Original Research Article

A descriptive cross-sectional study on the awareness level towards the COVID-19 among the internet users of Bangladesh

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ABSTRACT

Background: Coronavirus disease (COVID-19), a pandemic worldwide is caused by SARS-CoV-2 and represents the causative agent of a potentially contagious disease that is of great global public health concern. The present study aimed to assess the knowledge, attitude and practice towards the COVID-19 pandemic among the internet users of Bangladesh.
Methods: A web-based cross-sectional descriptive study was conducted with a structured questionnaire implemented through google form and circulated online over distinctive social media from April 2020 to June 2020. Data were analyzed using SPSS software version 23.0 employing univariate, bivariate and multivariate techniques and also one-way ANOVA where applicable.
Results: From the obtained data, 98.8% of the participants were aware of the COVID-19, among them 60.7% obtained the information from social media. The general transmission knowledge level score was found at 3.37±0.71. Overall knowledge level score on signs and symptoms and treatment options were found 2.8±0.05 and 5.17±1.44, respectively. This study demonstrated that a significant portion of the population (80.7%) is dissatisfied with the role of the government in combating COVID-19. One-way ANOVA reveals that women show more adherence with practicing the precautions required to refrain from COVID-19 which was highly significant (p value 0.066). The backward likelihood ratio analysis showed that education and sex have significant p value in case of treatment knowledge score and practice score, respectively.
Conclusions: Although the perception towards the COVID-19 is encouraging among the populations who are using the internets, our study findings suggest that updated knowledge, safety guidelines and preventive measures must be provided by the concerned authorities to enhance the awareness and to reduce the spreadability of the COVID-19 outbreak.

Keywords: Awareness, Coronavirus, COVID-19, Perception, Internet

INTRODUCTION

In late December 2019, an atypical pneumonia type disease outbreak in China turned into a public health emergency and later spread all over the world.[1] Isolation of the viruses from the infected persons and the molecular analysis demonstrated that this pathogen was a new type of coronavirus (CoV), firstly named as 2019-nCoV-2 and subsequently renamed as COVID-19 by the WHO.[2] The pathogenic analysis revealed that CoV's are RNA viruses, belonging to *Coronaviridae* composed of a large family, that targets mainly the respiratory system and causes a wide range of diseases, such as, middle east respiratory syndrome (MERS-CoV) and severe acute respiratory

syndrome (SARS-CoV).[3,4] Shred of evidences indicated that this COVID-19 first instilled in humans via the transmission from wild animals or seafood market in Wuhan, China. However, there is a distinct difference in genetic characteristics among the pathogens obtained from a human with wild sources, later it was recognized that human to human transmission played a major role in the subsequent outbreak.[5-7] As this COVID-19 has outbroken quickly all over the world, the WHO declared COVID-19 a global health concern on 30 January 2020, causing severe respiratory tract infections in humans and later on termed as a global pandemic on 11 March 2020.[8]

SARS-nCoV-2 primarily affects the respiratory tract and the infection is characterized by symptoms like fever, dry cough, dyspnea, headache, dizziness, generalized weakness, vomiting and diarrhea followed by severe hypoxia with ARDs.[2,4,9] Hence, later on, researchers suggest that SARS-nCoV-2 can also affect other organs of the body 10. According to the WHO and Center for Diseases Control (CDC), the transmission of SARS-nCoV-2 takes place mainly via droplets (both oral and nasal) and generation of aerosols during coughing, sneezing and talking as well as physical contact with COVID-19 patients.[5,9] Besides, there are several other sources including infection from COVID-19 hospitals, stools, sputum, ventilation system in the hospitals, contaminated face masks, personal protective equipment.[7]

From the beginning of this outbreak to date almost every country has reported COVID-19 cases. In Bangladesh, the first case of COVID-19 was reported on 8 March 2020, and the first death due to COVID-19 was reported on 18 March 2020.[11] At the end of July 2020, there were around 250,000 COVID-19 cases with 3,100 deaths in Bangladesh (according to DGHS).

