

Investigating knowledge, attitudes, and practices related to COVID-19 outbreak among Bangladeshi young adults: A web-based cross-sectional analysis

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Abstract

Aim: This study aimed to assess knowledge, attitudes, and practices (KAP) towards COVID-19 among young adults in Bangladesh.

Subject and Methods: A cross-sectional survey was conducted from 5th May to 25th May 2020. Young adults aged between 18-35 years were approached via social media to complete an online questionnaire consisted of socio-demographic characteristics and KAP towards COVID-19. Descriptive statistics, t-tests, one-way analysis of variance (ANOVA), and multiple logistic regressions were conducted.

Results: Of the 707 survey participants, the majority were male (57.1%), with a mean age of 25.03 (SD: 4.26) years, 60.3% were students, 57% had a bachelor's degree, and 64.4% urban residents. Participants gather information on COVID-19 mostly through Social media (70.4%). Overall, 61.2% had adequate knowledge with 78.9% having a positive attitude towards COVID-19 and only 51.6% had good practices. Most (86.8%) of the participants were confident that COVID-19 will be successfully controlled and Bangladesh was handling the COVID-19 health crisis well (84.20%). Only 75.2% of participants always washed hands with soap or hand-sanitizer and 70.6% wore a mask when going outside the home in recent days. Factors associated with adequate knowledge were being female, having a master's degree and above, and living in an urban area ($p < 0.05$). Participants having adequate knowledge of COVID-19 had higher likelihood of positive attitudes (OR: 6.41, 95% CI = 2.34-25.56, $p = 0.000$) and good practices (OR: 8.93, 95% CI = 3.92-38.42, $p = 0.000$).

Conclusion: Introducing effective COVID-19 Health campaigns incorporating factors to influence KAP is urgently needed.

Introduction

Coronavirus Disease 2019 (COVID-19) has evolved into a serious public health concern due to a novel human coronavirus, commonly recognized as acute respiratory syndrome coronavirus 2 (SARS-COV-2), which has been declared as a pandemic (Cucinotta and Vanelli 2020; Lake 2020). Since its origins in the Huanan seafood market in Wuhan, province of Hubei, China at the end of 2019, this novel virus has gained intense attention by spreading rapidly the rest of the world (Li et al. 2020). This situation was announced as a public health emergency of international concern (PHEIC) by World Health Organization (WHO) on 30 January 2020 (WHO 2020a). COVID-19 is extremely contagious and can even be transmitted by respiratory droplets (coughs or sneezes) in contact with an infected person (CDC 2020); up to 80 percent of cases have minor flu-like symptoms, fever, fatigue, discomfort, shortness of breath and recovery without medical assistance (Huang et al. 2020). Particularly the elderly and those with pre-existing chronic diseases are at increased risk of severity (Tian et al. 2020). As there is no antiviral curative remedy or vaccine to cope with this pandemic (Sahin 2020), the WHO recommends that the best approach to deter and curb the spread of COVID-19 is to be knowledgeable of the disease, its symptoms, modes of transmission and precautions, like hand hygiene, social distancing, respiratory etiquette and wearing a mask (WHO 2020b).

In Bangladesh, on 8 March 2020 the Institute of Epidemiology, Disease Control and Research (IEDCR) proclaimed first-ever confirmed case of COVID-19 (Banik et al. 2020), since then the number of cases started to put spikes on graphs and 975 deaths out of 71,675 confirmed cases have been reported as of June 08, 2020 (IEDCR 2020). To safeguard citizens, Bangladesh's government has taken unprecedented protective and precautionary actions and instituted a regional lockdown from 26 March 2020 (Kamruzzaman and Sakib 2020). Furthermore, all govt. and non-govt. entities, along with print and digital media, undertook massive advertising on COVID-19 for awareness of the general public. However, evidence from numerous media reports upholds that still, a considerable number of people do not adequately follow these instructions, which exacerbate the COVID-19 situation in Bangladesh. Evidence suggests that, for such measures to be effective, public adherence is essential, which is affected by their knowledge, attitudes, and practices (KAP) towards COVID-19 (Ajilore and Atakiti 2017). Studies carried out during the SARS outbreak 2003 suggest that knowledge and attitudes concerning infectious diseases are linked with serious misconceptions and panic among the public, which may disrupt further effort to prevent the

spread of disease (Person et al. 2004; Tao 2003). The KAP study regarding COVID-19 conducted in Hubei, China, concealed that public attitudes to obedience to government measures to combat the epidemic were significantly influenced by the level of knowledge about COVID-19 (Zhong et al. 2020). More knowledge was also found to be correlated with more optimistic attitudes towards COVID-19 preventive practices (Azlan et al. 2020; Zhong et al. 2020). In Bangladesh, a KAP study showed that a large proportion of people had limited knowledge of COVID-19 transmission and onset of symptoms and had positive perceptions of COVID-19 (Farhana 2020). Another Bangladeshi study found despite 54.87% respondents kept good knowledge but the attitude and practices were not impressive mainly because of poor knowledge, nonscientific, and orthodox religious belief (Haque et al. 2020).

Apart from this, there is no available KAP study of COVID-19 among young adults despite people between ages, 21-40 years account for about 50% positive cases in Bangladesh (WHO 2020c). We therefore aimed at assessing the KAP among young adults during the rapid transmission phase of the pandemic in Bangladesh. This study also expected to assist policymakers in designing suitable preventive approaches specifically targeting vulnerable groups for alleviating the burden of COVID-19 in Bangladesh.

