economic challenges, people's socio-economic status, unreliable supply of water, in conflict with meeting other needs such as provision of roads, healthcare etc. The Covid-19 pandemic emphasizes the significance of providing reliable supply of handwashing facilities in basic schools despite the socio-economic statuses of the developing countries. In the wake of the Covid-19, the availability, and practices of handwashing in basic schools sparked interest. In Indonesia, a study conducted in primary school 101893 Bangun Rejo found that handwashing with soap was below 50% and insufficient (Amar, 2021). A comprehensive assessment of handwashing knowledge, attitudes and practices among primary school students in northeast China discovered that none of the students completed all the steps recommended by WHO for handwashing (Hao et al., 2021). Similarly, hand washing practices evaluated at elementary schools in Mongolia found that the students poorly practiced handwashing during critical moments and had inadequate handwashing facilities and soap (Enkhbat et al., 2022). In analyzing the handwashing practices and its predictors in primary school students of Damote Woide district in South Ethiopia, it was found that proper hand washing practices was poor (28.10%) and puts the students at risks of infections (Admasie et al., 2022). Similar observations

of poor handwashing practices, inadequate handwashing facilities and education in basic schools have been recorded in other studies (Muramatsu-Noguchi et al., 2022; Sharma and Adhikari, 2022; Saima Alam et al., 2020; Okello et al., 2019; Steenkamp et al., 2022; McMichael, 2019; Otto, Opatoki and Luyi, 2022; Eshetu, Kifle and Hirigo, 2020; Toleubekov, Bolatova and Stafström, 2022)

Ghana, a developing nation, was also affected by the Covid-19 pandemic. This required that schools in the country, especially at the basic level, were supplied with handwashing facilities. Prior to the pandemic, there have been evidence of poor handwashing facilities in the basic schools in Ghana. According to Acheampong et al. (2019), 67% of students lack clean drying materials and resort to using their soiled school uniforms to clean their hands after washing. Other students also have poor handwashing habits (Dajaan et al., 2018). Steiner-Asiedu et al., (2011) reported that lack of access to resources such as soap, water, and disposable tissues impeded handwashing. In Northern Ghana specifically in the Zabzugu district, 92% of the primary schools had handwashing facilities but were underutilized due to lack of awareness and poor handwashing habits (Tiswin, Luguterah and Aladago, 2019; Dajaan et al., 2018; Appiah-Brempong et al., 2018). Again, assessing hand washing knowledge and practices in the basic schools of Kintampo Municipality showed that hand washing at critical moments was poor. Thus, 60.12% ignored handwashing after visiting the toilet, about 15% of students washed their hands under clean flowing water, and only 23.33% demonstrated knowledge of effective handwashing. The unavailability of water and soap were barriers to washing hands (Dajaan et al., 2018). During the Covid-19 outbreak, government and other private organizations made efforts to supply schools including at the basic level, handwashing facilities and to strengthen education on handwashing through the National Commission for Civic Education (NCCE). According to Kojo Abanyie et al., (2021), 75.9% of basic schools in the Wa Municipality did not have hand washing facilities which puts students at risks of infections.

The current study focused on presenting insights into the handwashing facilities in the basic schools in Ejura-Sekyeredumase Municipality located in the Ashanti region of Ghana and in the locus of the second Covid-19 hotspot regions. The absence of adequate handwashing facilities in the basic schools puts the students at great health risks. There is limited research that illuminates the availability of handwashing facilities in basic schools since the Covid-19 pandemic in Ghana (Mensah et al., 2022). The tactful evaluation presenting insights into handwashing facilities, patronage, and knowledge in Ejura-Sekyeredumase has yet to be covered. The purpose of this study was to examine the availability of handwashing facilities, knowledge, and patronage among the students in the critical region of Covid-19 outbreak in Ghana. This work provides a strong source of document for government decision makers and other stakeholders responsible for

providing hand washing facilities, monitoring, and supervising basic schools.

