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Translating Hand Hygiene Knowledge into Practice: A Study of Basic School Children in an Urban Community in Ghana

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Abstract:
This paper generally examines the level of knowledge and practice of hand washing with soap (HWWS) among basic school pupils and the existing challenges. The study employed structured questionnaires, interviews and spot observations to obtain relevant information from 162 pupils and 20 head teachers from 20 primary schools in Ofankor, in the Ga East Municipality, Ghana. The pupils comprising of equal proportion of boys and girls were purposively selected from the lower and upper primary grades. Most pupils (87%) reported being educated on HWWS but 73% reported actually practicing HWWS after visiting the toilet. Protection from illnesses was generally mentioned (60%) as the major importance of HWWS. Apparently, pupils who claimed to be educated on HWWS are more likely to wash their hands after visiting the toilet and before eating as compared to those who have not been educated ($\chi^2 = 4.17$; $p < 0.05$). Younger pupils (lower primary) are reportedly more likely to wash their hands after visiting the toilet and before eating as compared to older pupils (upper primary) ($\chi^2 = 13.40$; $p < 0.05$). Conversely, no statistically significant association ($\chi^2 = 2.96$; $p > 0.05$) was found between gender and these two critical moments for HWWS. Although pupils have good knowledge of HWWS, hand washing stations in the schools are not only sub-standard but also inadequate and soap provision is infrequent. The best practices to ensure effective implementation of hand hygiene programme in schools are discussed in detail in the paper.

Key words*: Hand washing, Soap, Hand washing stations, Hand hygiene, school children, Ofankor-Accra*

1. Introduction

Since the adoption of the Millennium Development Goals and related targets in the year 2000, significant progress has been made towards reducing child mortality and morbidity rates. However, WHO (2013) reports that, still there remains much to be done in order achieve the global targets on protecting the health of children. Diarrhea and acute respiratory infections continue to claim millions of young lives each year (Boschi-Pinto *et al*, 2008; WHO, 2009). Statistics indicate that pneumonia and diarrhea cause the death of 2million children annually and constitute 29% of under-five mortality rate globally (WHO/UNICEF, 2013). These diseases are avertable and do not require sophisticated technologies to do so. Among the preventive strategies to address this phenomenon, handwashing with soap (HWWS) has been shown to be very crucial. Available literature indicates that HWWS reduces diarrhea morbidity by 44% (Ladegaard, 1999; Black *et al*, 1981 and Kotch *et al*, 1994) and respiratory infections by 23% (Niffenegger, 1997; Carabin *et al*, 1999 and Robberts *et al*, 2000; Guinan *et al*., 2002; Vivas *et al*., 2010). Among school children, HWWS has been shown by various studies (Bowen *et al*., 2007, Hammond *et al*, 2000; Neuzil *et al*., 2002; Lau *et al*., 2012) to reduce absenteeism from school due to illness.

Hand washing with soap involves vigorous rubbing together of lathered fingers, fingertips, areas between the fingers, hands and arms for at least 10 to 15 seconds (US Public Health Service, 2009). This is followed by thorough rinsing under clean, running warm water and immediate drying of cleaned hands using individual disposable towels (ibid). Even though proper hand washing is the most effective and easiest way to prevent many diseases and infections among children, it has been widely reported that there is a low adherence to this practice globally (Akyol *et al*. 2006*;* Setyautami *et al*., 2012). Among school children, Vivas *et al*. (2010) argues that, this could be attributed to lack of water and soap and insufficient sanitation facilities for hand washing. However, even in areas where adequate hand washing stations are available, proper hand hygiene practices are dependent on pupils' knowledge and attitudes towards hygiene (ibid).

Globally, several studies (Scott and Vanick, 2007; Borchgrevink *et al*, 2013; Xuan and Hoat, 2013) have investigated the availability of hand washing stations in schools but has not exhaustively examined whether the availability of handwashing stations and education on hand hygiene imply proper hand hygiene practices among school children. In order to contribute to the existing body of knowledge in this regard, this study generally examines the level of knowledge on hand washing with soap, provision of hand washing stations and practice of hand washing with soap among primary school pupils.

2. Methodology

The study was conducted in Ofankor, in the Ga East District of the Greater Accra Region of Ghana. The area is located about 45 minutes due north of Accra on the Accra-Nsawam Highway that connects the national capital with its second largest city, Kumasi. Geographically, it lies on latitude 6°38′29″N and longitude 1°16′03″W with an estimated population of 41,000 people.

