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Assessment of Hygiene Practices among Students at the University of Cape Coast, Ghana

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ABSTRACT

Background: Proper hand hygiene practices have been shown to prevent the spread of communicable diseases. Although diarrhoeal diseases continue to be recorded among university students, there is paucity of studies focusing on hygiene behavior among university students in Ghana. This study assessed hand washing behavior, knowledge and practices among students of the University of Cape Coast, Ghana. **Methods:** A cross sectional study was conducted among 422 students from 4th January 2018 to 21st January 2018. A pretested, structured questionnaire was used to collect all relevant data. Frequencies and percentages were used for categorical data. Chi square and one –way ANOVA were used to determine associations between some selected variables. P values, <0.05 were considered significant. **Results:** The mean age of participants was 21.7±2.9 years. The overall general hygiene behavior of students was good with a mean score of 19.2±2.7. There was a significant difference (p=0.001) in the mean scores of male and female students with females scoring higher than their male colleagues. Predictors of hygiene behaviour among the students were their sex (R^2=0.164, p=0.001) and age group (R^2=0.003, p=0.048). Only 52.1% of students reported they always washed their hands with soap and water after using the toilets. Ownership and use of hand sanitizer was low (17.5%). **Conclusion:** Self-reported hand washing behavior among UCC students is poor despite generally good knowledge of students on hygiene. The findings highlight the need for regular formal training of University students on proper hygiene practices and to encourage hand washing by ensuring the availability of soap and water.

Keywords: Hygiene, hand washing, University of Cape Coast, students, self-reported study

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Background

The set of practices associated with the preservation of health and healthy living is generally referred to as hygiene. Safe hygiene practice includes a wide range of healthy behaviours, such as hand washing and safe faeces disposal. One of the most important practices that is central to the prevention of the spread of infectious diseases in the home and everyday life settings is hand hygiene [1]. In 1846, Dr. Semmelweis showed that disinfection of hands stopped the transfer of disease from cadavers to pregnant women [2]. Hand hygiene is defined as hand washing or washing hands and nails with soap and water or using a waterless hand sanitizer. Practice of hand hygiene can be difficult to perform due to many factors such as time constraints and the lack of wash bowls and hand washing basins in most schools. In situations where hand washing with soap is not possible, a waterless hand sanitizer such as an alcohol hand gel can be used instead. Alcohol hand gels should not contain not less than 60%v/v alcohol to be effective in killing germs. Hammond et al.(2000) showed in a research that a practice of good hand hygiene by using an alcohol gel hand sanitizer among elementary school children greatly reduced school absenteeism due to illness [3]. Even though the university community is usually well organized, students continue to suffer from sanitation related diseases. Studies have shown that the level of knowledge and hygiene practices of students in low to medium income countries like Ghana is low and must be improved [4]. Earlier studies on hygiene practices in students conducted in Ghana were mostly done among primary and secondary level students. These studies found poor hygiene behavior among students with inadequate sanitary facilities in most schools investigated [5]. The University of Cape Coast experienced an outbreak of cholera in 2016. That outbreak clearly indicated that there was a need to investigate and document in detail the hygiene behavior of students of the University of Cape Coast. This study therefore provides a good analysis of university students' attitude and practices pertinent to their personal hygiene behaviour.

Methods

This was a cross-sectional descriptive study that used a quantitative research method to collect data on the campus of the University of Cape Coast. The study was conducted among residential students of the University of Cape Coast from 4th January 2018-21st January 2018.

Using a hand washing prevalence of 34% found in an earlier study [6], a minimum sample of 345 was calculated. This was adjusted to 380 to account for 10% possible loss of data.

Students from five halls of residence were recruited into the study using the multistage sampling technique. A questionnaire was developed to obtain information on socio-demographical variables, such as the respondent's age, gender and level of education. Hygiene behavior was assessed by using a previously developed hygiene inventory (HI23) with some modifications. The original HI23 was developed by Stevenson et al. (2009) in Australia and tested by Altun et al (2010) for validity and reliability in a Turkish population [7, 8]. The coefficient alpha was 0.79 for the HI23. The modified questionnaire used for this study had three sections that assessed students' general hygiene behavior, food related hygiene and knowledge on hand washing techniques. Students' general hygiene behavior was determined using 9 questions each with three different responses. An assumed score of 3 was given to every correct answer, 2 for the less appropriate, and finally 1, for a wrong practice. These were summed up to make the general hygiene behavior score. Mean scores for each sex were subsequently calculated. The scores ranged from a minimum of 9 to a maximum of 27 with higher scores indicating better hygiene practices. The questionnaire was pre-tested on

20 students who were residents in a privately owned hostel and were not part of the study.