2. Materials and methods

The current research work was conducted in the Ejura Municipality of the Ashanti region of Ghana. The Ejura Municipality can be found from the coordinates 1°5" W and 1°39" W longitudes and 7°9" N and 7°36" N latitudes (Ghana Statistical Service, 2021). It has a large land area of about 1327 square kilometers and constitutes about 7.3 percent of the region's total land area. Ejura- Municipality has a population of 137,672. Out of this, the population below the age of 15 years is 35,131 representing 41.1% of the total population of the Municipality compared with the regional average of 37.7% (Ghana Statistical Service, 2010). The old adolescent (15-19 years) and young adults (20-24 years) in the Municipality are 9,638 and 8,046 respectively. These groups account for 20.7% of the total population. The situation whereby 20.7% of the population is between the ages of 15-24 years has a great potential for socio-economic development. There is a trend of decline in education of females as against males as they press the education ladder (Ghana Statistical Service, 2010). Females tend to face a number of challenges in schools some of which could be hygiene and sanitation compelling issues (Ghana Statistical Service, 2010).

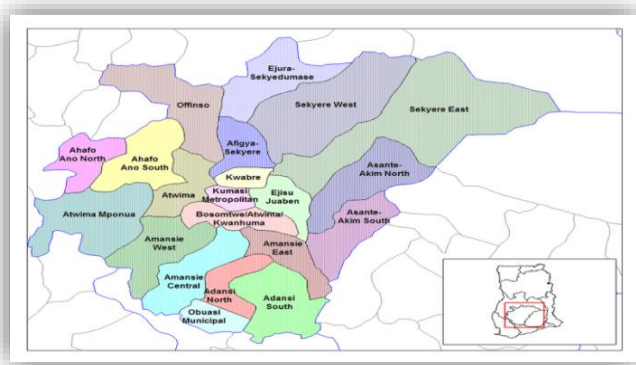


Figure 1: The figure represents the regional map of Ashanti region with the highlighted box showing the district of the study area and the arrow pointing towards the study location.

Study design, sampling protocols and analysis

This was a descriptive cross-sectional school-based study of selected basic schools in Ejura-Sekyedumasi Municipality. The study spanned five months (November 2019 to March 2020). From pre Covid 19 to time (month) Ghana recorded cases of covid 19. The total participants were purposively chosen to suit the subject matter and appropriateness. The population of the selected schools was 10,747. From this population, students aged between 4 years to 19 years from 30 randomly selected basic

schools (25 publics and 5 private schools) were picked. Two categories of respondents were sampled by Stratified method (Staff and students). A total of 570 students were randomly selected from the 30 schools and in each school a teacher was selected, administered a questionnaire, and interviewed (30 teachers in all). Ethical approval was sought from the Ejura-Sekyedumasi Education Directorate, the University of Education, Winneba, and School Management Committee (SMC) of all the basic schools.

Since the population size was known (10,747), the Yamane formula for sample size determination was employed. This is shown below.

$$n = \frac{N}{(1 + Ne^2)}$$

Where, n= corrected sample size, N = population size, and e = Margin of error (MoE), e = 0.05 assumed based on this research conditions.

$$n = \frac{10747}{(1+10747(0.05^2))} = 385.6 \sim 386$$

However, due to the distribution of the schools and disparities in the population (unequal number of students in each school), a much larger number of 600 respondents was used to represent more valid and collective views from the 30 selected schools within Ejura-Sekyedumase. The systematic sampling steps are summarized in Figure 2.

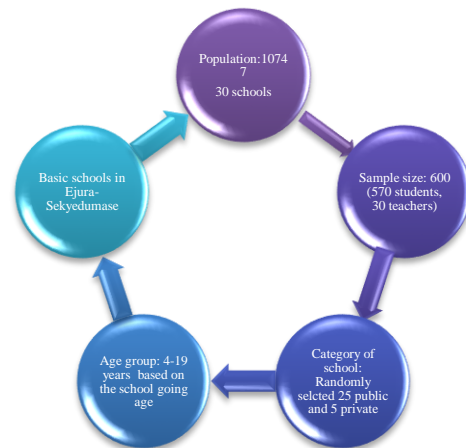


Figure 2: Cyclical summary of systematic steps for the study design and data collection