Methods

Participants and setting

A cross-sectional study was carried out from May 5 to May 25, 2020, among young adults in Bangladesh through a web-based survey because it was not feasible to do a community-based national sampling survey during this government-imposed lockdown in Bangladesh. Eligibility criteria to participate in the survey were to be young adults (18-35 years) (Ministry of Youth and Sports 2017), being Bangladeshi, social media user, understanding the study purpose, and willingness to voluntary participation.

Data collection procedure

Data was collected via a semi-structured questionnaire designed for the Google survey tool (Google Forms). The link generated from the Google Form was shared randomly as an invitation of participation to the public through social media groups (i.e., Facebook, WhatsApp) and also personally shared with the researcher's contact list. The first page of the questionnaire contained a brief introduction to the study's background, objective, eligibility criteria, declaration of confidentiality, and anonymity and informed consent of each participant took asking whether or not they want to participate in this study. Participants must respond positively for further proceeding with the self-reporting questionnaire consisted of i) socio-demographic information; ii) knowledge about COVID-19; iii) attitudes toward COVID-19; and iv) practices towards COVID-19. For the questionnaire, Cronbach's alpha is 0.64, suggesting the questionnaire is a legitimate and accurate tool for evaluating the purpose of the study. A total of 728 eligible participants approached and 707 completed the survey questionnaire with a 97.3% response rate and taken for final analysis.

Measures

Socio-demographic data of the participants were obtained through both open-ended and close-ended questions involving their age, gender, educational level, marital status, occupation, socio-economic class, the number of family members, place of residence, and division. Monthly family income served as a proxy measure for socio-economic class and was represented as a low (family income < 25000 BDT), moderate (family income 25000- 50000 BDT), and high (family income > 50000 BDT).

Participant's knowledge about COVID-19 was assessed using 13 items which were adapted from previous research (Azlan et al. 2020; Zhong et al. 2020). These 13 items comprised of clinical presentations (items 1-4), transmission routes (items 5-8), and prevention and control (items 9-13) of COVID-19 with "true," "false," or "not sure" response options to these items. Each correct response to a knowledge item has been assigned 1 point, while 0 points have been assigned to each incorrect/not sure response. For knowledge items, the total score ranged from 0-13, with a higher score indicating adequate knowledge about

COVID-19. Bloom's cut-off of 80% (≥ 10.4) was used to determine adequate knowledge (Kaliyaperumal 2004). The attitude section included 5 items, and the responses were assessed using a 3-point Likert scale "Disagree", "Not sure" and "Agree" each weighing 1 to 3 respectively. The combined score varies from 0-15, with an overall higher score indicating more positive attitudes towards the COVID-19, and ≥ 2.4 was set as a cut off value for positive attitudes towards COVID-19. The practice section consisted of 5 items, that was adapted from WHO recommended practices for prevention of COVID-19 transmission and the responses of each item was assessed with 3- point Likert scale "Never", "Occasionally", and "Always", each weighing 1 to 3 respectively. The combined score of practice items ranges from 0-15, with an overall higher score indicating more good practices towards the COVID-19. A cut off value of ≥ 2.4 was set for good practices.

Data Management and Analysis

Fully completed questionnaires were extracted from Google Forms and exported to a Microsoft Excel 2010 for cleaning and coding. The cleaned data was exported to Statistical Package for Social Science (SPSS) version 25 software. Data analysis consisted of descriptive statistics including frequency distribution, percentage, and computing mean scores. As applicable, the correlation between the various response and the socio-demographic characteristics of the participant was analyzed using a t-test, one-way ANOVA, or Chi-square test. To identify related factors with the response binary logistic regression analysis was applied and the significance level had been set at 0.05 (two-tailed).

Results

A total of 707 participants completed the survey questionnaire (response rate = 97.3%) and participated in this study with a mean age of 25.03 (SD: 4.26) years. The majority of the participants were male (n = 404, 57.1%), unmarried (n = 506, 71.61%), 554 (78.4%) had at least a Bachelor's degree, and rest of the participants had an education level of Higher secondary or below. Among the respondents 426 (60.3%) were students and 127 (18.0%) were employed either with the govt. /a private company. Most of the participants were from urban area (n = 455, 64.4%) in Dhaka division (n = 319, 45.1%). A detail of the socio-demographic characteristics of the participants is shown in **Table 1**. Social media such as Facebook, WhatsApp was the main source of information about COVID-19 among participants (n = 498, 70.4%) followed by News media (67%) and health organization's website (58%, **Figure 1**).

Table 1: Socio-demographic characteristics of the participants (n = 707)

Characteristic	Frequency (n)	Percentage (%)
Age (years)		
18-23	147	20.8
24-29	435	61.5
30 or more	125	17.7
Gender		
Male	404	57.1
Female	303	42.9
Marital status		
Unmarried	506	71.6
Married	201	28.4
Education level		
Bachelor degree	403	57.0
Master degree and above	151	21.4
Higher secondary	92	13.0
Secondary and below	61	8.6
Occupation		
Student	426	60.3
Govt./Private job	127	18.0
Business	86	12.2
Unemployed	68	9.6
Socio-economic class		
High	230	32.5
Moderate	286	40.5
Low	191	27.0
No of family member		
Less than 5	329	46.5
Between 5-7	260	36.8
More than 7	118	16.7
Place of residence		
Urban	455	64.4
Rural	252	35.6
Divisional classification		
Dhaka division	319	45.1
Chittagong division	207	29.3
Rangpur division	127	18.0
Others	54	7.6

