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ORIGINAL ARTICLE

Assessment of Bangladeshi People's Knowledge, Awareness, Precautionary Behavior and Preventive Actions During the COVID-19 Pandemic: A Cross-sectional Survey

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ABSTRACT

Introduction: Novel coronavirus (COVID-19) pandemic is a global burden where fear, anxiety and lack of knowledge, awareness and preventive measures play pivotal role for community transmission. Authority of each nation is strictly approaching various health related guidelines and awareness campaigns. However, the present study was aimed to assess Bangladeshi people pattern of adherence with the health principles, level of knowledge and awareness of community transmission about the virus. **Methods:** A cross-sectional online survey was conducted among the general people from 13 to 19 August 2020 by using a pre-assessed and validated questionnaire with the help of google tool and form. Total 1014 respondents were participated. Using SPSS software, chi-square (χ^2) statistic was calculated to analyze the significance of knowledge level, risk perception, actions and precautionary behavior of participants according to their educational level and age group. **Results:** Among the respondents, male (85%) were more knowledgeable than female (82.53%). Correctness of answers was maximum (92.31%) in 41-50 age group and minimum (69.23%) in 51-60 age group. Post graduated participants had the highest knowledge while students of secondary level had the lowest knowledge on it. Although, maintenance of personal hygiene was proportional with the educational status, but it had no significant variance regarding age. Taking medication without doctor advice showed similar character on sex, but it was considerably varied on ages. **Conclusion:** The study clearly indicated that knowledge, awareness, risk perception and preventive practices about COVID-19 significantly associated with age and education. A comprehensive public health strategy and additional effort is necessary to facilitate precautionary actions to limit the COVID-19 transmission.

Keywords: COVID-19, Perception, Precautionary action, Knowledge, Awareness

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INTRODUCTION

Coronavirus is a single stranded RNA virus of *Coronaviridae* family under the order of Nidovirales (1). It was identified in 1937 and denoted as corona virus due to crown like appearance during microscopic observation in 1965 (2-4). Later several types of coronavirus have been categorized among these alpha coronaviruses (HCoV-229E and HCoV-NL63) and beta coronaviruses (HCoV-OC43 and HCoV-HKU1) develop severe acute respiratory syndrome (SARS), while MERS-CoV, third types, responsible for zoonotic outbreak of Middle East respiratory syndrome (MERS) (2, 5-7).

However, the world has witnessed a new (novel) type of coronavirus at the end of December-2019, designated as SARS-CoV-2, that induce the ailment noted as coronavirus disease 2019 (COVID-19) (8-10).

Being a zoonotic virus, Coronavirus can easily transmit from animal to human, human to animal as well as human to human (11, 12). Although scientists are yet to clarify the real source of SARS-CoV-2, they assumed that it has transferred from sea food or animal market in Wuhan city of Hubei Province in China the location where the first cases of COVID-19 has been reported (13, 14). Because of highly contagious nature, it has spread throughout the world within a short period of time and immersed the world under COVID-19 pandemic (15, 16). Interpersonal transmission of the virus is strongly related to close contact with infected individual or through respiratory droplets during sneezing or

coughing which can land on mouth, nose or eyes of the people who are nearby of the infected individual or can travel through aerosol (17, 18). Besides, the virus can attach on the surface of any objects after exiting from the infected people and can survive for several hours or days (17). This phenomenon of the organism has created a dangerous situation for everyone who will touch the contaminated objects (17).

Infection of the SARS-CoV-2 has reported asymptomatic to respiratory symptoms where shortness of breath, common cold, cough, high fever, sore throat, severe inflammation, digestive symptoms etc. have frequently identified (1, 19-23). In severe condition, cytokine storms induce either amplified immune response or imbalance of adaptive immunity leading to multiple organ damage and subsequently death of infected individuals (23-26). Hematological study of COVID-19 patients reveals various abnormalities including leukopenia, leukocytosis and liver markers disproportion followed by hepatic cell damage due to up regulation of human angiotensin-converting enzyme 2 (ACE-2) in epithelial cells of bile duct (27-29). Although, risk factors of COVID-19 is not fully comprehensible, elderly or comorbid patients with hypertension, diabetes, cardiovascular disease and cancer may be under great risk (30).

Treatment options of SARS-CoV-2 infected patients are within limited choices since no potential antiviral drug has been developed or no safe and effective vaccines have been globally approved yet. Therefore, every individual, whether infected or uninfected, in every corner of the world is in great panic. In this situation, World Health Organization has nothing but figure out some effective guidelines for various stratum of a nation (31, 32).

Bangladesh government has been endeavored to keep the country safe from COVID-19. Besides different government and non-government organizations awareness program, various electric, print and social medias as well as volunteer associations are tirelessly working for improving consciousness to all classes of people (33). The authority has imposed general holidays to the entire country for long time along with zone-wise lockdown, but all the attempts showed limited outcomes, because the country has witnessed significant infection rate (August 30, 2020) (33, 34). Every tire of people including healthcare providers, security forces, media officials and mass people has been badly affected with considerable death toll (35).