The study proposal was reviewed by the University of Cape Coast Institutional Review Board. Informed consent from all respondents was obtained through the use of consent forms.

Data analyses

Data entry, verification and analysis were all done using SPSS (version 20.0). Data were analysed with appropriate measures of centrality (mean) and dispersion (standard deviation). Chisquare and one –way ANOVA were used to determine associations between some selected variables. *P* values, <0.05 were considered significant.

Results

A total of 422 students participated in the study. They comprised of 257 (60.9%) males and 165 (39.1%) females. The mean age of participants was 21.7±2.9SD. Their ages ranged from 15 years to 42 years. Most of the students were in the age group (20-24) years with 18 (19.7%) of them ≤19 years. The students who participated in the study were at different levels (years) of study, with most of them (201, 47.6%) in their first year of study (level 100).

General Hygiene Behavior of Students

The general hygiene behavior of participants' mean score was 19.2 ± 2.7 SD. There was a significant difference (p=0.001) in the mean scores of male students (18.3±2.4) and that of the female students (20.6±2.6). The age group of students was significantly associated with their hygiene behavior (p=0.001). There was however, no significant association between students' year of study (p=0.251) and their hygiene behavior.

The multiple linear regression analysis of sex of respondents (R^2=0.164, p=0.001) and their age group (R^2=0.003, p=0.048) were significant in determining the predictors of hygiene behavior among the students (Table 1).

Table 1. Regression analysis of sex and age of respondents and their general hygiene behavior

Model	β	SE	β	T	Sig.
(Constant)	16.8	0.538		31.251	0.001
Age-group	-0.382	0.194	-0.088	-1.978	0.048
Sex	2.279	0.251	0.404	9.086	0.001

Dependent variable: general hygiene behavior

Majority of the students (375, 88.5%) reported that they always washed their hands before eating with them whilst about 69.9% (295) said they always washed fruits and vegetables before eating them. When they use a public toilet 294 (69.7%) said they always cleaned the toilet seat before use. With regards to their personal hygiene 189 (44.8%) said they never wear the same underclothes two days in a row with 33.4% (141) reporting that they sometimes do (Table 2).

Table 2. General hygiene behavior of students

Behavior	Always n (%)	Sometimes n (%)	Never n (%)
Upon returning from lectures do you wash your hands?	146 (34.6)	201 (47.6)	75 (17.7)
Before eating food with your hands, do you wash your hands?	375(88.9)	41 (9.7)	6 (1.4)
Before preparing food, do you wash your hands?	276 (65.4)	124 (29.3)	22 (5.2)
Do you wash fruits and vegetables before you eat them?	295 (69.9)	116 (27.5)	11 (2.6)
When you use a public toilet, do you cover the seat with paper or clean it before use?	294 (69.7)	81 (19.2)	11 (2.6)
Do you wear the same top or short two days in a row?	88 (20.9)	161 (38.2)	173 (41.0)
Do you wear the same skirt or trousers two days in a row?	130 (30.8)	191 (45.3)	101 (23.9)
Do you wear the same underclothes two days in a row?	92 (21.8)	141 (33.4)	189 (44.8)
Do you go without a wash or shower or bath two days in a row?	0 (0)	50 (11.8)	372 (88.2)

Food Related Hygiene

There was no significant difference (p=0.102) in the mean scores of male students (7.3±1.4) and female students (7.5±1.3) with regards to their food related hygiene behavior. Most respondents (293, 69.4%) said they always wash their hands after handling raw foods and before handling cooked foods, only 150 (35.5%) said they always use separate chopping boards for raw and cooked foods.

Students' Knowledge on hand washing

Most of the respondents (339, 80.3%) correctly identified warm water as the best water for hand washing. When asked what the first step of hand washing was, 244 (57.8%) students knew correctly that it was wetting hands with water. A significant proportion of students (43.6%) claimed that they have not received any formal training in hand washing and personal hygiene.

