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## Personal Hygiene Assessment Among Different University Students of Dhaka, Bangladesh: A Step Towards the Prevention of COVID-19 Pandemic

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### ABSTRACT

Personal hygiene is deemed a necessary precautionary measure against different communicable diseases. Its importance is further reiterated during the current COVID-19 global pandemic. Maintaining personal hygiene, such as washing hands and sneezing etiquette are being considered as effective means of precaution. In the present study, the knowledge and practice level of hand hygiene and sneezing etiquette among different university students in the city of Dhaka in Bangladesh were investigated as these students represent a substantial fraction of the total population in Bangladesh. It was also observed if they have adopted any change in their hygiene practices due to the COVID-19 pandemic. A cross-sectional study was conducted among 240 students from different universities. An online-based questionnaire was provided to them. In this study, 96.7% of students were found to be aware of personal hygiene. 45% of students washed their hands 10 times a day, while 60% of them were unaware and maintained random durations of handwashing. The majority of them were aware of the sneezing rules and 48.3% of them used their elbows during sneezing. 79.2% of the tissue user students usually dispose of the tissue in a designated covered bin. Their hygiene practice had also been changed due to the COVID-19 pandemic. However, our result is insufficient to reflect the overall condition of Bangladeshi university students as it was done with limited resources via an online survey during the countrywide COVID-19 lockdown. Thus, future research is required to draw a conclusive picture.

**Keywords:** Personal hygiene, COVID-19 pandemic, communicable diseases, washing hands, sneezing etiquette, university students, Dhaka, Bangladesh

## **1. INTRODUCTION**

Hygiene refers to those practices or conditions which allow us to maintain health and prevent diseases through cleanliness [1]. Personal hygiene can be defined as a set of practices with which an individual takes care of his or her body [2]. Washing hands, taking showers, brushing teeth, and more are different practices of personal hygiene [3]. In medical and public health practices, personal hygiene is a frequently used concept [4]. Diseases arising from the lack of personal hygiene are major public health problems and can be seen mostly among the school students. Previous study has found that impaired personal hygiene contributes to several health-related problems, such as the transmission of disease-causing microorganisms, a higher rate of infectious diseases, gum infection, foodborne diseases, and reproductive tract infection [5]. Diarrhea and lower respiratory tract infection combinedly claim the lives of 3.5 million children younger than 5 years across the globe, predominantly in developing countries like Bangladesh [6-8]. A study found that good hygiene practice, proper sanitation, and assurance of clean water can prevent about 2.4 million deaths each year [9].

Hand hygiene is regarded as a leading prophylactic measure against the cross-transmission of microorganisms [10, 11]. This mode of hygiene is very important for adolescents, mainly secondary school students. If the practice is not properly maintained, these students can serve as the vectors of harmful microorganisms among each other. Infectious diseases, like gastro-intestinal infection and hepatitis, can spread from one person to another by contaminated hands [11]. Previously, a relationship between hand hygiene and the rate of infectious disease illness was observed [12]. The outbreaks of viral gastroenteritis among college students are related to the deficiencies in hand hygiene [13]. Among the college students, lack of hand hygiene is also associated with upper respiratory tract infections [14] and group B streptococcal colonization [15]. Hence, it can be said that maintaining hygiene is one of the key factors for preventing different major diseases.

At present, we are living in a pandemic condition due to COVID-19. Studies showed that personal hygiene can probably minimize the risk of COVID-19 transmission (<https://www.who.int/>). Maintaining hand hygiene through washing with soaps as well as practicing sneezing etiquettes are well-proven effective measures (<https://www.cdc.gov/>). Thus, raising awareness and practicing the mentioned modes of hygiene would be highly pragmatic approaches.

To date, several studies on maintaining personal hygiene have been conducted in Bangladesh. However, these studies were limited to only primary or secondary school going students [9, 16, 17]. University Students have a high risk of becoming a potential carrier and can spread communicable diseases as they account for a large proportion of our population. With the limited resources regarding personal hygiene practice, this study was carried out to assess the knowledge and practice level of hand hygiene and sneezing etiquette among different university students in the city of Dhaka in Bangladesh. The hygiene-related changes that they have adopted in response to COVID-19 along with their opinions on the effectiveness of these simple practices were also observed in this work.

