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Hand hygiene practices – A workplace based survey in Ghana

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Abstract

Hand washing is the most important and least expensive measure to prevent the transmission of infections including nosocomial infections. Effective hand hygiene techniques are recognized as a prototype of the few infection control practices with clearly demonstrated efficacy and remain the cornerstone of global efforts aimed at reducing the risk of infection. Pretested questionnaires in English language were administered to workers with different professional competencies at the Suame Magazine in Kumasi, Ghana. Most of the respondents (50%) washed their hands with water only before meals, water only after visiting the toilet (60%) and do not wash their hands at all after social gatherings (70%). Majority (96%) of the respondents said they had never seen a hand sanitizer before. 80% of respondents cited the radio as their main source of information on health related issues such as proper hand washing. In order to be effective, efforts to improve compliance with hand hygiene guidelines must be multifaceted. Many of these results can be improved by well-targeted public education campaigns.

Keywords: nosocomial; questionnaires; SuameMagazine; hand sanitizer; radio

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1. Introduction

Research has shown that, one cannot avoid getting microorganisms on the body including the hands because of the ubiquitous nature of microorganisms (Lucet et al., 2002; Abd Elaziz and Bakr, 2009; Alonso et al., 2012).

Since 2006, the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC) and other organizations have highlighted the need for controlled trials to assist in the formulation of recommendations on the use of Non- Pharmaceutical Interventions (NPI) such as proper hand washing with soap and water and other effective hand hygiene practices as options for the prevention of the spread of diseases (Felembam et al., 2012; Alonso et al., 2012).

The observations by Ignaz Philipp Semmelweis; a Hungarian physician and Oliver Wendel Holmes; an American physician over a century ago (Lane et al., 2010; Tubbs et al., 2012) demonstrated the efficacy of hand washing with soap in the prevention of infections including hospital-acquired (nosocomial) infections (Gulland, 2001; Alonso et al., 2012; Goldmann and Larson, 1992). Since then, proper hand washing practices have been universally accepted phenomena for the reduction of contact transmission of microorganisms (Grimmond, 1972, Bliss-Holtz, 2010) and are recognized as a prototype of the few infection control practices with clearly demonstrated efficacy and remain the cornerstone of global efforts aimed at reducing the risk of infection (Savolainen-Kopra et al., 2012; Luby et al., 2001).

While hand washing with water and soap (HWWS) has been identified as a major pathway to reducing the risk of diarrhoeal diseases such as cholera or giardiasis (Shahid et al., 1996; Hateley and Jurnaa, 1999; Hutin et al., 2003; Aung Myo and Thein, 1989) and respiratory infections such as influenza or common cold (Meilicke et al., 2008, Mitka, 2009), rates of HWWS still remain low across the globe (Ray et al., 2009; Rosenfeld, 2009; Chittleborough et al., 2012).

Whereas, everybody is at risk of contracting potentially dangerous hand-transmitted infections, pregnant women (Gray, 2007), children (Green et al., 2006; Han et al., 1988), the elderly (Hendley, 1973; Jeong et al., 2007) and the immuno-compromised (Geiss and Heeg, 1992, Gosain et al., 2004, Hossein and Sajjad, 2009) are at a greater risk.

Reasons given for the discrepancy between recommended and practiced hand hygiene behaviors include: allergy to some soaps (Boyce et al., 2000; Prottey and Pryce, 1987; Chamorey et al., 2010), inaccessibility to soap and water (Kesavan, 1999) and inconvenience in usage (Kleinert, 1971). The hand sanitizer was therefore invented as a technique to bridge these documented problems and improve hand hygiene compliance (Welbourn and Jones, 1999; Dyer et al., 2000).

In Ghana, alcohol based hand sanitizers are mostly used and have been shown to kill bacteria including Multi-drug resistant strains such as Methicillin-Resistant *Staphylococcus aureus* (MRSA) and Vancomycin Resistant Enterococci (VRE), fungi as well as viruses such rhinoviruses, influenza virus, Respiratory Syncytial Virus (RSV), vaccinia virus etc (Maury et al., 2000; Welbourn and Jones, 1999; Webster et al., 1994). Alcohol based hand sanitizers are known to work by stripping away the outer oily layer on the surface of the skin which prevents bacteria present in the environment from coming into contact with the hand.

Many theories have been developed to effect hand hygiene behavioral change (Fell, 2000, Fox et al., 1974, Gray, 2007) but unfortunately none has successfully demonstrated improvement in hand washing compliance in daily work routines.