Students' Hand Washing Practices

On their hand washing practices, majority of respondents (220, 52.1%) said they always wash their hands with soap and water. Some respondents admitted skipping hand washing after using the toilets. The main reasons why hand washing is skipped after using the toilets were reported as unavailability of soap (50.0%) and water (24.6%). About 15.6% (66) of respondents said they usually skipped hand washing because they are busy. In the absence of soap and water, 166 (39.3%) said they always use alcohol hand sanitizer whilst 51 (12.1%) do nothing. When asked how many times they washed their hands on the average every day, the response of majority (50.5%) of respondents was one to three times a day, only 26 (6.2%) said they washed their hands more than ten times a day. On the approximate time spent on each hand washing, most (143, 33.9%) students said they use 5-10 seconds, whilst 22.3% (94) do not use any specific length of time (Table 3).

Table 3. Students' Hand Washing Practices

Hand washing practice	n	%
Do you always wash your hands with soap and water upon visiting the toilets?		
Yes	220	52.1
Sometimes	189	44.8
No	13	3.1
Reasons for skipping hand washing at school		
Not necessary	22	5.2
Too busy	66	15.6
Always forget	19	4.5
Soap not available	211	50.0
Water not available	104	24.6
What do you usually use to clean/dry your hands after washing them?		
Clean towel or paper towel	216	51.2
Air	29	6.9
Handkerchief	142	33.6
Clothes	22	5.2
Other	13	3.1
Where there is no soap and water what do you do when you visit the toilet?		
Do nothing	51	12.1
Always use hand sanitizer	166	39.3
Sometimes use hand sanitizer	75	17.8
Use only water	13	30.8
On an average day, approximately how many times do you wash your hands?		
1-3	212	50.5
4-6	132	31.3
7-10	51	12.1
>10	26	6.2
When you wash your hands, approximately how long do you wash them for?		
5-10 seconds	143	33.9
15-20 Seconds	133	31.5
>1 minute	52	12.3
No specific length of time	94	22.3
Do you own and regularly use hand sanitizers?		
Yes	74	17.5
No	348	82.5

Discussion

General hygiene behavior

The overall general hygiene behavior score obtained by respondents was good (mean score

of 19.2±2.4 out of a possible maximum score of 27). General hygiene behavior among female students was significantly higher than their male counterparts. Some previous studies have shown that hand washing behavior among university students is strongly gendered. Females have been found to be more likely to wash their hands than males [6, 9, 10]. Overall, most of the students reported that they always washed their hands upon visiting the toilets. This finding is at variance with an earlier study conducted among University of Cape Coast students in 2012, which revealed that only 34% of participants actually washed their hands after leaving the toilet [6]. The difference is because the earlier study was observational in design and also involved a different generation of students. The level of reported hand washing after defecation found in this study is however comparable to the 68.2% found in a similar self-report study among Dominican University students [11]. Nevertheless, this level of self-reported hand washing after using the toilet is unacceptably low considering the fact that everyone who uses a toilet must wash his/her hands. Safe hygiene, of which hand washing is a key component, has been widely recognized to be one of the most cost-effective means of preventing contagious diseases [12]. Rates of hand washing after defecation have been found to be low globally. Curtis et al (2009), reviewed 13 observational studies on hand washing with soap after defecation in low-income countries and found an average rate of just 17% [13]. In Ghana, rates of hand washing with soap among the general population have also been found to be low. Scott et al (2007), reported a Ghana national survey that indicated that only 4% of mothers washed their hands with soap after using the toilets [14]. A work place based survey found that only 30% of respondents washed their hands with soap and water after using the toilets [15]. Students are known to be very busy and active and should therefore develop the habit of regularly washing their hands with soap and water. It is therefore worrying to note that only 34.6% of all respondents always washed their hands with soap and water upon returning from lectures.

About 69.7% of respondents reported that they usually cover their toilet seats with paper or clean it before use. It is important to adopt good personal hygiene habits when using a toilet in order to avoid contracting an illness. Toilet seats are known to be hot beds for bacteria and viruses. Common bacteria usually found on toilet seats include *Streptococcus, Staphylococcus, E coli and Shigella*. Viruses such as common cold viruses, hepatitis A virus, and other sexually transmitted organisms can be found on toilet seats as well [16]. Even though the risk of getting infected with microbes on toilet seats is minimal, good practices such as cleaning toilet seats before use can further reduce risk of infection especially in the presence of cuts or sores in the anal region. In a study that examined the survival and environmental spread of salmonella from domestic toilets, the results suggested that during diarrhoeal illness, there is considerable risk of spread of salmonella infection through contaminated hands and surfaces in the toilet area [17].