Currently, there are no specific treatment options available to combat either suspected or confirmed COVID-19 cases and all therapeutic interventions depend on the pathophysiology and severity of the patients.[12] The only available options are symptomatic relief using the antipyretics, analgesics, antihistamines, immune boosters and some broad-spectrum antibiotics and on a randomized trial basis, some antivirals (remdesivir, favipiravir, tocilizumab, ribavirin) and antiprotozoal drug (ivermectin) with the combination of doxycycline and antimalarials (hydroxychloroquine), corticosteroids (dexamethasone) are administered.[9,10,12,13] Besides, to relieve the severe hypoxia of the patient, high flow oxygen therapy is also used. However, no single treatment option had shown a complete cure for COVID-19.[10] Apart from these therapeutic interventions, the COVID-19 recovery rate also depends on essential and critical medical care (ICU). At present around 300 clinical trials with different interventions are ongoing on the effectiveness and safety in treating COVID-19 including vaccines. Therefore, until an effective option is available, it is important to control the spread of the pandemic in public and to protect them from this pandemic by keeping social distances and maintaining the health rules guided by WHO as well as use existing drugs and by means to control the progress of the disease proactively.

As Bangladesh is a densely populated country, the COVID-19 cases are rising very rapidly day by day, although the government has imposed a lockdown from 26 March 2020 to 01 June 2020; hence due to several hindrances, community transmission of the virus could not be prevented. Only through the increase in awareness of the people and maintaining the hygiene, the spread of the virus can be controlled in the long run and all of these depend on the people's knowledge, perception, and awareness towards the COVID-19. Therefore, understanding the knowledge level is important in controlling or combatting the spread of COVID-19 in Bangladesh. In the present study, we investigated the knowledge, awareness, and perception towards COVID-19 among the internet users of Bangladesh.

METHODS

Study design

A web-based cross-sectional descriptive questionnaire-based survey was conducted from April 2020 to June 2020. There was a lockdown to ensure the social distance from March 2020 to June 2020 in Bangladesh; therefore, a web-based survey was chosen. A structured questionnaire was prepared using google forms and the link was shared through different social media. The questionnaire was validated using Cronbach's alpha and a value obtained 0.85 indicating a reliable tool to assess and conduct this study.[14] This study included only those respondents who use the internets and were easily available for data collection and willing to participate voluntarily. The sampled subjects were not forced to participate and based on the willingness; 417 samples were collected.

Study tools

A structured questionnaire consisting of seven parts were documented in the google form. The first and second part contains a set of questions for the collection of demographic data and to assess the source of getting information. The third to fifth parts were set to assess the knowledge level about the transmission, signs and symptoms, and treatment options of COVID-19. The sixth part assesses the attitude of people towards the virus and the role of government. The last set evaluates the precautions adopted by participants to stop spreading the virus.

Statistical analysis

All the data were analyzed using SPSS software 23.0 version and statistical analysis was done by applying descriptive statistics. Some of the questions had multiple options to choose from, therefore the total of percentages is not always 100%. The relationship among the different

demographic characteristics and distribution patterns has been analyzed by using chi-square, t-test and one way ANOVA where it is necessary. Under a multivariate technique to identify associated factors with the response, both linear regression and binary logistic regression were performed. The significance level is considered $p < 0.1$, $p < 0.05$, $p < 0.01$, where it is applicable.

RESULTS

Sociodemographic Characteristics

Among the participants, 269 males and 148 females participated in this survey. Mostly the age groups (91.6%) of the respondents fall into below 30 years. Education

status showed that 41.0% of the respondents were graduated and 49.2% were studying at the undergraduate level. 23.3% of the participants were employed.

Source of information about Coronavirus

All of the participants were familiar with COVID-19 and 98.8% of the participants were aware that the WHO has declared COVID-19 as a global pandemic. The majority of the participants were informed about COVID-19 from facebook (60.7%). Though the majority of the participants believe that all information found in social media is somewhat reliable, 22.6% still believe that fake and misguided information is available on social media.