Knowledge

The mean Covid-19 knowledge score for participants was 8.5 (SD: 2.6 range 0–13). Participant's overall correct answer rate of this knowledge test was between 30.7 to 94.6%. About 61.2% of the participants scored 80% or more and considered having adequate knowledge. A higher proportion of the participants (n = 646, 91.4%) was identified common clinical symptoms of COVID-19, and wearing a face mask is an effective way to prevent transmission of COVID-19 (n = 632, 89.4%). Besides, people should avoid going to crowded places and avoid taking public transportations (n = 629, 89.0%). However, noticeable confusion was found among participants regarding the mode of transmission of COVID-19 and only 38.0% of participants correctly reposed that COVID-19 virus is not airborne and very few (n = 306, 43.3%) were able to respond correctly when asked if eating and touching wild animals could result in infection (**Table 2**). Participant's knowledge scores significantly differed across age-groups, genders, education levels, socio-economic classes, and residence places ($p < 0.05$, **Table 3**). Regression analysis had done to reveal factors associated with adequate knowledge of the participants and found that female participants had higher odds of having adequate knowledge (vs. male, OR: 2.75, 95% CI = 1.82-3.45, $p = 0.000$). Similarly, participants who had a master degree and above (vs. secondary and blow, OR: 2.52, 95% CI = 1.35-4.67, $p = 0.003$) and belongs to an urban area (vs. rural, OR: 3.02, 95% CI = 2.12-4.01, $p = 0.000$) had higher odds of having adequate knowledge than other counterparts (**Table 4**).

Table 2: Knowledge about COVID-19 among the participants (n =707)

Knowledge Question	True n (%)	False n (%)	Not sure n (%)
The major clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia. (True)	646 (91.4)	32 (4.5)	29 (4.1)
Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19 virus. (True)	339 (47.9)	248 (35.1)	120 (17.0)
There currently is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection. (True)	519 (73.4)	59 (8.3)	129 (18.2)
Not all persons with COVID-2019 will develop to severe cases. Only those who are elderly and have chronic illnesses are more likely to be severe cases. (True)	617 (87.3)	51 (7.2)	39 (5.5)
Eating or touching wild animals would result in the infection by the COVID-19 virus. (False)	259 (36.6)	306 (43.3)	142 (20.1)
Persons with COVID-19 cannot infect the virus to others if they do not have a fever. (False)	98 (13.9)	571 (80.8)	38 (5.4)
The COVID-19 can spread via respiratory droplets of infected individuals. (True)	586 (82.9)	78 (11.0)	43 (6.1)
The virus of COVID-19 is airborne. (False)	364 (51.1)	269 (38.0)	974 (10.5)
Ordinary residents can wear face masks to prevent the infection by the COVID-19 virus. (True)	632 (89.4)	50 (7.1)	25 (3.5)
It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus. (False)	120 (17.0)	532 (75.2)	55 (7.8)
To prevent the infection by COVID-19, individuals should avoid going to crowded places and avoid taking public transportations. (True)	629 (89.0)	61 (8.6)	17 (2.4)
Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus. (True)	616 (87.1)	62 (8.8)	29 (4.1)
People who have contact with someone infected with the COVID-19 virus should be immediately isolated for 14 days. (True)	574 (81.2)	81 (11.5)	55 (7.8)

Table 3: Relation between socio-demographic characteristics and mean KAP score (n =707)

Variable	Knowledge			Attitude			Practice		
	Mean ± SD	t / F	p-value	Mean ± SD	t / F	p-value	Mean ± SD	t / F	p-value
Age (years)									
18-23	8.14 ± 2.68	3.865	0.021	2.61 ± 0.34	4.825	0.008	2.44 ± 0.36	1.709	0.182
24-29	8.46 ± 2.57			2.70 ± 0.32			2.51 ± 0.37		
30 or more	9.00 ± 2.48			2.81 ± 0.29			2.47 ± 0.36		
Gender									
Male	8.16 ± 2.73	14.834	<0.001	2.68 ± 0.32	0.584	0.445	2.20 ± 0.34	5.269	<0.001
Female	8.91 ± 2.33			2.70 ± 0.33			2.87 ± 0.39		
Marital status									
Unmarried	8.67 ± 2.50	0.567	0.523	2.42 ± 0.36	3.235	0.034	2.46 ± 0.36	2.232	0.136
Married	8.55 ± 2.75			2.69 ± 0.32			2.51 ± 0.38		
Education level									
Bachelor degree	8.48 ± 2.56	4.179	0.006	2.71 ± 0.34	5.346	0.003	2.55 ± 0.37	3.234	0.024
Master degree and above	9.01 ± 2.29			2.81 ± 0.32			2.71 ± 0.34		
Higher secondary	8.07 ± 2.77			2.54 ± 0.35			2.38 ± 0.36		
Secondary and below	7.84 ± 2.99			2.33 ± 0.34			2.29 ± 0.35		
Occupation									
Student	8.53 ± 2.58	0.982	0.401	2.70 ± 0.32	0.651	0.582	2.51 ± 0.36	0.475	0.700
Govt./Private job	8.69 ± 2.59			2.67 ± 0.30			2.47 ± 0.35		
Business	8.28 ± 2.57			2.64 ± 0.34			2.45 ± 0.35		
Unemployed	8.10 ± 2.67			2.69 ± 0.33			2.46 ± 0.39		
Socio-economic class									
High	8.80 ± 2.43	3.573	0.029	2.69 ± 0.31	0.447	0.640	2.68 ± 0.34	4.254	0.005
Moderate	8.48 ± 2.56			2.69 ± 0.30			2.42 ± 0.37		
Low	8.12 ± 2.82			2.66 ± 0.34			2.21 ± 0.36		
No of family member									
Less than 5	8.41 ± 2.61	1.097	0.334	2.67 ± 0.32	1.057	0.348	2.49 ± 0.35	0.727	0.484
Between 5-7	8.67 ± 2.40			2.71 ± 0.30			2.42 ± 0.37		
More than 7	8.29 ± 2.91			2.68 ± 0.32			2.44 ± 0.39		
Place of residence									
Urban	8.89 ± 2.34	31.864	<0.001	2.71 ± 0.30	7.046	0.008	2.54 ± 0.35	41.783	<0.001
Rural	7.76 ± 2.78			2.64 ± 0.35			2.36 ± 0.36		
Divisional classification									
Dhaka division	8.61 ± 2.48	1.856	0.448	2.69 ± 0.32	0.186	0.906	2.47 ± 0.37	0.039	0.990
Chittagong division	8.53 ± 2.43			2.68 ± 0.33			2.48 ± 0.36		
Rangpur division	8.40 ± 2.78			2.67 ± 0.31			2.48 ± 0.35		
Others	8.36 ± 3.06			2.69 ± 0.33			2.49 ± 0.36		