In recent times however, there has been a move towards health education throughout the country of which effective hand hygiene practices have not been neglected but are inadequate. Public education on appropriate hand hygiene habits is of crucial importance; therefore, well focused educational campaigns could definitely bring about positive changes. These campaigns should be multifaceted and should include intensive education about the dangers of improper hand hygiene habits, practical demonstration sections and specific as well as pragmatic instructions on good hand hygiene techniques.

It is therefore important to plan, develop, implement, monitor, evaluate and reassess effective public education programs on hand hygiene. The educational activities should take into account some entrenched socio-cultural beliefs and practices among some Ghanaians. It is important that a multi-educational aid approach be used in order to reach more people in the community and the necessary resources allocated for this purpose.

2. Materials and methods

The study population was randomly selected from auto mechanics, automobile sprayers, vulcanizers, spare parts dealers, and food vendors at the Suame Magazine in Kumasi, Ghana.

Structured questionnaires in English language were designed, pretested on 10 prospective participants and self-administered. The questionnaires were checked for easy readability, easy comprehension, question design and length. As a result of pretesting, some open-ended questions were converted into closed-ended questions.

The questionnaire informed respondents of the objectives of the study and elicited socio-demographic data including marital status and educational background.

The questionnaires sought information on the knowledge of respondents on the effectiveness of hand washing with soap and water as well as the use of the hand sanitizer. The questionnaire also elicited information from respondents on their sources of health-related information such as good hand hygiene practices and the reasons for hand hygiene noncompliance among respondents.

A total of 600 workers at the Suame Magazine in Kumasi participated in the study. Literate and semi-literate participants were encouraged to fill the questionnaires themselves while illiterate respondents were taken through structured personal interviews in the local dialect.

The survey was conducted from November 2012 to January 2013. Permission to conduct the survey was obtained from the owners of the various garages. Workers were at liberty to refuse to participate in the study (the number declining to participate in the survey however was not recorded). The data obtained was analyzed using Microsoft Excel 2010.

3. Results

The study population comprised 528 males (88%) and 72 females (12%). Respondents' age ranged from 18 years to 55 years with a mean age of 36.5 years.

Most of the respondents were between the ages of 18-25 years (50%), single (61%) and had pre-secondary education (40%) (Table1).

51% (n=600) of the respondents were auto mechanics (Table2).

Table 1. Socio-demographic characteristics of respondents

Characteristic	Parameter	Respondents	
		n(600)	%
Gender	Male	528	88
	Female	72	12
Age (years)	18-25	300	50
	26-35	150	25
	36-45	78	13
	46-55	72	12
Marital Status	Married	335	29
	Single	135	61
	Widowed	5	3
	Divorced	25	7
Education	None	186	31
	Pre-secondary	240	40
	Secondary	162	27
	Postsecondary	12	2

Table 2. Various job descriptions of respondents

	Category of workers	Respondents	
		n=600	%
Job description	Auto mechanics	306	51
	Vulcanisers	78	13
	Automobile sprayers	48	8
	Spare parts dealers	132	22
	Food vendors	36	6

Respondents were asked of their hand washing habits with respect to common everyday activities such as eating, visiting the toilet and after social events.

Most of the respondents (50%) washed their hands with water only before meals, water only after visiting the toilet (60%) and do not wash at all after social gatherings (70%) (Table 3).

Table 3. Hand washing habits of respondents

Event	Mode of washing	Respondents	
		n=600	%
Before meals	Soap and water	180	30
	Water only	300	50
	Do not wash	120	20
After toilet	Soap and water	180	30
	Water only	360	60
	Do not wash	60	10
After social gatherings	Soap and water	60	10
	Water only	120	20
	Do not wash	420	70