Table 1: Knowledge level scoring about the transmission, signs, symptoms and treatment options for coronavirus.

Question/statement (answer in the box)	Number of responses (N=417)	
Transmission knowledge level scoring out of 4	(a) Infected to others, air-borne, contagious	(b) Water/animal borne
1. Do you know how coronavirus can be transmitted? (a)	386	31
	(a) Few minutes to few hours	(b) Few days to more
2. How long coronavirus can survive in the surface? (b)	245	172
	Yes	No
3. Coronavirus will not affect the bangladeshi population due to hot and humid weather? (no)	20	397
	True	False
4. A person without any symptoms can be a carrier. (true)	378	39
Overall transmission knowledge score (Mean±SD)		3.37±0.71
Signs and symptoms knowledge level scoring out of 3	(a) at least 3 symptoms	(b) <3 symptoms
1. Do you know the symptoms of coronavirus? (a)	381	36
	(a) 2-14 days	(b) Others
2. How many days require expressing the sign and symptoms of coronavirus? (b)	399	18
	True	False
3. The symptoms generally look like pneumonia. (true)	389	28
Overall signs and symptoms knowledge score (Mean±SD)		2.8±0.05
Treatment options knowledge level scoring out of 7	True/Yes	False/No
1. Currently there is no effective treatment options (true)	367	50
2. >80% people do not need to be hospitalized (true)	278	139
3. Antibiotic treatment has no role on coronavirus (true)	316	101
4. Have you ever heard Flattening the curve? (yes)	253	164
5. Which of the following categories comorbid patients need to be careful? (a)	(a) At least 3 conditions	(b) <3 conditions
	315	102
6. Drugs required for treating flu like symptoms (a)	(a) At least 2 drugs chosen	(b) <2 drugs chosen
	286	131
7. Oxygen ventilation is required for which patients? (a)	(a) Critically ill patients	(b) Others
	340	77
Overall treatment options knowledge score (Mean±SD)		5.16±1.44

Knowledge about the transmission of Coronavirus

Knowledge about the transmission of COVID-19 is important in controlling the spread among the mass

population. In this study, 92.3% of the respondents knew the transmission processes about coronavirus whereas 54.6% stated that this is a highly contagious disease. The majority of the respondents knew the way how he/she can be affected. 90.8% of the respondents chose the option of

being close contact with the affected persons. To evaluate the transmission knowledge level of the participants on coronavirus, 4 questions were taken into considerations. Although respondents had chosen several options, most of them were classified into two categories. 1 point was assigned to each correct answer and zero was assigned for incorrect or insufficient answers. The overall transmission knowledge score was found at 3.37±0.71 (Mean±SD) out of 4.0 (Table 1).

Table 2: Univariate and multivariate characteristics with Pearson's chi-square test for respondent's attitude towards the government role on the management of COVID-19 pandemic.

Demographic characteristics		Frequency (%)	Are you satisfied with the role of the government until now?				Do you think hospitals are prepared enough for COVID-19 management?			
			Yes	No	χ^2	p value	Yes	No	χ^2	p value
Sex	Male	269 (64.5)	55	214	1.11	0.57	23	246	0.83	0.36
	Female	148 (35.5)	24	124			9	139		
Age	Below 30	382 (91.6)	69	313	2.31	0.31	30	352	0.21	0.64
	Above 30	35 (8.4)	10	25			2	33		
Education	Below HSC	41 (9.8)	12	29	3.17	0.2	6	35	3.83	0.14
	Undergraduate	205 (49.2)	37	168			12	193		
	Graduate	171 (41.0)	30	141			14	157		
Employment	Student	305 (73.1)	58	247	1.65	0.44	24	281	0.66	0.96
	Employed	97 (23.3)	20	77			7	90		
	Unemployed	15 (3.6)	1	14			1	14		

degree of freedom for age and sex parameters df =1, for education and employment df = 2.