Table 4: Results of multiple logistic regression analysis on factors associated with adequate knowledge, positive attitudes and good practices towards COVID-19 (n =707)

Variable	Adequate Knowledge		Positive Attitude		Good practice	
	n (%)	OR (95% CI)	n (%)	OR (95% CI)	n (%)	OR (95% CI)
Age (years)						
18-23	81 (18.7)	Ref.	102 (18.4)	Ref.	65 (17.8)	Ref.
24-29	270 (62.4)	1.33 (0.91-1.95)	352 (63.1)	1.21 (0.92-2.14)	217 (59.5)	1.19 (0.74-1.93)
30 or more	82 (18.9)	1.55 (0.95-2.54)	104 (18.5)	2.00 (1.18-2.78)**	83 (22.7)	1.03 (0.77-1.39)
Gender						
Male	225 (52.0)	Ref.	243 (43.5)	Ref.	155 (42.5)	Ref.
Female	208 (48.0)	2.75 (1.82-3.45)***	315 (56.5)	0.87 (0.61-1.26)	210 (57.5)	3.23 (2.13-6.57)**
Marital status						
Unmarried	325 (75.1)	1.28 (0.64-2.97)	399 (71.5)	1.28 (0.66-1.47)	257 (70.4)	1.13 (0.81-1.56)
Married	108 (24.9)	Ref.	159 (28.4)	Ref.	108 (29.6)	Ref.
Education level						
Bachelor degree	245 (56.6)	1.41 (0.82-2.41)	319 (57.2)	1.52 (0.72-3.21)	212 (58.1)	1.06 (0.58-1.73)
Master degree and above	111 (25.6)	2.52 (1.35-4.67)**	117 (21.0)	0.91 (0.58-1.42)	74 (20.3)	1.44 (1.03-2.02)*
Higher secondary	45 (10.4)	0.87 (0.45-1.66)	70 (12.5)	0.84 (0.49-1.43)	47 (12.9)	0.95 (0.49-1.81)
Secondary and below	32 (7.4)	Ref.	52 (9.3)	Ref.	32 (8.8)	Ref.
Occupation						
Student	264 (61.0)	1.21 (0.72-2.04)	342 (61.3)	0.87 (0.43-1.79)	218 (59.7)	2.35 (1.01-5.67)
Govt./Private job	82 (18.9)	1.36 (0.74-2.48)	98 (17.6)	1.06 (0.56-1.99)	64 (17.5)	4.82 (1.45-17.23)**
Unemployed	48 (11.1)	0.94 (0.49-1.79)	64 (11.5)	0.75 (0.35-1.62)	48 (13.2)	0.92 (0.31-2.86)
Business	39 (9.0)	Ref.	54 (9.7)	Ref.	35 (9.6)	Ref.
Socio-economic class						
High	151 (34.9)	1.14 (0.72-1.80)	181 (32.4)	1.50 (1.01-2.23)*	122 (33.4)	3.7 (0.83-16.81)
Moderate	175 (40.4)	1.29 (0.83-2.02)	231 (41.4)	1.24 (0.85-1.79)	149 (40.8)	1.12 (0.78-1.62)
Low	107 (24.7)	Ref.	146 (26.2)	Ref.	94 (25.8)	Ref.
No of family member						
Less than 5	197 (45.5)	1.02 (0.67-1.57)	255 (45.7)	1.07 (0.65-1.76)	182 (49.9)	1.37 (0.89-2.09)
Between 5-7	166 (38.3)	1.21 (0.781.89)	213 (38.2)	1.41 (0.83-2.39)	127 (34.8)	1.05 (0.684-1.63)
More than 7	70 (16.7)	Ref.	90 (16.1)	Ref.	56 (15.3)	Ref.
Place of residence						
Urban	320 (73.9)	3.02 (2.12-4.01)***	375 (67.2)	1.23 (0.98-2.56)	272 (74.5)	5.42 (2.32-18.71)***
Rural	113 (26.1)	Ref.	183 (32.8)	Ref.	93 (25.5)	Ref.
Divisional classification						
Dhaka division	197 (45.5)	1.21 (1.16-2.82)	256 (45.9)	1.26 (0.65-2.55)	166 (45.5)	0.81 (0.45-1.44)
Chittagong division	137 (31.6)	1.12 (0.98-2.99)	160 (28.7)	1.08 (0.53-2.18)	104 (28.5)	0.75 (0.41-1.37)
Rangpur division	76 (17.6)	1.56 (1.83-2.53)	101 (18.1)	1.23 (0.57-2.63)	64 (17.5)	0.75 (0.39-1.43)
Others	23 (5.3)	Ref.	41 (7.3)	Ref.	31 (8.5)	Ref.
Knowledge level						
Adequate	---	---	345 (61.8)	6.41 (2.34-25.56)***	222 (60.8)	8.93 (3.92- 38.42)***
Poor			213 (38.2)	Ref.	143 (39.2)	Ref.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Attitude

