

Effectiveness of Hand Washing Among Basic School Children in Sunyani Township. (A Case Study at Lawrence Demonstration School)

Austin D. Amoako, Stanley Doe

Abstract

Most childhood illnesses, diseases and deaths are caused by the use of unsafe water for drinking and hand washing. The purpose of this study was to determine the effectiveness of hand washing in reducing absenteeism secondary to infectious illness. One-hundred and forty-two elementary school children were randomized by classroom into control and study group. With a crossover design, all children participated in both groups, with a three-month washout period. Fifty-nine (59) children representing 83.1% were absent due to illness while in the control group. Thirteen (13) children representing 18.3% were absent but not because of infectious diseases but due to malaria and social reasons while in the study group. Non-hand washing as an adjunct to regular hand washing with soap and warm water was shown to be effective in reducing absenteeism due to infectious illness by 43%. Therefore, in order to reduce absenteeism because of infectious diseases among basic school children, it was recommended as other studies also indicate that the observed rates of hand washing with soap at critical moments range from zero to 34% (GHWD 1, 2008; Scott *et al.*, 2003).

Index Terms— School children, Hand washing, Infectious diseases, Diarrheal diseases, Gastrointestinal Diseases, Absentism, Water supply, Hand washing facilities, Hand hygiene, Illness.

1 INTRODUCTION

The state of the world's children is the best measure of human well-being and the health of children are the measure of the health of every country including Ghana. According to the Centres for Diseases Control (CDC) 10-11-2010 in America, 160 million school days are lost each year due to infectious illness (Vital Health and Statistics, 2000). The uncontrolled spread of infection has historically been a problem in young school-age children, kindergarten through 3rd grade.

Although regular hand washing has been widely recognised as the most effective means to combat the spread of infectious illness, hand washing among school-age children is inconsistent at best. (Lopez, Hand Washing Among School Children in Bogota, Colombia, 2008)

Elementary school –age children are particularly vulnerable to infections. While hand washing is the best method of preventing infections, many elementary schools are housed in buildings that have barriers to effective hand hygiene. Most childhood illnesses, diseases and deaths are caused by the use of unsafe water for drinking and hand washing. Improving water supply and hygienic benefits are the health of the school child in the sense that, it directly reduces diseases and indirectly improves the child's prospects in his educational endeavour. (Lopez, 2008)

When kids come into contact with germs, they can unknowingly become infected simply by touching their eyes, nose, or mouth. Moreover, once they are infected, it is usually just a matter of time

before the whole family comes down with the same illness. (Paediatricians at Kids Health.Org, Thursday 17th November 2011.

In Ghana, the National Community on Water and Sanitation Programme has among its mandate to increase the number of school children, aged 6-15 years, who wash their hands with soap, especially after using the toilet (GPPPHW Ghana, 2005). In addition, the School Health and Education Programme (SHEP) in Ghana is to provide comprehensive health education and services, as well as ensure availability and use of water and sanitation facilities in schools to facilitate the practice of hand washing. It must be mentioned, however, that adequate and well functioning school sanitation and hand washing facilities play a major role in ensuring good hand washing practices (Tay, 2005). Although interventions such as the SHEP exist in schools, studies have not been conducted to assess and document the impact of these interventions on school children's knowledge, attitudes and practices.

In order to achieve true sustainable development, countries all over the world must create a world that is fit for children to live in and that means a world with safe and adequate water for drinking and hand washing as well as adequate sanitation. Remarkable improvements have been made in the past century in the fight against communicable diseases, yet a significant amount of mortality and morbidity world- wide can still be attributed to these conditions. Respiratory diseases and diarrhoea are the two leading causes of diseases burden globally and is responsible half of all child deaths each year.

2 Background to the Study

There is the great need to cultivate the habit of hand washing after using the toilet, after washing or changing a baby, before eating and on any other occasion when there is a reasonable likelihood that we could pass harmful germs on to others.

It is obvious to say that, people rather wash their hands with soap after eating with the purpose of avoiding the aroma of the food they have eaten which is one of the acts that are practiced from the ancient time to the modern period due to ignorance.



Hand washing with soap

Figure 1: Hand washing with soap

2.1 Significance of the study

The research is solely meant to know the effectiveness of regular hand washing with soap and warm water in reducing absenteeism among school children. Also, this study when completed will provide suggestions as to how hand washing can be improved among the basic school children to reduce absenteeism from school due to infectious disease illness.