Knowledge about the general signs and symptoms of COVID-19

The signs and symptoms of the COVID-19 vary significantly from patients to patients and the symptoms are somewhat like common cold and flu. Thus, the respondents were asked whether they were familiar with the signs and symptoms of coronavirus. The majority has chosen the four symptoms such as fever (387), dry cough (380), breathing difficulties (373) and shortness of breath (301) as the major indicators for COVID 19. To evaluate the knowledge level score about the signs and symptoms of coronavirus, 3 questions were chosen. If any participant chose at least 3 symptoms rightly, they were given a score of 1 and others were given 0. Simultaneously those who gave the right information about the incubation period or days requiring expressing signs and symptoms for SARS-nCoV-2 were also scaled 1 point (Table 2). The overall signs and symptoms knowledge score was calculated at 2.8±0.05 (Mean±SD) out of 3.0 (Table 1).

Knowledge about the treatment options of COVID-19

88.9% of the respondents agreed that there are no effective treatment options for COVID-19. 67.8% of respondents confirmed that the majority of the affected people don't need to be hospitalized and 77.8% of respondents also opined that antibiotics have no role in COVID-19 treatment. Oxygen therapy and ventilation support require for critically ill patients which were known to 85.6% of the respondents. 62% of the respondents were familiar with the term flattening the curve. Overall knowledge about the

treatment options of COVID-19 was calculated based on 7 questions and it was found 5.16±1.44 (Mean±SD) out of 3.0 (Table 1).

The general attitude towards the COVID-19 and role of the government

79.5% of the respondents agreed that they will isolate themselves if they find any symptoms of COVID-19 among themselves or any of their family members. 93.5% of participants were well aware of the terms isolation and quarantine. 93.8% of the respondents opined that panic-buying will cause inflation and shortages of necessary items. Among them, 84.9% of the respondents bought an additional amount of grocery items and others for their homestay. 80.7% of people were not satisfied with the role of government. There are no significant differences among the different demographic variances (Table 2).

Precautions, knowledge and practice for COVID-19

A total 97.3% of the respondents believed that prevention is better than cure for COVID-19 by maintaining proper health hygiene. 92.3% of the respondents were aware of common respiratory hygiene practices, 85.8% preferred handwashing with soap-water, 86% of the participants used hand sanitizer during the scarcity of soap-water, 88.2% uses mask when go outside and almost everyone washes their hands after coming back to home from outside (99.5%). To evaluate the precautions knowledge level and precautionary practice score, 6 questions were chosen. If any participant chose at least 3 ways of

precautions, they were given a score of 1 and others were given 0. The overall practice score was observed at 5.42±0.87 (Mean±SD) out of 6.0 (Table 3). Moreover, 91.8% of the respondents agreed that the majority of the Bangladeshi population may not follow the national guidelines for preventing the COVID-19 outbreak

Table 3: Precaution's knowledge and practice score.

Question/statement (answer in the box)	Number of responses (N=417)	
Practice scoring (out of 6)	Yes	No
1. Do you think, proper precautions it is possible to stop spreading? (yes)	406	11
2. Do you use hand sanitizer in scarcity of soap-water? (yes)	355	62
3. Do you use mask at outside? (yes)	368	49
4. Do you wash hand and face after coming from outside? (yes)	415	2
5. Do you follow the rules of respiratory hygiene? (yes)	385	32
	(a) Chosen at least 3 ways	(b) Less than 3 ways
6. What are the different ways that you follow? (a)	347	70
Overall practice score (Mean±SD)		5.42±0.87

Table 4: Distribution of COVID-19 transmission, signs, symptoms and treatment options knowledge level score in different categories (one way ANOVA).