## 2. MATERIALS AND METHODS

A descriptive cross-sectional questionnaire-based study was conducted on different university students currently living in Dhaka city during the period from March to June 2020. A total of 240 students from Dhaka Medical College, Mugda Medical College, University of Dhaka, Jagannath University, Jahangirnagar University, Bangladesh University of Engineering and Technology, Bangladesh University of Textiles, Bangladesh University of Professionals, Military Institute of Science and Technology, North South University, Southeast University, Brac University and National University were participated to this online-based survey. The minimum sample size was calculated using the Leslie and Kish formula (Equation (1)) which was previously used for descriptive studies [18]. The following formula was used for calculating the appropriate sample size:

$$N = \frac{P(1-P)Z^2}{D^2} \dots\dots\dots (1)$$

where, N is the minimum sample size needed; D is the level of error that can be tolerated and P is the estimated proportion of personal hygiene knowledge among university students. Z is the standard variation corresponding to the confidence level. At a confidence level of 95%, Z= 1.96. With a 6.5% level of error and a P of 72.9%, the calculated appropriate sample size N was 180. In the present study, a total of 240 students were finally surveyed for more accuracy. An online-based survey was conducted after preparing a structured questionnaire to collect the data (Supplementary file). The respondents were provided with the questionnaire in the form of a Google Doc file that they filled in, thus submitting their answers online. Later on, the collected responses were organized on a spreadsheet and analyzed by using Microsoft Excel.

## 3. RESULTS

In the present study, the socio-demographic status of the respondents was assessed among 240 university students of Dhaka (**Table 1**). In our study, 53.75% of total respondents were male whereas 46.25% of respondents were female reflecting the male majority. All the respondents were divided into three age groups of 18 to 21, 22 to 25, and 26 to 29 years, respectively. The majority of them belonged to the 18-21 year age group with the largest percentage of 77.50%. The other two age groups of 22-25 and 26-29 years consisted of 19.17% and 3.33% of the total respondents, respectively. Frequencies of individual age groups were further explained in **Table 2**. Here, 34.58% of total respondents were 20 years old which made this group the highest constituting group. The lowest comprising age groups were 26 and 28 years, filling up only 0.42% of the total target population. Moderate responses were collected from the age of 21 (21.67%) and 19 (16.67%), respectively.

We observed the distribution of personal hygiene knowledge among university students (**Table 3**). 96.7% of the students claimed to possess the knowledge of personal hygiene. This particular fraction of respondents, who were knowledgeable of personal hygiene, were furthermore asked to select the particular hygienic practice(s) that occur(s) to their mind whenever they came across the expression: Personal hygiene; 67.5% of them selected hand washing, whereas 55% and 42.9% selected taking a shower and proper sneezing manner

respectively. Besides, cleaning the face and wearing clean outfits were selected by 33.3% and 1.2% of students. However, 4% had chosen all the given options mentioned in Table 3.

**Table 1.** Demographic Characteristics of the study population

<b>Variables</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Sex</b>		
Male	129	53.75
Female	111	46.25
<b>Total</b>	<b>240</b>	<b>100.00</b>
<b>Age</b>		
18-21 years	186	77.50
22-25 years	46	19.17
26-29 years	8	3.33
<b>Total</b>	<b>240</b>	<b>100.00</b>

**Table 2.** Frequencies of different age groups (N = 240)

<b>Age (years)</b>	<b>Frequency</b>	<b>Percentage (%)</b>	<b>Comments</b>
18	11	4.58	
19	40	16.67	
20	83	34.58	Highest comprising group
21	52	21.67	
22	22	9.17	
23	6	2.50	
24	9	3.75	
25	9	3.75	
26	1	0.42	Lowest comprising group
27	4	1.67	
28	1	0.42	Lowest comprising group
29	2	0.83	

**Table 3.** Distribution of personal hygiene knowledge of respondents (N = 240)

Questions being asked	Answers	Frequency	Percentage (%)
Having Knowledge of personal hygiene	Yes	232	96.7
	No	8	3.3
What comes to their mind first after listening personal hygiene? (More than one answers were allowed)	Washing hands	162	67.5
	Cleaning face	80	33.3
	Taking shower	132	55
	Proper sneezing manner	103	42.9
	Wearing Clean outfits	3	1.2
	All of the above	10	4

After evaluating their basic knowledge of personal hygiene, we further assessed their level of practice (**Table 4**). To assess this, hand washing and sneezing etiquettes were taken under the basic consideration, since touching with hands and sneezing are the main modes of communicable disease transmission. Here, 84.6% of the total respondents were found to know proper handwashing rules designed by WHO [19], whereas 15.4% were unaware of it, posing a serious threat to public health. After that, they were asked about the daily frequency of handwashing. The majority of them (45%) responded that they usually wash their hands 10 times a day. The second-largest fraction of respondents (30.4%) wash their hands only 5 times a day, whereas 19.2% wash their hands 15 times a day.