3. _____

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4. METHODOLOGY

4.1 Study Population

The study population constituted 142 school children from Lawrence Demonstration School Complex in Sunyani Township, comprising both females and males between the age range of 7 and 15 years.

This suggests that the population was drawn from upper primary and Junior High Schools in Lawrence Demonstration School Complex in Sunyani Township.

4.2 Sample Size

A sample size of one hundred and forty two (142) basic schoolchildren from class four (4) to Junior High School (JHS) two (2) were selected for the study. A crossover design was used. In the crossover design, each classroom was randomized to begin as the experimental group (non-handwashing) comprises 71 students with 30 males and 41 females or the control group (regular handwashing) comprises 41 females and 30 males.

A structured register was given to the housemistress of the school and school prefect to be used by both the controlled and experimental group respectively. These imply students were supposed to sign anytime they came to school. The knowledge behind the register was to figure out absenteeism as the result of illness relating to diarrhoea or any other disease. Contact numbers of all parents and guardians were taken with the reason to contact them to know the reason why a particular student was absent. Those that were absent due to infectious illness were recorded as absent and those with any other reason like malaria or any social reason were ignored.

During the first two weeks of the study, reminders were given to the children. After the first two weeks of participation, reinforcement information was announced on Mondays only. Following school

vacations of greater than two consecutive days, the school nurse reviewed the hand-washing protocol in each classroom. It was the responsibility of classroom teachers to encourage the practice of the hand washing with warm water and soap precisely sunlight soap and to reinforce the protocol. The study group received two visits from a nurse from the Regional Hospital – Sunyani for reinforcement education during the study.

Four hand washing basins(veronica buckets) were provided for the school including one napkin each and 140 sunlight liquid detergent were given to the students for efficient and effective hand washing. Above all, each student was motivated with one big pen. Students were also educated to wash their individual napkins every evening and air-dry it before the next day.

5. RESULTS AND DISCUSSION

One hundred and forty-two (142) students participated in both groups of the study, 82 girls and 60 boys. In the control group was total number of 71 students, 30 males and 41 female with ages ranging from 7 to 15years where age 11-formed majority with 13 students followed by age 10 with 10 students and age 7 and 15 forming the minority with 4 students each.

On the other hand is the study group with 71 students comprising 41 females and 30 males with ages ranging from 7 to 15years where age 11 form the majority and age 15 forming the minority. The students were randomly selected from three classrooms in upper primary namely classes 4, 5 and 6 including JHS 1 & 2. JHS 3 students did not participate because of studies for their final exams.

Interestingly, the above figures show clearly that, there are similarities in the two groups in terms of age and gender but with a vast difference in terms of school absenteeism.

The number of absences and the absence incidence were evaluated in

total and by illness. 58 children did not record any absenteeism due to illness in the study group, while only 13 children recorded absenteeism, which was not due to illness but for other social reasons. This statistics best explains the effectiveness of hand washing with soap because Table 5 shows that, 59 school children absented from school once or more than once as a result of infectious illness in the control group against 13 absenteeism in the study group as a result of any other disease like malaria or social reasons other than infectious illness. Using McNemar’s test for dichotomous variables with paired subjects, significantly fewer children became ill while practicing regular hand washing (chi square = 0.2668; $p = .00875$). The odds of being absent due to infectious illness were reduced by 37.32% with the adjunct hand washing practice. Fewer children representing 18.1% were absent in the control group as compared to the study group which recorded 83.1% absenteeism (Table 4).

Of the total number of children in the study, 70 pupils were reported to be in school throughout the study without any absenteeism as the result of illness representing 49.3%.

On the contrary, 72 pupils were reportedly absent at least one day or more due to respiratory or gastrointestinal symptoms representing 50.7%, for 201 school days lost during the 110 days of the study, absent only once was recorded to be 19 representing 13.38% and 53 absenteeism was recorded as absent more than once representing 37.32%. (Table 4 and Figure 4). The above implies that, general absenteeism was 50.7% with 201 school days lost. As noted in Table 1, the percentage of students who were absent due to infectious illness by class level ranged from 71% in the upper primary to 29.8% in the JHS 1&2. This means that absenteeism among the primary students or in other word younger ones was higher as compared to JHS students.

Below are the outcomes of the results in tabular form.

Table 1: Frequency distribution of ages.