When participants were asked question regarding attitudes on COVID-19 found that majority of the participants had a positive attitude towards COVID-19 ($n = 558, 78.9\%$) with mean attitude score 2.7 (SD: 0.3). About 87% (614) of the participants agreed that COVID-19 would successfully be controlled with the rate of reporting “disagree” and “not sure” was 4.2% and 8.9% respectively. When participants asked whether Bangladesh was handling the COVID-19 health crisis well most of the participants ($n = 595, 84.2\%$) agreed with this statement with rates of disagreement and uncertainty were at 5.8% and 10%. However, 55.3% ($n = 391$) believed that COVID-19 is a deadly disease when asked about the severity of the disease. Even so, participants were optimistic that self-awareness is necessary to remain free from COVID-19 with an 80.1% agreement (**Figure 2**). There found a statistically significant association between attitude and socio-demographic variables such as age groups, marital status, education level, and place of residence ($p < 0.05$, **Table 3**). Participants age-groups 30 years or more (vs. 18-23 years, OR: 2.00, 95% CI = 1.18-2.78, $p = 0.006$), belongs to high socio-economic class (vs. low, OR: 1.50, 95% CI = 1.01-2.23, $p = 0.024$) and having adequate knowledge (vs. poor, OR: 6.41, 95% CI = 2.34-25.56, $p = 0.000$) were more likely to have positive attitude (**Table 4**).

Practices

In terms of practices towards COVID-19 among participants found that 75.2% ($n = 532$) always washed hands with soap or hand-sanitizer thoroughly and up to 70.6% ($n = 499$) always wore a mask when going outside the home in recent days. Even though 33.9% ($n = 240$) and 14.6% ($n = 130$) of participants reported “occasionally” and “never” maintained safe distance with people (3 feet) when going outside the home. Meanwhile, only 62.1% ($n = 439$) of participants avoided gone to any crowded place with a rate of reporting “occasionally” and “never” was 30.0% and 7.9% respectively. The overall mean practice score of the participants was 2.5 (SD: 0.4) with only 51.6% ($n = 365$) had a good practice on COVID-19. Participant's mean practice score was significantly different in terms of gender, education level, socio-economic class, and place of residence ($p < 0.05$, **Table 3**). Multivariate analysis showed that participants with age group 30 years or more (vs. 18-23 years, OR: 3.23, 95% CI = 2.13-6.57, $p = 0.005$), gender status female (vs. male, OR: 3.23, 95% CI = 2.13-6.57, $p = 0.005$) with occupation govt. /private job (vs. business, OR: 4.82, 95% CI = 1.45–17.23, $p = 0.003$) and resided in urban area (vs. rural, OR: 5.42, 95% CI = 2.32-18.71, $p = 0.000$) and having adequate knowledge (vs. poor, OR: 8.93, 95% CI = 3.92- 38.42, $p = 0.000$) were more likely to have good practices (**Table 4**).

Discussion

In the present study, we evaluated knowledge, attitudes, and practices towards COVID-19 among young adults in Bangladesh. The study found that about six in every ten (61.2%) young adults had adequate knowledge about COVID-19, which implies that a significant proportion of Bangladeshi young adults had poor knowledge about COVID-19. This knowledge score, however, is higher than that recorded among Bangladeshi people (Haque et al. 2020) (54.87%) but far lower than the COVID-19 knowledge score among Chinese (90%) (Zhong et al. 2020) and US residents (80%) (Clements 2020). Low knowledge score regarding COVID-19 in this study has its roots partly in the participant's low exposure to government-stipulated information or advertising regarding COVID-19 since the outbreak began. Furthermore, the lack of seriousness in terms of reported cases and death from COVID-19 makes Bangladeshi residents unwilling to know about this infectious disease rigorously. This study also identified that majority of the Bangladeshi young adults access knowledge regarding COVID-19 mainly through social media such as Facebook, WhatsApp which is analogous with a recent COVID-19 study conducted by Farhana, (2020). This finding also justified by the fact that a vast majority of Bangladeshi young adults relying on the internet and social media in their regular lifestyle and during lockdown initiative amid COVID-19 which is increased by 15-20% (Hossain 2020).

A substantial number of sociodemographic factors significantly affect participant's knowledge scores such as age-groups, genders, education levels, socio-economic classes, and places of residence which were quite similar to a study by Haque et al.

(2020). Multiple regression analysis found participant's adequate knowledge was dominated by factors such as gender, marital status, education, and place of residence. Female participants were more likely to have adequate knowledge. This finding was surprisingly similar to a cross-cultural KAP study by Ali et al. (2020). Higher education level was significantly associated with having adequate knowledge which can be justified by previous studies (Erfani et al., 2020; Farhana, 2020). This shows a substantial educational gap, possibly reflecting substandard information to the public and dissemination concerning COVID-19. Thus, customizing the information obtained upon on epidemic by health authorities as well as other news agencies need to tackle the multifaceted complexity of drivers contributing to lesser knowledge.