Knowledge on hand washing

Majority (80.3%) of the students knew correctly that the best water for hand washing was warm water. This level of knowledge is higher than the 28.5% found among some university students in Bangladesh [18]. Even though warm water does not kill germs, it has been commonly recommended for two reasons. Warm water is usually more comfortable to use than cold water. Again modern soaps are designed to be most effective in warm water [19, 20]. Many of the students (57.8%) were able to correctly identify the first step in hand washing to be the wetting of hands with water. However, a significant proportion of the respondents (42.2%) did not know the first step in hand washing. This could probably be because almost half (43.6%) of the respondents reported that they had not received any formal training in hand washing. Some earlier studies conducted in the United Kingdom

and China had shown that training in hand hygiene had a positive relationship with hand hygiene compliance among medical staff [21, 22]. This finding highlights the need for hand hygiene campaigns and training programs for all students. Some studies have also found that the presence of hand hygiene posters in wash rooms encouraged hand hygiene among students. In an American College study, it was demonstrated that when rest rooms contained hand washing signs, subjects used soap more than subjects in rest rooms that had no signs [23]. Therefore messages highlighting correct hand washing techniques or reminders to use soap and water may increase compliance.

Practices towards hand washing

Majority of respondents (52.1%) reported that it was their practice to always wash their hands with soap and water. Unavailability of soap and water were cited by students to be the main reasons why they sometimes skip hand washing. Poor water supply was also mentioned as one of the main obstacles to hand washing in an earlier university study [18]. Therefore this implies that if hand hygiene practice among students is to be improved then authorities should ensure continues supply or availability of water and soap. When there is no soap and water, many of the students reported that they always or sometimes use hand sanitizers. Alcohol based hand sanitizers are waterless hand hygiene agents that have been widely accepted and used globally. The correct use of hand sanitizer does not require water, it is less time consuming and does not require hand drying with potentially contaminated surfaces [25]. A number of efficacy studies have demonstrated that hand sanitizers are as or more efficacious than hand washing with plain soap and water [26, 27]. The Centers for Disease Control and Prevention recommends that students should wash their hands often with soap and water or use a hand sanitizer especially after cough or sneezing [28]. Thus in settings where soap and water are not always available, or cannot be easily accessed, students should be encouraged to acquire and use personal hand sanitizers to use when necessary. Hand sanitizers must however not be used if hands are visibly dirty or greasy. Most (50.5%) of the students said they washed their hand about one to three times on an average day. This frequency of hand washing is low compared to what was found in a Turkish study in which most of the university students surveyed reported that they washed their hands 6-10 times a day [29]. It is not possible to define a universally recommended number of hand washes a day because it depends on the type of activities one is engaged in. However, considering the busy and adventurous nature of students, the frequency of hand washing obtained in this study is woefully inadequate to prevent infection. Only 43.8% of respondents in this study reported that they washed their hands for more than 15 seconds before rinsing. The Centers for Disease Control and Prevention (CDC) in 2012 recommended that hands should be rubbed with soap for 15 to 20 seconds before rinsing thoroughly [28]. In an observational study, only about 5% of respondents spent more than 15 seconds in combined washing, rubbing, and rinsing of their hands. The inadequate length of hand washing reported by students in this study can be addressed with regular hand washing training programs.

Conclusion

Even though the overall hygiene behavior of students was good as most students reported that they always used soap and water to wash their hands, there were still significant numbers of students who did not regularly practice proper hand washing. Information on personal hygiene and how to properly use sanitary facilities on campus should be included in student's hand books. The environmental health section of the University Health Services should organize hygiene training to all students regularly.

Competing

The authors declare no competing interests.

Authors' contributions

James Prah contributed to the conception of the research idea, designing study, data analysis and writing of manuscript, Obed Lasim, Mohammed Abdulai, and Adelaide Ampofo-Asiama contributed to collection of data and revision of paper. All the authors have read and agreed to the final manuscript.

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