Ages	Frequency	Percentage	Cumulative
7	7	4.93	4.93
8	13	9.15	14.08
9	15	10.56	24.65
10	20	14.08	38.73
11	25	17.61	56.34
12	17	11.97	68.31
13	18	12.68	80.99
14	19	13.38	94.73
15	8	5.63	100
	142		

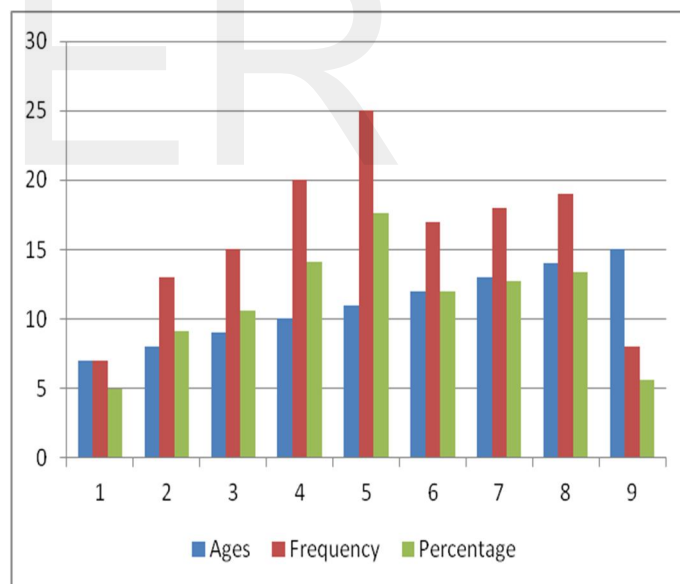


Figure 3: Graph indicating ages, frequency and percentage of participants in the study

As noted in Table 1, the percentage of students who were absent due to infectious illness by class level ranged from 71% in the upper primary to 29.8% in the JHS 1&2. This means that absenteeism among the younger age was high as compared to the age, which

represents JHS 1&2

Table 2: Frequency distribution of sex.

Sex	Frequency	Percent	Cum
Female	82	57.75	57.75
Male	60	42.25	100
	142	100	

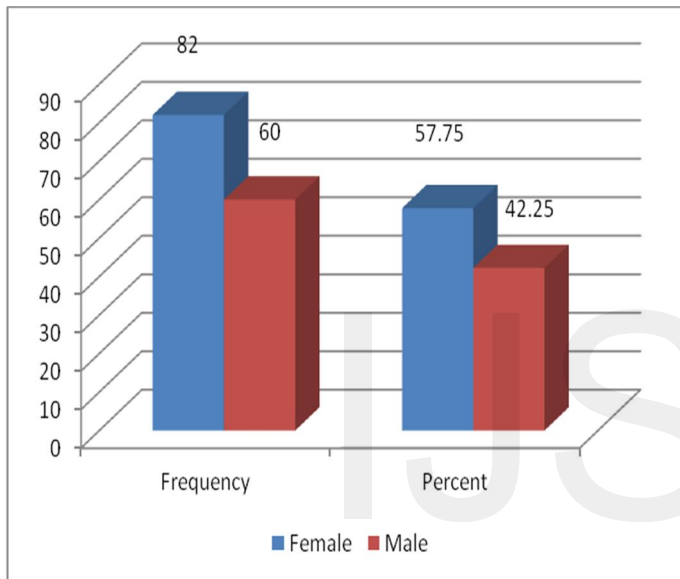


Figure 4: Graph representing frequency and percentage of participants by gender.

The table above displays the frequency of gender in the study. In general, One hundred and forty-two (142) students participated in the study. Eighty-two (82) males representing 57.75% formed the majority whiles sixty (60) male children representing 42.25% also form the minority in the study.

Table 3: Frequency and percentage distribution of study groups.