Data collection tools and procedures

A questionnaire, interview checklist and observations were used to collect data from the students, and teachers on hand washing facilities in the selected schools. Each questionnaire consisted of 15 items addressing key hand washing facilities and practices issues ranging from availability, patronage, knowledge, water sources and quality, handwashing materials and others. In each school, 19 students were selected randomly, and a teacher was purposively chosen making 20 respondents from each

school. The questionnaire was pretested for ambiguity, complexity, errors, and understanding in a simulated basic school environment for validity. Orientation was given to all respondents regarding how to fill out the questionnaire. Self-administered questionnaire was used for each respondent and was asked to fill the questionnaire individually without consulting his or her friend. The questions on the questionnaire lists were interpreted in their local language (Twi). Observations were made on hand washing facilities, state and patronage in each school using a checklist with defined markers.

Data Analysis

Data obtained from students and staff were cleaned, coded, tested, and compared for their effective relationships using the Statistical Package for Social Sciences (SPSS Version 20) to analyze data by means of Partial and Spearman's Correlation for 2-tailed test. Means (\bar{x}), percentages (%), and standard deviations (SD) were calculated, and the Pearson Chi-Square test deployed to show the effect size and the strength of relationship between variables. P-values were analyzed at $p < 0.05$ for significance difference.

3. Results and discussion

3.1. Handwashing facilities in basic schools in Ejura-Sekyeredumase

The Table 1 represents feedback from 30 interviewed teachers at the selected basic schools on the availability of handwashing facilities. Items 1 and 5 with mean 1.0 typify response that there was handwashing facility in the schools, and it was closer to the classroom. Mean of 1.43 and 3.33 with $SD=1.24$ and 0.5 respectively corresponds to the type of hand washing facility and the number available. The predominant available facility was bucket with water (Table 1). This promotes communal handwashing which is proven to be unhygienic (Appiah-Brempong et al., 2018) and could be a source of infection transmission including Covid-19 on its own. The maximum number of handwashing facilities in a school was 3 and minimum was 2. This finding aligns with Appiah-Brempong et al., (2018) who found that hand washing facilities in some selected schools in Ghana were inadequate for use. However, a mean of 2.0 showed that the handwashing facilities in the schools were not enough for teachers and students to use for effective handwashing which directly sadly matches the release by WHO that about 43% of schools worldwide lack access to basic hand washing facilities (WHO, 2020).

3.2. Hand washing materials at identified facilities

Lopez-quintero et al., (2009) concluded that many developing countries reported of a lack of water and soap in their schools. However, Afroza (2007) stated that water, soap, and hand washing facilities were found in most

schools. On the other hand, Anyarayer et al., (2019) deducted in their study that many developing countries conveyed a lack of water and soap in their schools. In this current study, soap and detergents were reported mostly to always be at the hand washing facility (1.20) and this can influence the practice of hand washing (UNICEF, 2006). Most students also claimed water flowed always (1.27) with few reporting intermittent water availability (26.7%, $SD=0.45$). Items 3,4,5 and 6 represents rating of the hand washing facility in the schools by the students from excellent to adequate. Majority rated the safety of the facility as excellent representing 53%. Availability of resources such as soap, water, paper tissues, dustbins and cleanliness were reported by many students as good (66.7%). According to Oppong et al., (2019) many schools in Ghana either have inadequate or lacks clear cut materials for hand washing. Students and teachers used the facility seldomly (Table 2). There was a statistically significance difference ($p < 0.05$) between the availability of water, soap, cleanliness, and patronage of the facility.