The present study found that a large majority of participants were optimistic and showed a positive attitude (79%) toward overcoming COVID-19. Approximately eighty-seven percent concur that the virus can be successfully controlled, and 84.2% of participants were confident that the Bangladeshi government was handling the health crisis very well. A high level of positive attitude among participants regarding COVID-19 also found in studies conducted among people in Malaysia and Saudi-Arabia (Al-Hanawi et al. 2020; Azlan et al. 2020). Positive attitudes and high confidence in the control of COVID-19 can be interpreted by the Bangladesh government's unprecedented response in taking stringent control and precautionary steps including the lockdown, and suspension of all domestic and international flights, prayer at mosques, the closing of all offices and educational institutions to safeguard citizens from COVID-19 (WHO 2020d). Evidence from the SARS epidemic in China also showed high confidence among residents (70.1-88.9%) that SARS can be successfully controlled and a recent KAP study by Zhong et al. (2020) on COVID-19 also found positive attitude among 90.8% Chinese people. Participant's attitudes differ by age, marital status, education, and place of residence. In contrast, a study in Thailand found participants' attitudes were not affected by age, gender, experience, and job/occupation (Srichan et al. 2020). Sociodemographic factors such as older age, high socio-economic class, and adequate knowledge were associated with more positive attitudes regarding COVID-19 employed, overall recapitulating previous findings by Zannatul et al. (2020). Participants' positive attitude was significantly correlated with the level of COVID-19 knowledge, similarly study among Chinese citizens observed that high COVID-19 scores were positively aligned with less possibility of "disagreement" and "unsure" responses to attitude questions (Zhong et al. 2020).

Although attitudes towards COVID-19 were optimistic, the present study exhibits still a notable proportion (48.4%) of the young adults in Bangladesh who did not have good preventive practices to COVID-19. In terms of practicing hand hygiene, about three fourth of the participants (75.2%) stated that they always wash their hands with soap or hand sanitizer which was remarkably similar with findings of other studies (Al-Hanawi et al. 2020; Olum et al. 2020) except for a study in Thailand which found 54.8% did not regularly use soap during washing of hands (Srichan et al. 2020). About ninety percent of participants respond positively to wearing masks when going outside the home. this finding is similar to previous KAP studies regarding COVID-19 (Erfani et al. 2020; Rahman and Sathi 2020) but contradictory to study conducted among Malaysian people which found 51.2% of participants reported wearing a face mask when going out in public (Azlan et al. 2020). Unfortunately, still, a significant proportion of Bangladeshi adults reluctant to appropriate preventive practices in terms of avoiding going to any crowded place in contradiction to finding among Nepalese people which showed about 94% of the participants had avoided visiting any crowded place (Asraf et al. 2020). This vast variety in finding due to the fact that although Bangladeshi government imposed a nationwide lockdown and social distancing measures young adults show negligence to obey rules because of the participant's poor knowledge regarding the high infectivity of the COVID-19 virus, which can be easily transmitted between people via invisible respiratory droplets. Another underlying reason may be that Bangladeshi young adults feel less susceptible to COVID-19 as stated by WHO compared to the child and older people (Tian et al. 2020). Factors interplay with inappropriate preventive practices were male gender, occupation of "students" and unemployed, residing in a rural area, and had poor COVID-19 knowledge. This study reveals an obvious fact that male participants had potentially inappropriate practices and in high risk of COVID-19. Such findings demonstrate the value of optimizing the COVID-19 knowledge of residents through education programs explicitly engaging certain demographic groups, which can also contribute to improvements in their attitudes and practices towards COVID-19.

Conclusion

In summary, the present research was able to have an extensive evaluation of Bangladeshi young adults KAP toward COVID-19. Our findings have shown that a considerable number of young adults in Bangladesh are adequately knowledgeable with COVID-19 and have shown a positive attitude, but are insensitive to appropriate preventive measures, which can be alarming. While the government has taken substantial steps to minimize the spread of the virus, further endeavors have been required to support the groups most significantly impacted. Effective health education campaigns aimed at enhancing knowledge of COVID-19 are therefore desperately needed to help people encourage an even more positive mindset and maintain appropriate preventive practices.

Limitations Of The Study

This study has several limitations. Firstly, this study followed a cross-sectional study design that cannot establish causal inferences. Secondly, self-reporting interviews were used to collect data instead of face-to-face interviews which is prone to social desirability and declarative memory biases. Thirdly, this study used an online survey with a convenience sample through the networks of the researchers and disseminated through different social media platforms (Facebook, WhatsApp, etc.). As a result, there is a possibility of bias as underprivileged populations may not have been able to participate in the study, thereby restricted to only those with internet access, and consequently unlikely to represent an accurate reflection of the whole Bangladeshi young adults.

Declarations

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Compliance with ethical standards

Ethical approval

This research was conducted in accordance with the Biosafety, Biosecurity, and Ethical Clearance Committee of Jahangirnagar University, Dhaka-1342, Bangladesh.

Informed Consent

This study is considered a primary data set and the participants were given no economic motivation, and anonymity was maintained to make sure data confidentiality and reliability. It was also notified that at any time, participants could withdraw from the survey without giving any justification.

Conflict of interest

The authors declare that they have no conflict of interest

Funding

The authors declare that no funding has been received for this study from any individuals or organizations

Statement of Ethics approval

The study was performed in accordance with guidelines of the Biosafety, Biosecurity, and Ethical Clearance Committee of Jahangirnagar University, Dhaka-1342, Bangladesh. All procedures performed in studies involving human participants were following the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Statement of Participant Consent

This study is maintained ethical standards to the highest possible extent. Even if data was collected online, informed consent was obtained from each participant included in the study. Furthermore, anonymity was maintained to make sure data confidentiality and reliability.