Group	Frequency	Percent	Cum
Control	71	50	50
Study	71	50	100
	142	100	

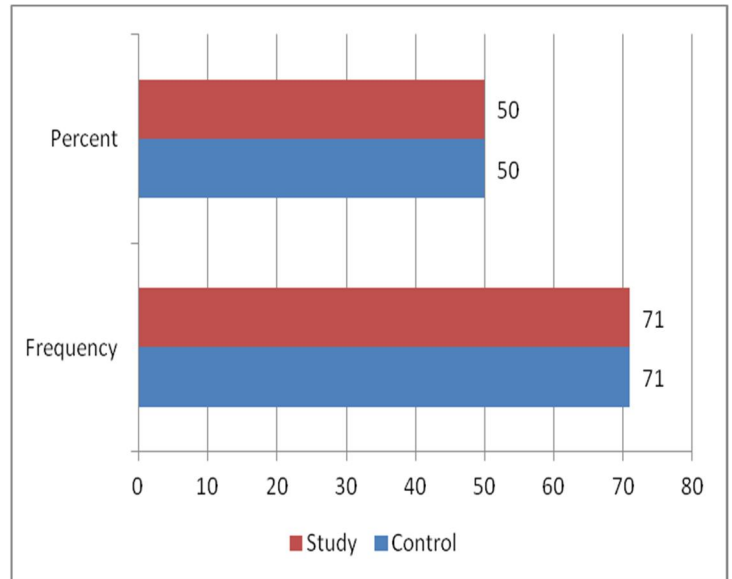


Figure 5: Graph representing percentage and frequency of participants in the study

From the table above, the two study groups namely study and control have the same number of seventy-one (71) students each registered for the study which represents 50% each.

Table 4: Frequency and percentage distribution by absenteeism.

No Absent=0, 1=abst once, 2=abst more than once	Frequency	Percent	Cum
No Absent	70	49.3	49.3
Absent once	19	13.38	62.68
Absent more than once	53	37.32	100
Total	142	100	

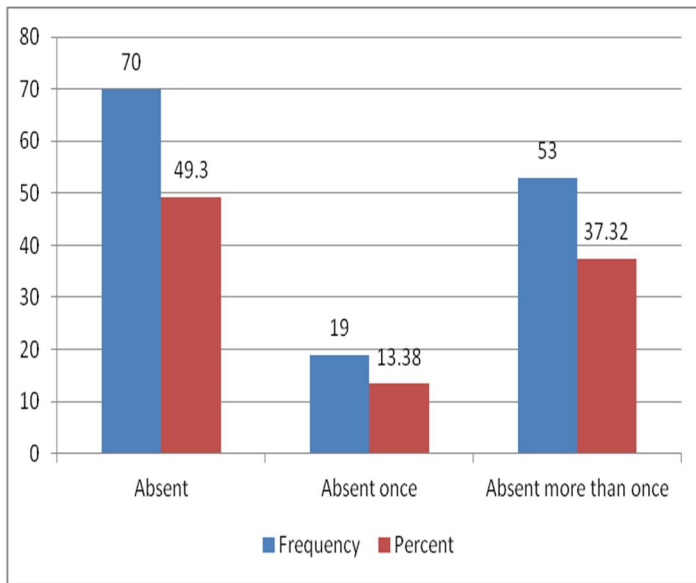


Figure 6: Graph showing classification of absenteeism as: No absent, absent once and Absent more than once.

From the table above, one hundred and forty-two (142) students participated in both study groups. Absenteeism was categorized into three groups namely: No Absenteeism, Absent once and Absent more than once.

Of the total number of children in the study, 70 pupils were reported to be in school throughout the study without any absenteeism as the result of illness representing 49.3%. Absent only once was recorded to be 19 representing 13.38% and 53 absenteeism was recorded as absent more than once representing 37.32% thus two days or more due to respiratory or gastrointestinal symptoms, for a total of 804 school days during the 93 days of the study. As noted in Table 1, the percentage of students who were absent due to infectious illness by class level ranged from 71% in the upper primary to 29.8% in the JHS 1&2.

Table 5: Cross tabulation of groups to school attendance.

Group	Absent			Total
	No Absent	once	Absent >1	
Control	12	9	50	71
Study	58	10	3	71

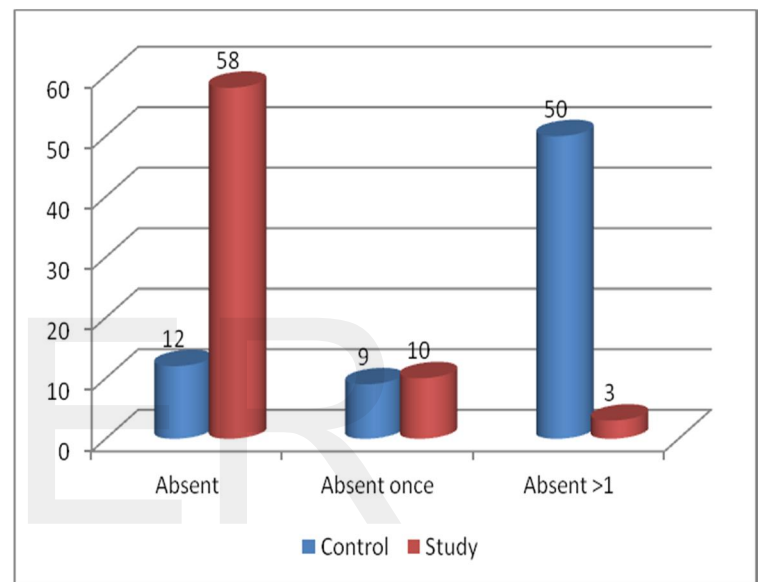


Figure 7: Graph showing absenteeism by group.