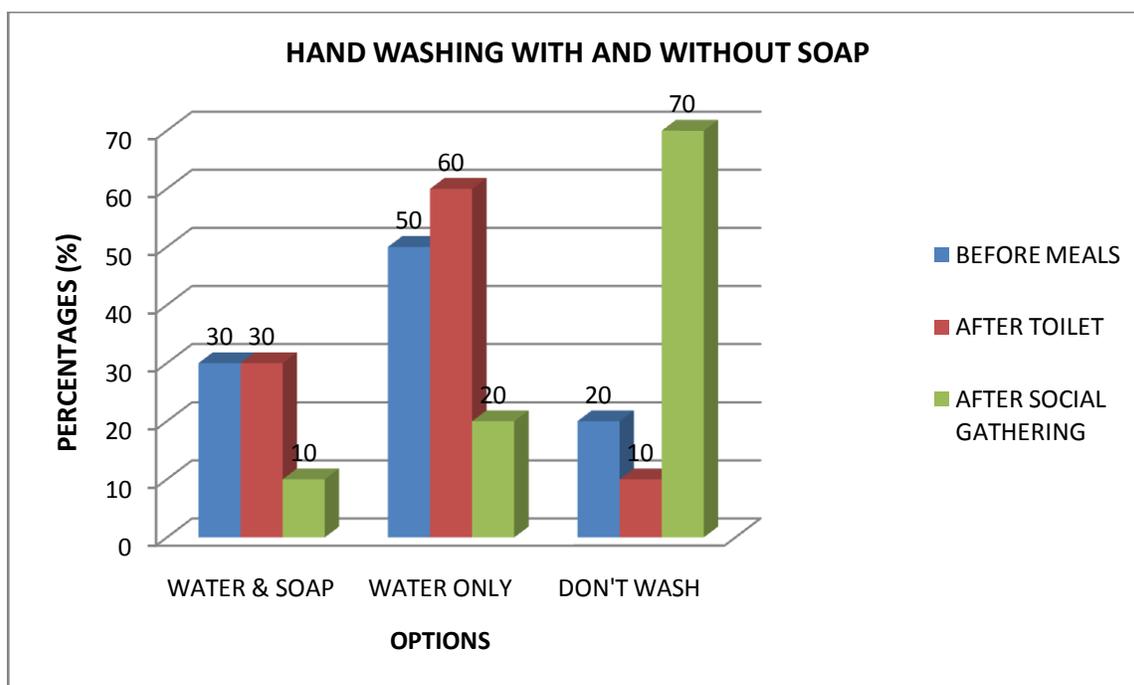


Figure 1. Bar chart representing hand washing activities of respondents after three events

70% (n=600) of respondents said they had some level of knowledge about the effectiveness of hand washing with soap. 96% of the respondents said they had never seen a hand sanitizer before. The remaining respondents (4%) who had seen a hand sanitizer before said they had seen one at either the hospital or clinic being used by health care professionals. None of the respondents had actually used a hand sanitizer before.

Respondents were then asked about their sources of information on health related issues such as good hand hygiene practices. Majority of respondents (80%) cited the radio as their main source of information about health-related issues (Figure 2).

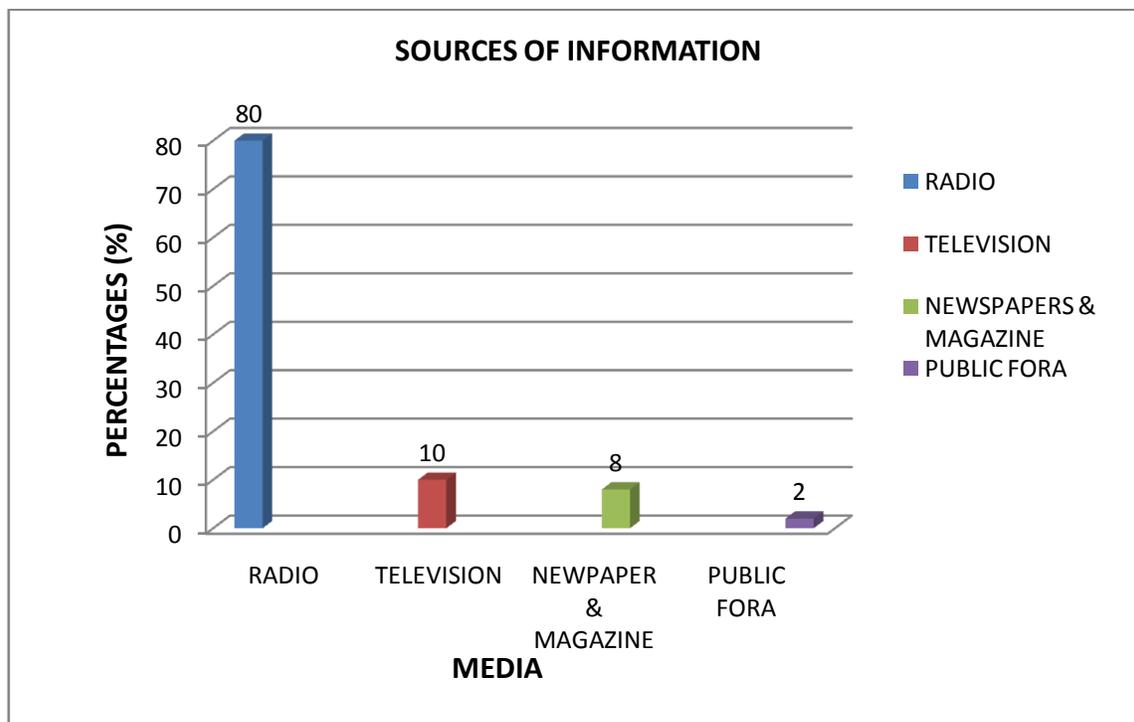


Figure 2. Bar chart showing the sources of information of respondents

Reasons cited by respondents for bad hand washing practices were varied. Absence of hand washing facilities at vantage points in the workshops were cited by 48% of the respondents, 18% cited forgetfulness, 8% cited allergy with some soaps, 15% thought it was unnecessary whiles 11% cited other reasons. Other reasons included busy work schedules, socio-cultural factors etc.