3.3. Knowledge and patronage of handwashing

Of a valid case of 570 students, using the frequency and percentage, males were more likely to wash their hands with soap than were females (39.8% to 37%). This contrasts with Teumta et al., (2019), Mariwa et al., (2012), and Albastawy (2017) findings that a significantly higher proportion of females washed their hands ≥ 6 times a day when compared with the males. Our study corroborates to findings of other studies which reported significant differences in practice of hand washing between males and females (Sultana, 2016). Cruz and Bashtawi (2016) reported similar to our current study that males washed hands more often than females. Although one's ability to wash hands with soap after visiting the toilet was independent of gender and statistically insignificant, $X^2(2, N=570) = 1.334, P=0.513$. This was further supported by the infinitesimal effect size as demonstrated by the phi Cramer's V (Table 3). Generally, more students (76.8%) washed their hands with soap and water after visiting the toilet corroborating with findings by Albashtawy (2017) that majority of the students (97.5%) washed their hands with water, and nearly 70% of them used soap after using the toilet in basic schools in Jordan. Nevertheless, a study by Teumta et al., (2019) found low prevalence (10.7%) of hand washing with soap and water. Our study showed knowledge about hand washing influenced the practice of it among the students (Mfuh et al., 2019). Tables 3, 4 and Figure 3 shows how the students have been educated about the practice of handwashing, but the practice was hindered by inadequate facilities.

The critical moments of handwashing were acknowledged by the students. More students recognized that washing of hands after visiting the toilet was critical followed by equal proportion of responses for after cleaning, before and after picking rubbish representing 30.88% and 17.02% respectively (Figure 3). The distribution showed a fair expression of knowledge on

critical periods of handwashing among the students in the schools. Many research works have stated the need to wash hands during critical times such as visiting the toilet, before eating, and after sweeping to critically improve health and wellbeing (United Nations Children's Fund, 2013; United Nations Children's Fund, 2018). This implies students who realized the need to wash their hands at the pointed critical moments of handwashing might be improving their health and safeguarding against Covid-19.

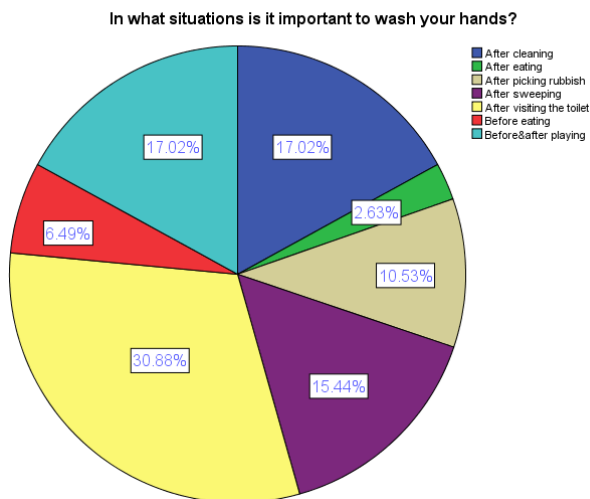


Figure 3: Expressed critical moments for hand washing among the students

3.4. Parents level of education and influence on hand washing

Parents are the primary source of knowledge to their children and their level of education influenced students' ability to know germs (Appendix A, Table 1). This is congruent with many studies that found a positive relationship between students' parents' level of education and the practice of hand washing among the students (Luby, 2005; Dongre et al., 2006; Ocaktan et al., 2010; Moussa et al., 2015). However, the effect size was relatively small (Cramer's $V = 0.15$). There was a positive correlation between the education of students' parent and their perception of germs (Table 4, Appendix A, Table 1) making the alternate hypothesis true ($p < 0.05$). This means that educated parents tend to understand hand washing and germs so educate their children on the importance of hand washing. This corroborates with reports by Ray et al., (2009) that parents teach their children about handwashing and germs when they are young. Students who knew of germs seemed motivated to wash their hands more often. Thus, there was a significant difference between students who knew about germs and the number of times they practiced hand washing, $X^2(4, N=546) = 13.26, P=0.010$. Most (298) of these students washed their hands twice daily followed by thrice daily (166) (Table 4). This practice was inadequate compared with a study in Turkey where majority (72.6%) of the study participants washed their hands more than 6 times a day (Ergin et al., 2011).