The number of absences and the absence incidence were evaluated in total and by illness. 58 children were never absent due to illness in the study group, while only 12 children as compared to the control group were not absent due to illness. This statistics best explains the effectiveness of hand washing with soap because, 59 school children absented from school once as a result of illness in the study group against 13 absenteeism in the control group as a result of illness. Using McNemar’s test for dichotomous variables with paired subjects, significantly fewer children became ill while practicing regular hand washing (chi square = 0.2668; $p = .00875$). The odds of being absent due to infectious illness were reduced by 37.32% with

the adjunct hand washing practice. Fewer children were absent in total in the study group (Table 4)

Table 6: Represents absenteeism by age as the result of infectious diseases.

Age	Absent.			Total
	No Absent	Once	Abst.>Once	
7	2	2	3	7
8	7	1	5	13
9	6	3	6	15
10	9	5	6	20
11	10	2	13	25
12	12	1	4	17
13	9	0	9	18
14	10	4	5	19
15	5	1	2	8
Total	70	19	53	142

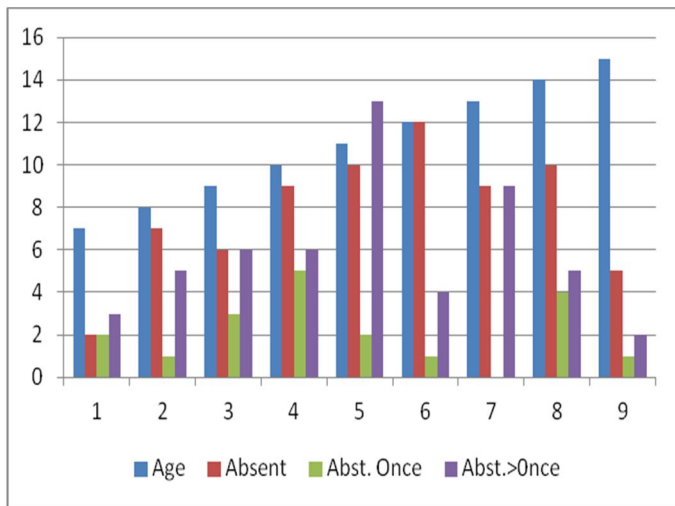


Figure 8: Graph showing absenteeism by age.

As shown in the graph above, absenteeism when participating in the control group became consistent in all age group among the children (Table 6). Except for age 15 students, gastrointestinal illnesses were reported less frequently when practicing regular hand washing. The

reporting of absenteeism due to illnesses was less consistent in age 15 as an adjunct to irregular hand washing, but again, was notably lower in age 7. Once a child became ill, there was not a statistically significant difference in the mean number of days a child was absent in the study group as compared to the control group.

Table 7: Displays absenteeism by class.

ID	Frequency	Percentage
Class 4	30	21.13
Class 5	42	28.94
Class 6	30	21.13
JHS 1	27	19.01
JHS 2	13	9.15
Total	142	100

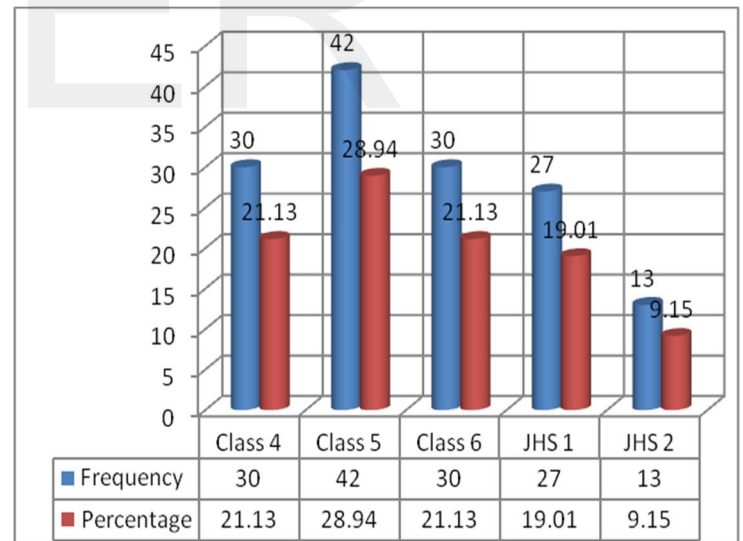


Figure 9: Graph showing absenteeism by class.