4. Discussion

Suame Magazine is one of the largest mechanical workshops in West Africa. It is located on the Kumasi-Offinso road in the Ashanti Region of Ghana.

The study population was predominantly males (88%) because of the fact that in Ghana and other developing countries, any job bordering on vehicle repair and the sale of vehicle spare parts is mostly seen as a “male only” job.

Willing participants below the age of 18 years were excluded from the study because we thought they were too young to be able to understand the contents of the questionnaires. Majority of respondents (50%) were within the age range of 18-25 years. This is probably because people within this age range are mostly apprentices and it is common practice that each automobile workshop has a lot of apprentices at any particular time.

Due to the fact that most of the respondents were apprentices, it is not surprising that majority of the respondents were single (61%). Considerable proportions of the respondents were not educated at all (31%) or had pre-secondary education (40%). In Ghana, usually illiterates or school dropouts are sent to learn various kinds of trade.

Work at the Suame Magazine is such that, workers are almost always exposed to dirt, oily substances (grease) etc. which may be trapped on the surface of the skin and provide a safe haven for the proliferation of micro-organisms. Workers are also known to spend long hours in the sun while working and therefore sweat a lot. Evidence has shown that damp skin can harbor much more bacteria than dry skin (Kleinert, 1971, Kirk, 1966, Luby et al., 2001), thus these workers are at a greater risk of acquisition of infection. The use of effective hand hygiene techniques at appropriate times is therefore vital in the reduction of the risk of spread of infections.

It is generally recommended that people should observe effective hand hygiene practices especially before, during and after preparing food (Singh, 2004, Strohbehn et al., 2008, Allwood et al., 2004), before eating (Luby and Curtis, 2008, Murphy, 2004), after using the toilet (Maley, 2000), after changing diapers or cleaning up a child who has used the toilet (Strohbehn et al., 2008), after blowing the nose, coughing or sneezing (Meilicke et al., 2008, Mitka, 2009, Scott, 1985), after attending social gatherings (Menkes, 1965), after the close of work (Meengs et al., 1994) etc.

Unfortunately, hand hygiene compliance is very low among this group of people who are almost always exposed to dirt and hence diverse microorganisms. In this study, 30% of respondents washed their hands with soap and water before meals, 50% washed their hands with water only before meals while 20% did not wash their hands at all before meals. The hand is an important source of ubiquitous microbes most of which are potentially pathogenic. Therefore, not washing the hand at all or ineffective hand washing before meals exposes the body to a large inoculum of pathogenic micro-organisms which can cause diarrhea, respiratory infections, keratoconjunctivitis, etc. which can result in low productivity and absenteeism.

70% of the respondents were found not to wash their hands at all after social gatherings such as funerals, engagements, weddings etc. where they are likely to come into contact with diverse groups of people who may harbor dangerous pathogens. 20% of respondents said they wash their hands with water only after social gatherings while 10% wash their hands with soap and water after social gatherings. Socio-cultural factors tend to play a critical role in people’s perception of risk including the risk of disease acquisition.

60% washed their hands with water alone after visiting the toilet, 10% do not wash at all while 30% washed with soap and water after visiting the toilet. Toileting exposes the hand to fecal micro-organisms which may be potentially pathogenic and hence effective hand hygiene practices after toileting is crucial. These fecal pathogens can be easily transmitted from person to person and can lead to the outbreak of potentially fatal epidemics such as cholera outbreaks and *Escherichia coli* 0157:H7 outbreaks. A significant number of food vendors were seen not to practice effective hand washing which is very alarming.

Documented hand washing techniques include wetting the hand with clean running water (warm or cold) and applying soap. The hands being rubbed together to make lather and scrubbed well especially the back of the hand, between the fingers and under the nail bed. The rubbing action should be continued for at least 20 seconds. The hands should then be rinsed under running water and dried using a clean towel or air-drying (Sheldon, 1994, Carter, 2002, Douglass, 1987).

98% did not know what a hand sanitizer was and had never seen one before. The remaining respondents who had seen a hand sanitizer before said they saw it being used in the hospitals or clinics by health care workers. This is therefore in keeping with evidence that health care workers observe effective hand hygiene practices than the general public (Verdeny and Teres, 1983; Takahashi et al., 2009).