It was evident that students realized the effects of eating with unwashed hands representing 99.47% (Figure 4). These students were more likely to wash hands before meals (Ray et al., 2006; Jeong et al., 2007; Aunger et al., 2009; Ray et al., 2009). Rarely astonishing responses were recorded where some students expressed that they will not be satisfied when they eat with washed hands (0.35%) and bitter taste of food when their hands are not washed (0.18%). These responses could come from the sampled group within the preparatory and lower primary schools showing deficiency in their understanding of the linkage between handwashing and diseases reduction especially Covid-19.

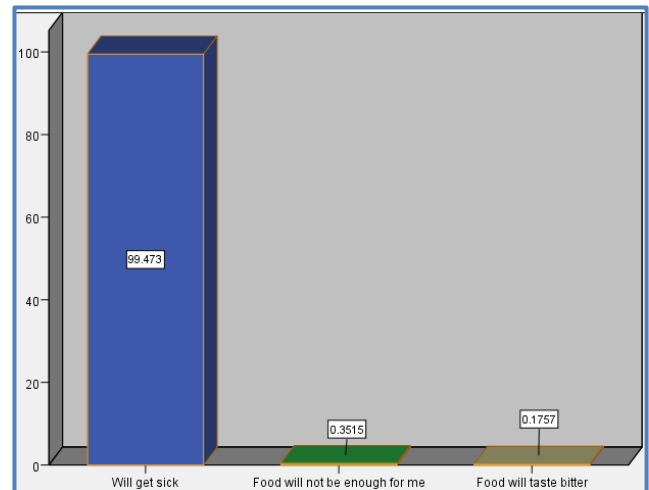


Figure 4: Knowledge on repercussions of food consumption with dirty hands

It is worthwhile noting that there were impediments to the practice of hand washing among the students and teachers. The absence of soap and water sometimes hindered hand washing practice the most (42.13%). Some students simply forgot to wash their hands (37.1%) and a few students were always in a hurry to eat at the expense of hand washing (18.1%) (Figure 5). The reasons identified in this study as the impediments to hand washing by the students are similar to other studies identifying reasons such as lack of soap, laziness, and lack of awareness of the relevance and need for hand washing could explain the disparities in the practice of hand washing (Muiru et al., 2018; Suen et al., 2019; Mariwa et al., 2012). There was a significant difference ($p < 0.05$) between handwashing and absenteeism from school. The practice of hand washing minimized students' absenteeism from school (Appendix A, Tables 2 and 3). This is explained by the fact that frequent effective hand washing prevents hosts of infections among the students, and they will be healthy to attend school as opposed to falling sick and absenting from school.

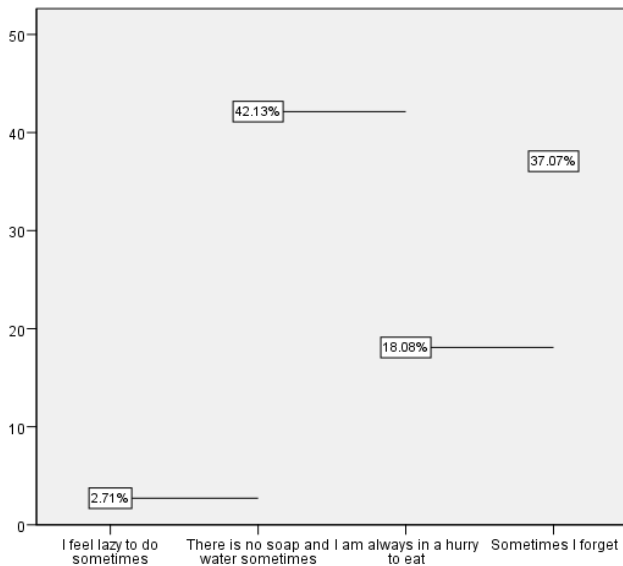


Figure 5: Hindrances to hand washing

Table 1: Response to availability of handwashing facilities in the Schools (n=30) (Y=Yes, N=No, BWW=Bowl with water, VB=Veronica bucket)