The pattern of absenteeism among all classes became more consistent in the school children. Particularly for class 5 who recorded 42 students representing 28.94%, absenteeism was reported more frequent in other classes as well but not as high as class 5 except JHS 2 students who reported 13 absenteeism

representing 9.15% as the result of illness .

Also, it is obvious that absenteeism among the upper primary pupils (classes 4,5 and 6) was very alarming thus 102 as compared to 40 in the JHS 1 and 2 representing 71.2% and 29.8% respectively. The reporting of respiratory illnesses was less consistent as an adjunct to regular hand washing (Table 7).

Table 8: chi square interpretations.

Group	Absent	Expected	Observed	Expected	Observed	Expected	Total
Study	12	35	9	10	50	27	71
Control	58	35	10	10	3	27	71
	70		19		53	0	142

For the *chi square* interpretation, we reject the null hypothesis since the *p value* is greater than the critical value at a significance of 95%. From the frequency table listed above, it can be observed that if school attendance really predicts a student’s hand washing practice. It can be deduced that the students for this study in the study sgroup fairly practice hand washing since it is just half of them representing 49.3% that attend school implying their practice of hand washing. The remaining percentage that is unevenly distributed between students who absented once and more than once from school thus 13.38% and 53.32% respectively. It is however, though insignificant but alarming that 37.32% of students did not attend school regularly indicating that they were at a higher risk of diseases since they did

not practice hand washing. That can also be a contributing factor of their inability to attend school, which could increase their chance of disease avoidance since they would practice hand washing.

Chi square test

H₀: Hand washing is influenced by sex

H_a: Hand washing is not influenced by sex

Table 9: Evaluation on how hand washing is practiced among basic school children.

School attendance	Female	Male	Total
Absent	40	30	70
Absent once	12	7	19
Absent more than once	30	23	53
Total	82	60	142

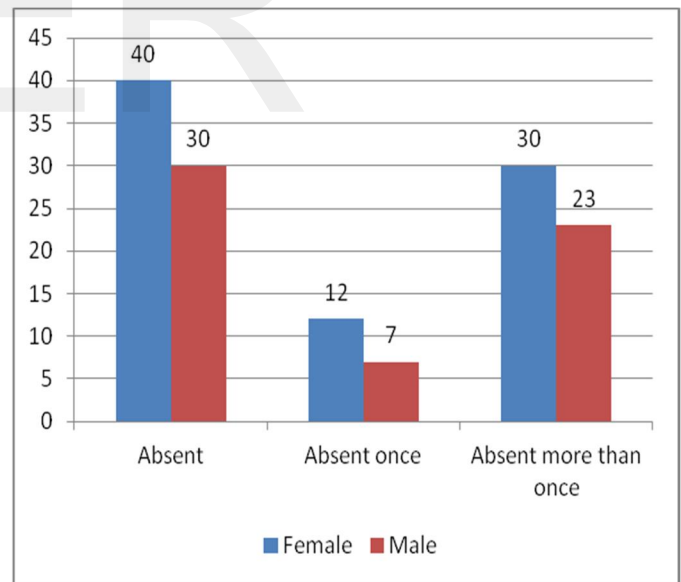


Figure 10: Graph showing absenteeism by gender.

From the *chi square* results listed above given at a significance level of 5%. The null hypothesis is acceptable since the *p value* is 0.2668. Hence, it can be said that the sex of a student determines their attendance to school hence having a higher probability of practicing

hand washing. It can also be explained according to **Table 9** above that absenteeism was evenly distributed among the participants by gender. On the contrary, some studies have alluded to the fact that hand hygiene can vary by gender. In a study conducted by Guinan, McGuckin-Guinan, and Severeid (2000), the researchers reported that middle-school boys wash their hands less frequently, use less soap, and spend less time washing their hands than middle-school girls.

Although gender differences were not a primary variable of interest in the study, higher levels of absenteeism secondary to infectious illness among boys was not reported.

Table 10: Measures of central tendencies.

Variable	Observation		Std.		
	s	Mean	Dev.	Min	Max
ID	0	0	0	0	0
Group	0	0	0	0	0
Age	142	11.18	2.22	7	15
Sex	0	0	0	0	0
Absenteeis					
m	142	0.88	0.93	0	2

6. DISCUSSION OF RESULTS

The discussions are based on the data analysis, which were taken into consideration, the specific findings that were gathered during the research upon which conclusions were drawn.