Moreover, only 5.4% of students wash their hands 20 times a day. On the other hand, the time duration of washing hands was also recorded. 11.3% of the respondents reported that they wash their hands for roughly 10 seconds, while 28.7% usually spend 20 seconds. And surprisingly, the majority of these students (37.1%) usually do not monitor their handwashing time, while 22.9% washed their hands for random durations, which poses a threat to public health. It is noteworthy that a total of 60% of the participating tertiary level university students were not aware of their handwashing duration (37.1%) or randomly (22.9%) washed them, which reflected negligence in a crucial aspect of personal hygiene threatening the public health. Raising awareness of public health issues and personal hygiene among these students is very important.

In case of maintaining sneezing etiquettes, 77.5% of the respondents were already aware of the sneezing rules designed by WHO [20] while 22.5% were not. During sneezing and coughing, the majority of these students (48.3%) covered their nose and mouth with their elbows. Apart from them, 39.2% covered it with tissue and 24.6% used cloths as the mode of protection. A small fraction of students (4.6%) does nothing during sneezing. Albeit being small in proportion, this fraction has the potential of serving as the carrier of communicable diseases. The respondents were also asked about the disposal of the tissue after use. The majority of them

(79.2%) reported that they dispose of the tissue in a designated covered bin, while 8.3% keep them in the pocket which is a commendable practice. Nevertheless, 8.8% of the respondents throw the tissue anywhere while 3.7% failed to report what they exactly do with the tissue after use. The last two groups comprising a total of 12.5% of the study population need to be aware of the imminent danger which may arise from their negligence.

**Table 4.** Distribution of personal hygiene practice level of respondents (N = 240)

Segments	Questions being asked	Answers	Frequency	Percentage (%)	
Hand Hygiene	Knowledge of the proper handwashing rules by WHO	Yes	203	84.6	
		No	37	15.4	
	Times of washing hands in a day (Times)	5	73	30.4	
		10	108	45	
		15	46	19.2	
		20	13	5.4	
	Times spending on washing hands (Duration)	10 sec	27	11.3	
		20 sec	69	28.7	
		Random	55	22.9	
		Usually don't count	89	37.1	
	Sneezing Etiquettes	Knowledge of the sneezing rules designed by WHO	Yes	186	77.5
			No	54	22.5
During sneezing (Mode of protection)		Cover it with tissue	94	39.2	
		Cover it with cloths	59	24.6	
		Cover it with elbow	116	48.3	
		Usually don't do anything	11	4.6	
Doings with the tissue after sneezing		Throw it anywhere	21	8.8	
		Throw it in a bin with cover	190	79.2	
		Keep it in their pocket	20	8.3	
		Can't remember	9	3.7	

In the last part of the survey, considering the contemporary lockdown due to the pandemic, the participating students were asked three basic questions regarding COVID-19 and how it affected their lives. Among the students, 95% of them were well known about this disease. Furthermore, they were asked about their thoughts on preventing this disease. 51% of them suggested maintaining basic hygiene as a preventive measure. Lastly, we enquired about the changes that they underwent due to the COVID-19 outbreak. Surprisingly, 31.25% of the total respondents expressed that they have become more conscious and careful about maintaining hygiene.

#### **4. DISCUSSION**

University students are an important part of the population. As they are in their late adolescence, due to the continuing physiological changes, self-care activities are very much important for them [21]. Due to the developmental level, cultural background, socio-economic status, personal habits, and health status, personal hygiene practice can be affected [22, 23]. Several studies have been conducted on the personal hygiene of primary school students, secondary school students, and people living in slum areas across the world as well as in Bangladesh. But a very few studies have concerned the hygiene-related behavior of university students. In Bangladesh, only one study has been done previously on students from four private universities to investigate their handwashing practice [18]. However, no such study was previously done on tertiary level students in terms of sneezing manner in Bangladesh. Therefore, in this study, we attempted to assess the hand hygiene and sneezing manner related knowledge and practices among different university students of Dhaka city.