There are two types of hand sanitizers namely alcohol based hand sanitizers and alcohol free hand sanitizers. Alcohol based hand sanitizers have 60-95% alcohol as its active ingredient (Welbourn and Jones, 1999) while alcohol free hand sanitizers have benzalkonium chloride as their active ingredient (Dyer et al., 1998; Dyer et al., 2000; White et al., 2001). Excipients such isopropyl alcohol, aqua, carbomer, glycerin, perfume, alkyl acrylate, triethanolamine, citronellol, citral, limonene etc are commonly used in the formulation of hand sanitizers (Dyer et al., 2000).

To use the hand sanitizer in an efficient manner, it is recommended that one places a small amount, the size of a thumbnail on the palms of the hand and rubs it over the entire hand including the back of the hand, between the fingers and under the nail bed (Ogunsola and Adesiji, 2008; Welbourn and Jones, 1999).

Reasons cited for the low compliance of hand washing with soap by respondents were varied. 48% said hand washing facilities were not available for use at vantage points in their work place and were therefore compelled to wash their hands without soap even at critical times while 18% of respondents said they simply forgot to wash their hands. To address these problems, a two prong approach must be adopted. Firstly, the government in collaboration with the Ministry of Health should make sure that hand washing facilities are available in all public places including work places. Also, effective education and sensitization programs must be mounted to inculcate in the public the importance of hand washing.

8% said they developed allergies such as contact dermatitis or eczema after using some soaps which deterred them from washing their hands with soap. This confirms documented instances of the development of skin allergy with some soaps (Barfred et al., 1993; Borgatta et al., 1989; Boyce et al., 2000). A broader range of hand washing detergents should be made available to the public so that people do not have to stick with detergents which can cause allergic reactions.

15% thought hand washing was unnecessary as the nature of their work exposed them to dirt almost all the time. This therefore implies that the nature of their work and the tradition of improper hand washing among peers had a negative influence on the practice of effective hand hygiene.

11% cited other reasons such as busy work schedules, constant anticipation of attending to the next client as well as socio-cultural factors. In developing countries such as Ghana, people have entrenched socio-cultural beliefs and practices which are often influenced by religion. For example, Muslims have specific times within the day which are designated for washing themselves including their hands. They may therefore defer hand washing till it is time for ablution.

Majority of respondents (70%) said they had some knowledge about the effectiveness of proper hand washing with water and soap. This therefore implies that, knowledge level does not correspond to practice in real life situations as observed in some previous studies (Abd Elaziz and Bakr, 2009, Badaro and Jones, 2001).

The media plays a vital role in the dissemination of important health related information such as proper hand hygiene practices. Due to the fact that, majority of respondents surveyed was illiterates and semi-literates, the radio (80%) and television (10%) played an immense role in this regard. Almost all the workshops visited had radios which were tuned in to popular radio stations. A few workshops and spare parts shops had television sets. This emphasizes the fact that the mass media plays a critical role in effective public education as documented in previous studies (Fakolade et al., 2009; Gurtler, 2007).

Newspapers and magazines as health education channels were not effective in this category of people. The few literate respondents said they did not like reading newspapers or magazines because their hands were almost always dirty or greasy.

Public for a are an important avenue that can be exploited in public health education. A strong collaboration between the Ministry of Health, the Ministry of Education, the Ministry of Information, Non-Governmental Organizations (NGOs), religious groups, professional associations and developmental agencies such as the WHO, USAID, UNICEF etc have important roles to play in this regard.

Planning, developing, implementing, monitoring and reassessing effective public education policies and programs with special emphases on effective hand hygiene practices is urgently needed in Ghana.

5. Conclusion

Implementation of multifaceted interventional hand hygiene policies and programs with continuous monitoring and performance feedback, provision of hand washing facilities and hand hygiene products are important in improving hand hygiene compliance.

6. Recommendations

- Periodic surveys that provide information on the trend of compliance of hand washing with soap and its effects on the health of individuals must be conducted on regular basis.

- Individuals should be given in-depth education on the need to wash their hands with soap and the media empowered to give frequent education on hand washing with soap.
- Provision of soap at every workplace should be encouraged to promote use of it at critical times.

7. Limitations

- For reasons of convenience, this study was conducted at only one auto mobile garage in Kumasi.
- Less attention span of respondents because of anticipation of the going back to their work schedules.
- Lack of privacy because of closeness of the workshops made it impossible to do “out of sight” or “out of hearing” interviews. Some shy ones hence declined the interview and some repeated what their neighbors said.

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