The term "hand washing facility", as defined by Heenan, is "a facility, providing a basin, container, or outlet with an adequate supply of portable running water, soap and single-use towels (Heenan, 1992).

School attendance is an integral part of the learning process. (Rodriguez, 2002). Disruption in learning as the

direct result of lost school days due to the spread of infectious illness among school children can have a negative impact on learning (Table 7 and figure 7) "Healthy Hands" was supported as a valid model for reducing absenteeism related to infectious illness in my study. Significantly, fewer children in the study group representing 13 (18.31%) pupils contracted a respiratory or gastrointestinal illness than children in the control group representing 59 (83.1%) pupils. The decreased absenteeism for those children practising the hand washing as an adjunct to irregular hand washing. (Dyer et al., 2000; White, Shinder, Shinder, & Dyer, 2000). In the study group was a drastically decrease in absenteeism due to infectious illness when practising regular hand washing as compared to irregular hand washing (control group).

Studies in developing countries consistent with my present study have shown that students can perfectly wash neither their hands to increase school attendance if proper attention is paid to them by teachers. Lopez-Quintero also asserted that several developing countries consistently reported lack of soap and unavailability of water (Lopez-Quintero *et al.*, 2009). Since proper hand washing requires the use of soap and only a small amount of clean running water from a tap, or an improvised tap, but this seems not to work without students being effectively monitored by teachers and parents according to my study. However, Table 6 shows the number of diarrhea related and intestinal infection cases recorded in my study reveals that, hand washing can best prevent these cases among schoolchildren.

Again, according to my recent study, the majority of the improvised

hands washing facilities were used on a communal basis in the school at large, where the same water is used by more than one person, which does not conform to proper hand washing guidelines (Centers for Disease Control, 2007). A baseline survey conducted in schools at Yogyakarta early in 2007, indicated that although 55% of schools have hand washing facilities, only 27% of children wash hands at break time, and only 9% of the schools were found to supply soap for hand washing by children (Afroza, 2007). Furthermore, innovative marketing strategies, such as the "global public private partnership for hand washing with soap strategy," have proven valuable in reducing the economic and technical barriers that frequently jeopardize the sustainability and effectiveness of health-promotion interventions.

Not only the above but also, hand washing is not exclusively taught as a subject, but it is an aspect of Environmental and Religious Studies, Natural Science and Moral Education, which are subjects, taught at the primary levels of the Ghanaian Educational System. This defeats the whole aim of using school children as change agents for hand washing practices. School hygiene programmes have existed for a long time and hygiene and sanitation messages are often included in the formal curriculum (SHEP, 2008). According to the annual report on SHEP activities, the SHEP programme in the Tema Metropolis has over 95% coverage in the public schools, even though this is not the case for private schools.

Also general absenteeism as displayed in Table 4 and 5 confirm the argument that, regular hand washing with warm clean water and soap precisely sunlight soap reduces absenteeism at large. Table 5 shows that, 50 pupils representing 70.4% were absent more than once in the study group as compared to 3 pupils representing 4.3% in the control group. This is confirmed by a study conducted by Bartlett and Biswas, as well as, Dery, reiterated that health and hygiene education

in schools may drastically reduce children's absenteeism from school but rarely translates into children practicing hygienic behaviors since they may lack these facilities even at home (Bartlett, 1981; Biswas *et al.*, 1990; Dery, 2008). The standards clearly state that, hand washing basins with clean water and soap must be provided in each toilet block and be supervised by a member of staff to ensure proper hand washing by the school children (WFP/UNESCO, 1999). Other hand washing methods like enough hand antiseptic or alcohol must also be used to thoroughly wet or cover both hands. The front and back of both hands and between and the ends of all fingers are rubbed for approximately 30 seconds until the liquid, foam is dry. According to my present study, regular hand washing with soap and water is much more effective than any other method.

From **Table 5**, effectiveness of regular hand washing with water and soap is very obvious and for that matter reduces absenteeism drastically with the reason that, the control group recorded only 13 absenteeism as compared to study group, which recorded 59 absenteeism representing **18.31% and 83.1%** respectively. This was supported by a research by Mayo Clinic staff (October 16, 2007) that inadequate hand hygiene also contributes to food-related illness, such as salmonella and Escherichia coli infection.

7. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Summary

Elementary school –age children are particularly vulnerable to infections. While hand washing is the best method of preventing infections, many elementary schools are housed in buildings that have barriers to effective hand hygiene. Most childhood illnesses, diseases and deaths are caused by the use of unsafe water for drinking and hand washing. Improving water supply and hygienic benefits are the health of the school child in the sense that, it directly reduces diseases and indirectly improves the child's

prospects in his educational endeavour. (Lopez, 2008).

The purpose of this study was to determine the effectiveness of hand washing in reducing absenteeism secondary to infectious illness. One-hundred and forty-two (142) elementary school children were randomized by classroom into control and study group. With a crossover design, all children participated in both groups, with a three-month washout period. A 45-minute "Germ Unit" was taught to all children in the study group as they started the experimental phase and a standard unit on hand hygiene was taught as they started the control phase. Fifty-nine (59) children representing 83.1% were absent due to illness while in the study group. Thirteen (13) children representing 18.3% were absent but not because of infectious diseases but due to malaria and social reasons while in the control group. Non-hand washing as an adjunct to regular handwashing with soap and warm water was shown to be effective in reducing absenteeism due to infectious illness by 43%.

Therefore, in order to reduce absenteeism because of infectious diseases among basic school children, it was recommended as other studies also indicate that the observed rates of hand washing with soap at critical moments range from zero to 34% (GHWD 1, 2008; Scott *et al.*, 2003). The implications of all trends observed including my study is that more work needs to be done in terms of the provision of hand washing facilities both at home and in schools. Hand washing facilities should not be hidden from school children but should rather be made available to them all the time to promote good hand washing behaviors among children. Ghana Health Service with collaboration of Ghana Education Service should introduce SHEP in private schools to bridge the gap between private and public schools.

7.2 Conclusion

To reduce absenteeism among basic school children in Sunyani

Township and Ghana as a Nation and to ensure adoption of proper regular hand-washing behaviour, numerous individual and contextual barriers and their interactions demand attention. At the individual level, it is important to determine the different cues that students need to help improve their behaviours and the information that can shape positive attitudes toward proper regular hand washing behaviour.

Hand-washing promotion can be incorporated into the school curriculum, and other stakeholders (e.g., soap manufacturers) can be invited to participate in these educational activities. The paramount contextual-level barrier facing this population, however, is the scarcity of adequate facilities for hand washing in most schools. This not only prevents children from adopting proper hygienic behaviour hence absenteeism from school but also thwarts school-based educational and health-promotion efforts. Indeed, many students expressed a lack of coherence between the messages provided by teachers regarding hygiene and the daily reality of their school environments.

7.3 Recommendations

The Centres for Disease Control and Prevention recommendations for effective hand washing may be overly ambitious or unrealistic in environments such as Sunyani schools because they emphasize the importance of hand washing during all episodes of germ contamination and the utilization of paper towels for hygienic hand drying. From a practical standpoint, hand-washing compliance among schoolchildren in Sunyani may be enhanced by focusing on higher risk contamination events—such as before eating or handling food, after contact with faces, or during the influenza season—and by adopting more-effective hand-drying methods such as "spontaneous room air evaporation." Gradual introduction of stricter and more-comprehensive recommendations can be pursued once

children have habituated basic hygienic practices and an adequate context for hand-washing hygiene has been established. Exploration of pathways leading from the performance of behaviour to formation of habit (automatic responses to specific cues) is warranted but will be beyond the scope of this study.

Promotion of healthful behaviours requires the design of coherent and comprehensive school health policies supportive environments (e.g., provision of waste-disposal containers in bathrooms, improvement of occupational health and safety standards in schools), and the involvement, encouragement, and redefinition of responsibilities of students, parents, teachers, school staff, health professionals, and private and public organizations. At the broader societal level, government and other agencies responsible for the well-being of children need to be made aware that financial and technical support of simple and inexpensive interventions, such as hand washing with soap, may be effective in the achievement of the Education for All objectives, Millennium Developmental Goals.

Other studies also indicate that the observed rates of hand washing with soap at critical moments range from zero to 34% (GHWD 1, 2008; Scott *et al.*, 2003). The implications of all trends observed including my study is that more work needs to be done in terms of the provision of hand washing facilities both at home and in schools. Hand washing facilities should not be hidden from school children but should rather be made available to them all the time to promote good hand washing behaviors among children. Ghana Health Service with collaboration of Ghana Education Service should introduce SHEP in private schools to bridge the gap between private and public schools.

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