Characteristics		Transmission knowledge level distribution			Signs and symptoms knowledge level distribution			Treatment options knowledge level distribution		
		Score	F value	P value	Score	F value	P value	Score	F value	P value
Sex	Male	3.35±0.75	0.51	0.47	2.79±0.49	0.78	0.38	5.1±1.46	0.006	0.93
	Female	3.41±0.65			2.83±0.44			5.15±1.44		
Age	Below 30	3.37±0.72	0.06	0.81	2.80±0.49	1.15	0.28	5.12±1.44	3.94	0.047**
	Above 30	3.40±0.65			2.89±0.32			5.62±1.52		
Education	Below HSC	3.19±0.75	2.73	0.066*	2.65±0.73	2.21	0.11	4.19±1.52	15.59	<0.01***
	Undergraduate	3.34±0.73			2.80±0.44			5.06±1.40		
	Graduate	3.46±0.68			2.83±0.43			5.51±1.38		
Occupation	Student	3.34±0.73	1.245	0.289	2.79±0.49	0.28	0.75	5.05±1.45	3.32	0.037**
	Employed	3.42±0.66			2.83±0.45			5.46±1.47		
	Unemployed	3.60±0.63			2.80±0.41			5.46±1.13		

*, **, *** indicates the statistic is significant at the 0.1, 0.05, and 0.01 level, respectively. The value represented here as Mean ±SD, SD (standard deviation).

Table 5: Distribution of COVID-19 practice score in different categories (one way ANOVA).

Characteristics		Count	Practice score level distribution		
			Score	F value	P value
Sex	Male	269	5.42±0.74	3.45	0.064*
	Female	148	5.55±0.69		
Age	Below 30	382	5.47±0.73	0.64	0.42
	Above 30	35	5.37±0.66		
Education	Below HSC	41	5.66±0.53	1.87	0.154
	Undergraduate	205	5.42±0.77		
	Graduate	171	5.47±0.71		

Occupation	Student	305	5.42±0.74	0.13	0.87
	Employed	97	5.42±0.74		
	Unemployed	15	5.42±0.74		

* indicates significant at the 0.05 level, values represented here as Mean±SD, SD (standard deviation).

Table 6: Multiple linear regression output showing factors significantly related to higher treatment knowledge level and practice score using the backward likelihood ratio method.

Factors	β	Standard error	t	P value
Treatment knowledge score				
Intercept	4.93	0.106	46.26	<0.01**
Education (below undergrad vs graduate)	0.5889	0.1738	3.387	<0.01**
Practice score				
Intercept	5.37	0.065	82.14	<0.01**
Sex (male vs female)	0.176	0.091	1.922	0.055*

** Indicates the statistic is significant at 0.01 level.

Univariate and multivariate analysis of the variance of demography, knowledge, attitude, and perception towards coronavirus

To evaluate the transmission, signs and symptoms, and treatment options knowledge level of the participants on COVID-19 and their relationship, statistical analysis was carried out (Table 4). It is found that education has a significant impact on the knowledge level of transmission of COVID-19. Treatment knowledge level distributions vary significantly in different demographic variances such as age, education and employment. Females were more prominent in practicing the precautions required to refrain from COVID-19 which was highly significant (Table 5). The backward likelihood ratio analysis reveals that education and sex have significant p value in case of treatment knowledge score and practice score, respectively (Table 6).

DISCUSSION

COVID-19 is posing a significant threat to public health and has already declared as a global pandemic by the WHO. As there is still no specific treatment and vaccine, only preventive measures can play an important role in reducing the infection rate and the spreading of the virus. This means that only people's adherence to preventive and control measures is an utmost necessity. But the adherence of the people with these measures is affected by their knowledge, attitude and practices towards the virus. United Nations predicted in one of their memos using globally recognized modeling techniques and parameter assumptions that due to the large population densities in Bangladesh, the COVID-19 situations can be as worsen and up to 2 million people may die if no fruitful intervention is taken. The message is clear, people of bangladesh need to know the coping strategy regarding the pandemic and should take necessary measures accordingly. Thus, this study aimed to assess the KAP of the Bangladeshi population for the novel coronavirus disease 2019, COVID-19.