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Figures

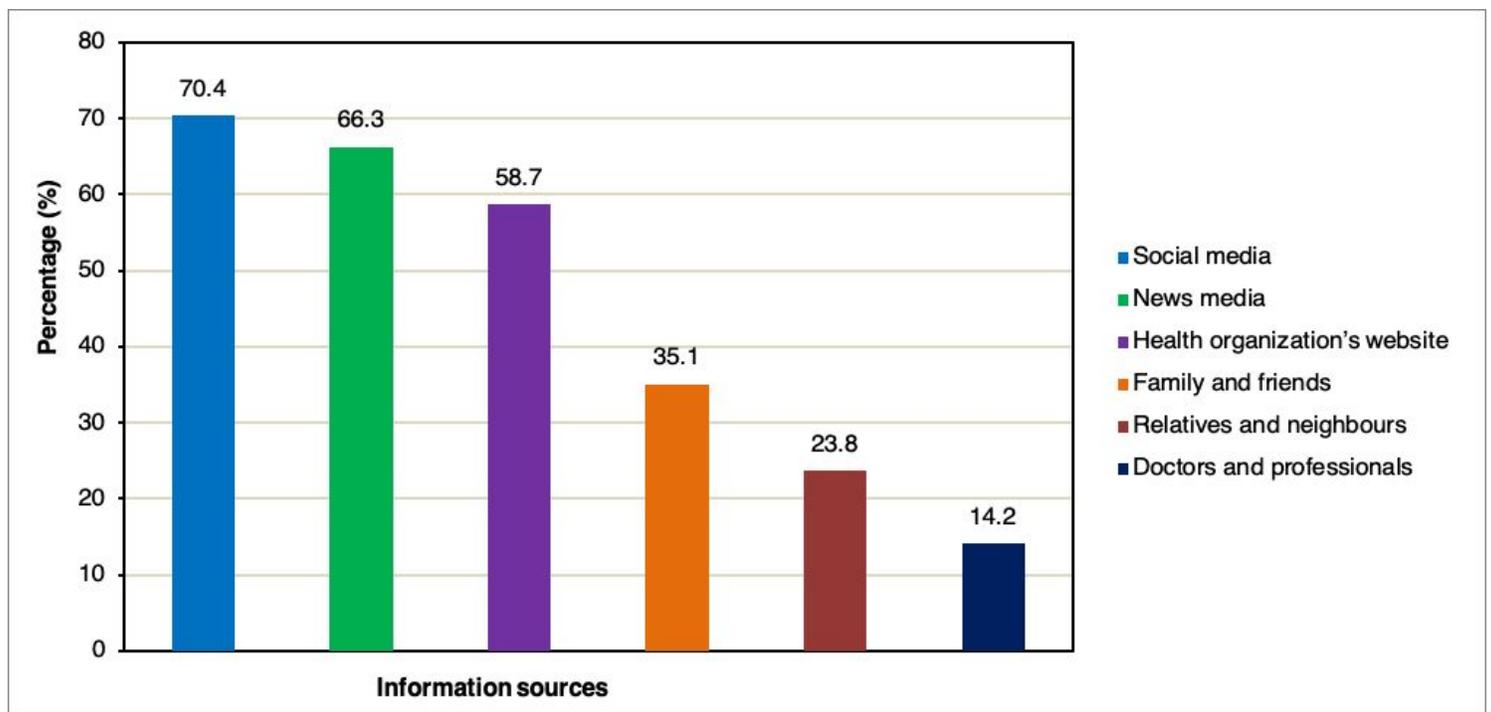


Figure 1

Sources of information regarding COVID-19 among participants.