	Y	N	BWW	VB	std(X)	\bar{x}
1. Do you have handwashing facility?	30 (30)				-	1.0
2. Type of handwashing facility			17 (30)	13 (30)	0.50	1.43
3. Number of handwashing facility available	3(10), 2(7) (30)				1.24	3.33
4. Is the handwashing facilities available enough?		30 (30)			-	2.0
5. Is the facility closer to classroom?	30 (30)				-	1.0

Table 2: Response to availability of soap and water at the hand washing facilities in the schools (n=30) (A=Always, S=Sometimes, YNA=Yes but not always, E=Excellent, G=Good, A=Adequate)

	A	S	YNA	E	G	A	std(X)	\bar{X}	P-Value
1. Availability of soap and detergents at vantage points for handwashing	24(80%)	6(20%)					0.41	1.20	
2. Availability of water at handwashing points	22(73.3%)	8(26.7%)					0.45	1.27	0.00
3. Safety of facility				16(53%)	12(40%)	2(6.7%)	0.63	1.53	
4. Cleanliness of facility				6(20%)	20(66.7%)	4(13.3%)	0.58	1.93	

5. Resource availability	5(16.7%)	20(66.7%)	5(16.7%)	0.58	2.0
6. Accessibility	3(10%)	21(70%)	6(20%)	0.55	2.10
7. Use of facility	30(100%)				

Table 3: Cross tabulation of Gender and hand washing after toilet.

Gender			Do you always wash your hands with soap after visiting the toilet?			Total	X ²	Phi Cramer's V	df	p-value
			Yes	No	Sometimes					
Male	Count	Count	111	8	160	279	1.334 ^a			
		Expected	107.1	10.3	161.6	279.0				
		% within Gender	39.8%	2.9%	57.3%	100.0%				
	Female	Count	107	13	169	289				
		Expected	110.9	10.7	167.4	289.0				
		% within Gender	37.0%	4.5%	58.5%	100.0%				
Total	Count	218	21	329	568		.048	2	.513	
	Expected	218.0	21.0	329.0	568.0					
	Count									
	% within Gender	38.4%	3.7%	57.9%	100.0%					

Table 4: Knowledge of germs and regularity of hand washing

Knowledge of germs		Number of times hands are washed during school hours					Total	p-value	df	X ²	Phi Cramer's V
		One	Two	Three	Four	Five					
Yes	Count	31	298	166	24	27	546	0.010	4	13.265 ^a	.155
	Expected	30.7	297.7	164.2	24.7	28.7	546				

4. Conclusion

Hand washing is provenly accepted as a preventive measure against infectious and communicable diseases. Our study was carried out from pre covid 19 (November) and at the onset of Covid-19 (March) in Ghana. It involved randomly selecting 30 basic schools. The 30 basic schools comprised twenty-five public schools and five private schools. We considered the availability of hand washing facilities in the schools, knowledge on proper hand washing, patronage of the facilities, and parents' educational level on student's hand washing habits. We discovered the presence of handwashing facilities in the schools but were insufficient to serve the students and staff. The available handwashing facilities

had materials/resources reported by most students to be good with more than 50% rating the hand washing facilities as excellent. Students were knowledgeable about hand washing and majority washed hands during critical moments of hand washing. It was found that self-awareness and knowledge about handwashing motivated its practice. Parents' educational level correlated positively with students' handwashing behaviour which meant that students of educated parents had better understanding of handwashing. However, a few challenges found to impede handwashing in the schools were irregular supply of soap, water, and forgetfulness.

In lieu of this, it is suggested for further intensification of proper hand washing practices by the Municipal health directorate in collaboration with school health coordinators and National Commission for Civic Education (NCCE). The government through the ministry of education should ensure all-year round provision of

hand washing facilities and materials. The basic school heads could organize internally generated funds to maintain and sustain the functioning of these facilities. School health education clubs should be formed from kindergarten to junior high schools and students should be taught proper hand washing through drama and poet to instill the habit of hand washing in them. Teachers and school prefects (leaders) should act as supervisors to promote hand washing in the basic schools.

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