Overall, 162 pupils and 20 head teachers from 20 primary schools in the study area were involved in the study. The study employed face-to-face interviews with purposively selected primary school pupils and head teachers using on structured questionnaires and wide-ranging spot observations. It was limited to primary school pupils, generally known to be between the ages of 6 and 12 years, because they fall within the target age bracket for most hygiene education programmes. Pupils from all the six grades in the primary schools were involved in the study. However, for the purpose of this study, they were broadly categorised into two major levels; lower primary level (Grade 1-3) and the upper primary level (Grade 4-6). Generally, pupils in the lower primary level are relatively younger (6-8years) than their counterparts in the upper primary level (9-12years). The selected pupils were made up of equal proportions of boys and girls as well as lower primary and upper primary level pupils. To ensure that all pupils understand the questions, they were translated into their local dialect where necessary. Interview and observation checklists were used to obtain information from headteachers and from spot-checks respectively. The former was used to capture information on the challenges to promoting effective hand hygiene practices among pupils while the latter was used to capture information regarding the number, types and locations of handwashing stations as well as the avability of soap for handwashing.

The results from the study were analysed with SPSS version 17 employing descriptive statistics such as frequencies and percentages. Comparative analysis were undertaken with the chi-square test at 5% significance level to establish relationships between selected study parameters.

3. Results and Discussion

From the study, approximately 87% of the pupils reported being educated on hand washing with soap. Gender-disaggregated data (Table 1) per the study points out that that more than half (56%) of the 141 pupils who reported to have been educated on HWWS were girls while a greater proportion (95%) of those who had not been educated (N=21) were boys. There was a statistically significant relationship (χ^2 = 19.75, $p < 0.05$) between gender and reported education on HWWS; more girls (56%) claimed to be educated on HWWS than boys (44%). This is in spite of the fact that, most pupils (91%) who claimed to be educated on HWWS indicated being educated by their teachers. Redmond (2009) underscores the crucial role teachers play in ensuring proper hand washing practices among students. Despite the fact that hand hygiene is not incorporated in the curriculum for basic school education, some teachers, as gathered from the study, endeavor to informally educate pupils during weekly meetings with pupils. During these periods, pupils are taken through various aspects of proper hand washing. Moreover, education on hand hygiene also forms part of the School Health Education Programme (SHEP) implemented by the Ghana Education Service in schools across the country Steiner-Asiedu *et al*. (2011). However, much attention has not been given to this laudable initiative. This is evidenced, among others, by the fact that since the establishment of SHEP in 1992, the accompanying national policy to guide its implementation was launched in 2014; after more than a decade (Ghana Education Service, 2012; Ghana News Agency, 2014).

The results of the study further point out that parents play an insignificant role in educating their wards on proper hand washing techniques - only 9% of pupils were educated by parents to wash hands with soap. This observation utterly diverges from recommendations by the Centers for Disease Control and Prevention (CDC, 2012) which urge parents to be involved in educating children on hand washing with soap to protect their family's health.

In terms of grades, a greater fraction (55%) of those who reported to be educated on HWWS (n = 141) were in the upper primary (Table 1). This also depicted a statistically significant relationship with education on HWWS (χ^2 =9.23, $p < 0.05$).

Criteria	Educated on HWWS		Frequency (n)	Percentage (%)
Gender-disaggregated	Yes (n = 141)	Boys	62	44
		Girls	79	56
	No (n = 21)	Boys	20	95
		Girls	1	5
Grade-disaggregated	Yes (n = 141)	Lower primary grade	64	45
		Upper primary grade	77	55
	No (n = 21)	Lower primary grade	17	81
		Upper primary grade	4	19

Table 1: Gender- and grade-disaggregated data for education on HWWS

Study variables		Importance of hand washing with soap			
		Avoid sickness n (%)	For clean hands n (%)	Avoid Punishment n (%)	None n (%)
Gender	Boys	36 (37)	38 (72)	4 (50)	3 (100)
	Girls	62 (63)	15 (28)	4 (50)	0 (0)
	Total	**98**	**53**	**8**	**3**
Grade	Lower Primary	0 (0)	73 (74)	0 (0)	8 (15)
	Upper Primary	8 (100)	25 (26)	3 (100)	45 (85)
	Total	**8**	**98**	**3**	**53**
Education	Educated on HWWS	8 (100)	85 (87)	3 (100)	45 (85)
	Not educated HWWS	0 (0)	13 (13)	0 (0)	8 (15)
	Total	**8**	**98**	**3**	**53**