Both male and female students took part in this study. After dividing into three age groups, students were asked whether they knew about personal hygiene. We found that the majority of them know about personal hygiene. Also, healthy practices like washing hands, cleaning the face, taking showers, proper sneezing, and wearing clean outfits occurred to their mind after coming across the expression: Personal hygiene; The majority of these students considered washing hands, taking shower, and proper sneezing manner as the first thought (Table 3). We further analyzed their level of practice towards hand washing and sneezing manner (Table 4). In the case of practicing hand hygiene, we found that 84.6% of the respondents know about the proper handwashing rules provided by WHO. The majority of the respondents (64.2%) wash their hands 10-15 times a day. One study in 2009 over the university students in Turkey showed that 67.1% of students wash their hands 6 to more than 11 times in a day [24]. Moreover, one study conducted in Bangladesh in 2016 showed that majority of the university students (43.5%) washed their hands only 3-5 times a day [18]. Compared to that, from our study, we can assume that tertiary students studying in different universities in Dhaka city are becoming more conscious about their handwashing frequency and duration, which is one step further towards maintaining hand hygiene.

But, at the same time, we noticed an alarming fact that 60% of our respondents either wash their hands randomly or usually do not monitor the time which corroborates to a previous study [18]. These university students are washing their hands more often, but their awareness about the duration of hand washing does not improve. Hence, raising awareness among these students is very important as they can become potential infection carriers once they are infected themselves.

Next, we asked the participants about their daily life practice of sneezing etiquettes (Table 4). The majority of them (77.5%) responded positively towards the question of whether they were aware of the sneezing rules designed by WHO. 95.4% of students said that they usually try to cover their mouths with tissue, cloth, and elbow cumulatively. A previous study in 2014 in the USA showed that 10.5% of their students do not do anything while sneezing [25] whereas, in Bangladesh, we found that 4.6% of the university students of Dhaka city do the same which is undoubtedly a lower number in comparison to that in the USA. The optimistic part of our study is that 87.5% of our targeted students were found to dispose of the tissue in a designated bin with a cover or keep it in their pocket after using it for sneezing. It reflects that the majority of them are aware of this fact. However, 12.5% of them either throw the tissue anywhere or usually do not remember what they did with that. Thus, awareness should be raised among these 12.5% of students imminently.

In 2020, the whole world is going through a global pandemic due to the infection of Covid-19. To prevent this virus from spreading, personal hygiene received more importance than other measures, which is also resonated with the result of the present study. Positive changes can be seen among the students which must be continued. Spreading awareness among the students can be very much helpful to save the population from infectious diseases.

There are several limitations to our study. As the survey was randomly performed over some of the university students in Dhaka city, it does not reflect the overall condition of Bangladeshi university students as well as the whole population. Besides, this work was done within a very short period via an online survey portal during the countrywide COVID-19 lockdown. An extensive nationwide survey in the future is highly necessary to put a decisive conclusion.

## **5. CONCLUSIONS**

The outcome of this study indicates that a good number of these tertiary students maintain a moderate level of awareness and practice of sneezing manner, but a good number of them are still unaware of proper hand hygiene. Therefore different awareness programs and necessary initiatives should be taken to improve the condition.

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**Supplementary file  
Questionnaire prepared for this study**

**\*Required**

**1. Location**

**2. Sex\***

**3. Age\***

**4. Do you know about personal hygiene?\***

(Mark only one)

- a. Yes
- b. No

**5. What comes your mind first after listening personal hygiene?\***

(Mark all that apply)

- a. Washing hands
- b. Cleaning face
- c. Taking shower
- d. Proper way of sneezing or coughing
- e. Other: \_\_\_\_\_

**6. How many times do you wash your hands in a day?\***

(Mark only one)

- a. 5 times
- b. 10 times
- c. 15 times
- d. 20 times

**7. How much time do you spend on washing your hands?\***

(Mark only one)

- a. 10 s
- b. 20 s
- c. Random
- d. Usually don't count

**8. Do you know the proper hand washing rules by the WHO?\***

(Mark only one)

- a. Yes
- b. No

**9. What do you usually do after sneezing?\***

(Mark all that apply)

- a. Cover it with tissue
- b. Cover it with cloths
- c. Cover it with elbow
- d. Usually don't do anything

**10. Do you know the sneezing rules designed by the WHO?\*** (Mark only one)  
a. Yes  
b. No

**11. What you usually do with the tissue after sneezing?\*** (Mark only one)  
a. Throw it anywhere  
b. Throw it in a bin with cover  
c. Keep it in your pocket  
d. Don't remember

**12. Do you know about COVID-19?\***  
Answer: \_\_\_\_\_

**13. What do you think about how can we prevent this disease?\***  
Answer: \_\_\_\_\_

**14. What kind of changes happens with you after COVID-19 outbreak?\***  
Answer: \_\_\_\_\_

**15. Do you think we can prevent this just by maintaining hygiene?\*** (Mark only one)  
a. Yes  
b. No  
c. Maybe

**16. What do you think about this survey?**  
Answer: \_\_\_\_\_