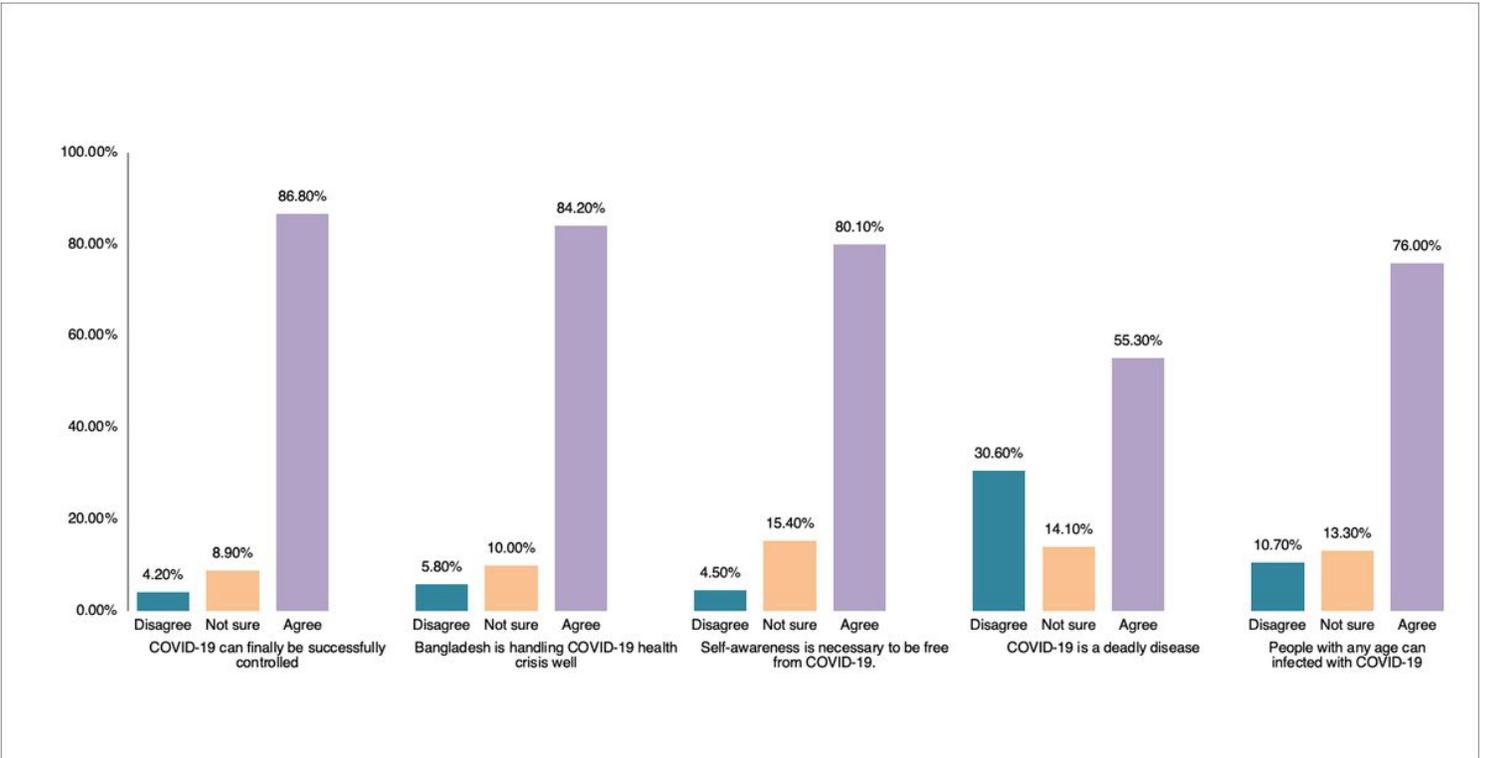


Figure 2

Attitudes of the participants towards COVID-19 (n =707)

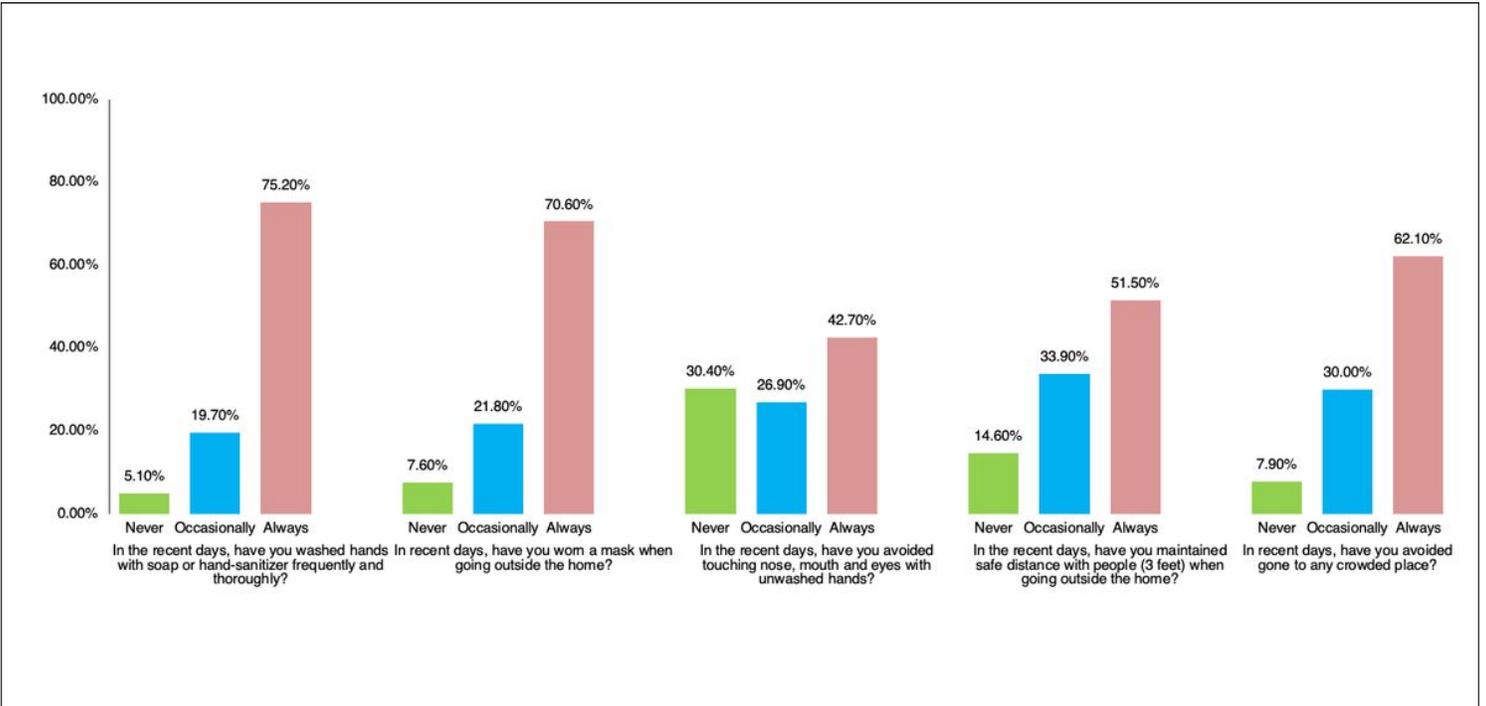


Figure 3

Practices of the participants towards COVID-19 (n =707)