Table 2: Importance of handwashing with soap to pupils

A significant proportion of the pupils (93%; n = 151) have adequate knowledge on the importance of HWWS. This is against the fact that the majority out of this number (n = 91) were able to identify the direct benefit of hand washing with soap, which is to avoid sickness as has been numerously established in available literature (Curtis and Cairncross, 2003; GPPPHW Ghana, 2005; Aiello *et al*, 2008; Judah *et al*, 2009). Similarly, Scott *et al.* (2007), in their study in Ghana, also found that protection from diseases provided the impetus for hand washing with soap. This was relatively higher among girls, Lower Primary pupils and pupils who have been previously educated on hand washing with soap (Table 2).

Study parameters		Commonest periods for hand washing with soap			
		At all times n (%)	After eating n (%)	After visiting the toilet n (%)	Before eating n (%)
Gender	Boys	3 (75)	4 (57)	54 (45)	20 (62.5)
	Girls	1 (25)	3 (43)	65 (55)	12 (37.5)
	Total	**4**	**7**	**119**	**32**
Grade	Lower Primary	0 (0)	0 (0)	73 (61)	8 (25)
	Upper Primary	4 (100)	7 (100)	46 (39)	24 (75)
	Total	**4**	**7**	**119**	**32**
Education	Educated on HWWS	4 (100)	7 (100)	106 (89)	24 (75)
	Not educated on HWWS	0 (0)	0 (0)	13 (11)	8 (25)
	Total	**4**	**7**	**119**	**32**

Table 3: Practice of hand washing with soap

Regarding the practice of HWWS, the pupils reported washing their hands with soap predominantly after visiting the toilet (73%) as shown in Table 3. This is in line with the UN Education Agency's assertion that HWWS is most important after defecation (UNICEF/IRC, 1998). Gender-wise, more girls (55%) reported HWWS after defecation than boys while compared to girls, boys (63%) mostly reported HWWS before eating. Further, the proportion of lower primary pupils (61%) who reported HWWS after

defecation was relatively higher than that of higher primary pupils (39%). However, a reverse trend was reported for HWWS before eating. The study also emphasizes the importance of educating school-aged children on hand washing in that, a greater (75%) fraction of pupils who had been educated on HWWS reported washing their hands with soap after visiting the toilet. Statistically significant associations were found between education on HWWS (χ^2= 4.17; $p < 0.05$), pupils' grade (χ^2 = 13.40; $p < 0.05$) and the two major reported moments for HWWS: after visiting the toilet and before eating. This could suggest that pupils educated on HWWS and lower primary pupils are more likely to practice HWWS during these critical moments. Conversely, no statistically significant association (χ^2 = 2.96; $p > 0.05$) was found between gender and these two reported moments for HWWS.

Extensive field observations during the study revealed that, all the 20 schools in the study have functional hand washing stations (HWS) with water and soap. In all, 64 HWS were observed in the study schools. Out of this number, shared basins constituted the highest proportion (80%), while plastic/metal storage containers with taps and stand pipes constituted 15% and 5% respectively. Although the availability of HWS promotes hand washing practices as Hulland *et al.* (2013) argues, CDC (2007) regards the use of shared basins for handwashing as inadequate in ridding the hands of pathogens. Nonetheless, the availability of shared basins in the study schools, as observed from this study, shows an existing commitment by the school authorities to promote hand washing among pupils and also presents a good opportunity for improvement. Because these shared basins, mostly plastic basins are relatively cheaper, the school authorities interviewed assert that they find this 'financially convenient' to acquire them as compared to the others (Figure 1). This is due to the fact that, there is no independent funding mechanism for such purpose and therefore, over the years, the head teachers have relied mostly on the annual capitation grant from the central government for the provision of the handwashing stations. However, the head teachers bemoaned the untimely release and the inadequacy of the grant for various school activities as Osei *et al.* (2009) also confirms. The establishment of an independent funding source with the support of corporate bodies and civil society groups for activities generally bothering on school health education could be very instrumental in addressing this issue.