The study is dominated by the male (64.5%) and all of the respondents were well educated. Despite the lack of knowledge, bangladeshi people are careful to avoid potential problems and dangers of it. 88.2% of the respondents use masks when they go outside. From the study, it is evident that social media such as facebook is playing a vital role in disseminating information. Although misinformation can lead to burden the cost of the diseases, 22.6% population does not believe in the information obtained from online sources.

It was found that young people (18-29 years age) are more likely to go outside than middle and older (30 year and above) which coincides with the study of dengue.[15] There is a popular myth that this virus can't affect Bangladeshi people due to hot and humid weather. Under the mythology, we have asked the respondents about their belief in it. Interestingly, 23 participants believed in this mythology.

The transmission knowledge level scoring shows that the overall average score is 3.37 out of 4.0 which is very good. Meanwhile, the study is conducted in mid of the pandemic. In the meantime, all the required information regarding transmission has been disseminated into society. The same type of study was also conducted earlier and the outcome is comparable.[16] But there is a significant relationship with the education level of the participants with the transmission knowledge level (p value 0.066). So, the government should educate and aware of the less educated persons about the coronavirus by effective publicity and community involvement. The knowledge level score about the general signs and symptoms was also promising (2.8 out of 3.0). The precaution knowledge and practices score were also found significantly higher, 5.47 out of 6.0. The majority of the population know at least three measures on how to stop spreading the coronavirus which is following the previous findings.[16] Almost 96% chose to stay at home during this period. Women are generally more knowledgeable about the precautions which are in accordance with a study found in Saudi Arabia.[13]

There are little knowledge gap in the treatment options of this virus among the different demographic population which is common due to misinformation is leading in the social media. The overall general score was observed at 5.16 out of 7. Highly educated and elderly populations were much aware of the treatment options of coronavirus. One way ANOVA analysis showed that the F statistic value and p values concerning the education level are 15.59 and <0.01, respectively. Besides, young participants as well as students are less aware of the treatment options too. So, an effective strategy needs to develop to aware people of the treatment options for flu as well as coronavirus.

The study reveals that a significant portion of the population (80.7%) is dissatisfied with the role of the government in combating the disease. There is no relationship with the different demographic populations. They were also asked about the measures that the Bangladesh government can have taken earlier. The majority recommended the government to provide sufficient support to the frontline service providers through giving PPE, masks and testing kits. Despite knowing that panic buying may cause inflation of necessary items, 84.9% of people bought additional grocery items to stay at home. The majority of the participants opined that bangladeshi peoples are less likely to adhere to the rules and regulations imposed by the government.

This study found knowledge score has a direct association with wearing a mask when going outside and staying home. A study in China reported a similar association between knowledge score and wearing masks.[17] We found that overall higher knowledge score is associated with higher preventive practices toward COVID-19, a similar association between the knowledge about the disease and preventive practices were reported in KSA on MERS-CoV, Pakistan on dengue and in China on COVID-19.[15,17,18]

Finally, the study findings may be useful to inform policymakers and healthcare professionals, on further public health interventions, awareness-raising, policies and health education programs. Men are less likely to follow the precautions which should be taken into considerations. Besides, an awareness program needs to formulate adhering the less educated people to the national rules and regulations of COVID-19.

Limitations of this study

Though the amount of data we collected for this study wasn't sufficient enough to conclude anything exactly, this result can give us some representative idea about the knowledge, attitude and perception towards the COVID-19 pandemic only among the internet users of Bangladesh. Moreover, as an online survey, the majority of the participants had a very high level of education. So, this result mainly gives us some representative ideas about the

educated population of Bangladesh which is about 60% of the overall population. Additionally, community-based national sampling surveys were not feasible during this particular period.

CONCLUSION

Our study findings suggest that all the educated persons of Bangladesh have good knowledge and practices toward COVID-19. But they are highly dissatisfied with the role of the government and services of the hospitals. Though they have less knowledge about the treatment options, they are aware of the precaution steps. We believe that the study will inspire the healthcare authorities and media to spread more COVID-19 related accurate knowledge which ultimately results in better preventive practices toward COVID-19.

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