Figure 1: A cross section of pupils washing their hands in plastic shared basins (Source: Field survey)

A study by Ampratwum and Armah-attoh in 2010 identified that the capitation grant is the primary source of funding for almost all the activities of these schools including renovation works on school structures; maintenance of furniture; purchase of sports equipment and textbooks; printing of examination papers; first aid; sanitation and hygiene materials and in-service training. Overall, 71.5% of the available handwashing stations in the 20 schools were provided from capitation grant while the Parent Teacher Association (PTA) and individual donors provided 24% and 4.5% of the HWS respectively. This implies that the provision of HWS in the various basic schools is largely the responsibility of the schools. There is the need for civil society groups, entrepreneurs and other faith-based organizations to be involved in implementing and scaling up hand hygiene activities in these schools and possibly across the country.

Observing the locations for the hand washing stations, it was discovered that 2 out of the 20 schools have their hand washing stations placed only in front of head teacher's office, 6 schools have theirs placed in front of classrooms and the remaining 12 schools have their hand washing stations placed in front of the head teacher's offices, classrooms and in front of toilet facilities. Location of hand washing stations close to toilets is very crucial. This, according to Adams *et al.* (2009), is to ensure that hand washing after using the toilet becomes a habitual practice among school children and teachers.

While international guidelines by UNESCO (2004) recommend that a hand washing station should be allocated for 50-100 pupils, this study found that between 21 and 225 pupils shared a hand washing station in the study schools with an average of 68 and a median of approximately 67 pupils per HWS. It was therefore not uncommon to observe overcrowding of pupils at hand washing stations in some schools. Although all the HWS had water available for hand washing, not all of them had soap available. Globally, it has been observed that washing hands with only water is a common practice. But this practice, as WHO (2008) maintains, is considerably less effective in eliminating germ-carrying dirt and grease from the hands as compared to washing hands with soap. Additionally, Saboori *et al.* (2013) demonstrate that provision of soap at HWS significantly improves hand washing rates among pupils. These underscore the importance of providing soap always at HWS. In almost half (47%) of these schools, the soaps were provided exclusively by the PTA, while others were provided by Unilever Ghana Limited (28%), Parents (19%) and capitation grant (6%). This goes to reinforce the fact that, the issue of hand hygiene among pupils is predominantly left in the hands of school authorities while external agencies/authorities play very little role. Yet, Esrey (1991) asserts that, involvement of local authorities in school sanitation and hygiene programmes is the key to enhancing its effectiveness.

In justifying the absence of soap at some of the HWS, more than two-thirds (68%) of the head teachers cited misuse of soap by pupils as the key factor while 32% asserted that pupils usually steal the soaps when provided. There is therefore the need to find lasting solutions to these barriers since it has a grave effect on ensuring proper hand hygiene practices among pupils. Supervision of pupils during handwashing, which is not done in these schools as per observations, could be among the solutions to these problems.

4. Conclusion

The study points out that much effort has been put into educating a significant proportion (87%) of basic school pupils on hand hygiene but the same cannot be said about the provision of adequate hand washing stations. Apparently, pupils educated on HWWS are more likely to wash their hands after visiting the toilet and before eating as compared to those who have not been educated (χ^2= 4.17; $p < 0.05$). Younger pupils (lower primary; 6-8years) are reportedly more likely to wash their hands after visiting the toilet and before eating as compared to older pupils (upper primary; 9-12 years) ($\chi^2 = 13.40$; $p < 0.05$). Conversely, no statistically significant association ($\chi^2 = 2.96$; $p > 0.05$) was found between gender and these two critical moments for HWWS. This, possibly indicate that educating pupils on hand hygiene is vital in ensuring its practice among them but the practice is more pronounced among younger children.

The use of predominantly shared basins, inadequate hand washing stations coupled with irregular supply of soap for the hand washing is a huge misstep in inculcating good hand hygiene habits among pupils as observed from the study. To surmount this, the study proposes a reliable and independent financing mechanism for school health promotion programmes which comprises of hand hygiene promotion. This will ensure that the needed funds are available for undertaking activities related to hand hygiene promotion such as acquisition and maintenance of hand washing stations and purchase of soap. Further, hand hygiene promotion should not be only left in the hands of school authorities but should involve other corporate bodies, local authorities and entrepreneurs to ensure successful implementation and sustainability.

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