The present scenario may induce some question marks about the areas for which the nation is suffering. Searching the potential factor behind it may reveal the lack of awareness and substandard adherence with the guidelines of social distancing and maintaining personal hygiene may be the causative factor of the pandemic situation in Bangladesh. A positive attitude and a good

knowledge about disease, transmission, protective measures and current treatment options on COVID-19 among the citizens can enable the country to minimize the community transmission and impact of the pandemic. To find out the level of knowledge and awareness of mass people some survey have been performed during the COVID-19 outbreak in Bangladesh on a limited number of people at the beginning of the COVID-19 pandemic (12, 13). But several factors like poverty, knowledge on technical terms, treatment option, preventive measures, risk perceptions, actions and precautionary behaviour on COVID-19, population density, educational status, deforestation, climate change etc. have been pointed out as the main factors for outbreak of infectious disease in the third world country (35, 36).

The present study was aimed to observe the pattern of adherence with the health guidelines, level of knowledge and awareness about novel corona virus and the current practices of significant proportion of Bangladeshi common people to maintain personal hygiene to stop further community transmission. The current study will also provide first evidence on knowledge, awareness, risk perception and precautionary behavior of general people during a critical period at the end of nationwide general holiday. It may reveal the important source of drawbacks and population-based evidences that can be focused to overcome the situation and will assist the authority to take proper steps for motivating the inhabitants to stick with the proper guideline for maintaining sound health which will eventually bolster sustainable development of the country.

MATERIALS AND METHODS

Study design, participants and data collection

A cross-sectional online survey was designed and conducted from 13 to 19 August, 2020 among the general people in order to identify the population based evidence about current general public awareness, risk perceptions, actions and precautionary behaviour related to COVID-19 in Bangladesh (37). The socio-demographic characteristics of participants in this study were sex, age and educational level. There were total 1014 respondents participated in the online survey. The survey questionnaire was prepared for google tool, google form and the link of the form was generated and shared on different social media like Facebook, WhatsApp, Viber etc. The inclusion criteria to participants in this survey were being reside in Bangladesh, having internet access and not less than 16 years of old. People who were not interested to participate in the online survey were excluded from the survey. A permission to conduct the survey was taken from the Faculty of Pharmacy, University of Dhaka before starting the study. The reference of application was 29/7/2020 (SN:200).

Study measures

The survey questionnaire was designed in both English

and Bengali. The questionnaire was divided into participants consent, socio-demographic characteristics and three phases of questions which were based on knowledge and awareness, risk perceptions as well as actions and precautionary behavior of respondent against the risk of COVID-19.

Validation of the survey

Some steps were followed to ensure the validity and reliability of the questionnaire before the survey. Firstly, two Bangladeshi experts on epidemiology and public health were asked to review the questionnaire and after their assessment the questionnaire was modified. Then the questionnaire was presented on 30 participants who were excluded from the study sample later. Participants were requested to fill the questionnaire. The process was done twice 2 weeks before starting the original survey. Participants response data were used to find internal consistency reliability using cronbach's alpha (0.73) and test-retest reliability using the intra-class correlation coefficient (0.94). According to the result, the internal consistency reliability was acceptable and excellent.

Statistical data analysis

The data was analyzed by using Microsoft Excel 2019 and Statistical Package for Social Sciences (IBM SPSS Statistics V22) was implemented to do statistical data analysis. Study data were revealed in frequencies and percentage of socio-demographic status of participants, knowledge and awareness about COVID-19 as well as risk perceptions, actions and precautionary behavior on COVID-19 among 1014 participants. SPSS was used to check the association between socio-demographic characteristics (sex, age group, educational level) and level of knowledge ($\leq 50\%$ and $>50\%$) of participants about COVID-19. The term "association" was used in spite of "correlation" because the relationship between two categorical variables was considered and that's why chi-square (χ^2) statistic was calculated to test the significance of the categorical variables. Also, by using SPSS software, χ^2 - statistic was calculated to analyze the significance of risk perceptions, actions, precautionary behavior of participants according to their educational level and age group. Moreover, SPSS was used to analyze how many participants (frequencies, percentage) took preventive measure during this pandemic without doctor's suggestion according to their socio-demographic characteristics.

RESULTS

Socio-demographic characteristics and responses of participants

In this study; socio-demographic characteristics of participants were sex, age and educational level. Total 1014 respondents were participated in the survey where 63.1% was male and 36.7% were female. Age was divided into five groups according to age range of respondents where 81.6% respondents were between

16-30 years. Most of the respondents were higher secondary level completed (46.9%) where graduation and post-graduation level completed respondents were 26.2% and 20.3% respectively (Fig. 1). As the survey was conducted through online it clearly indicates that young population uses more internet than the elderly in Bangladesh.

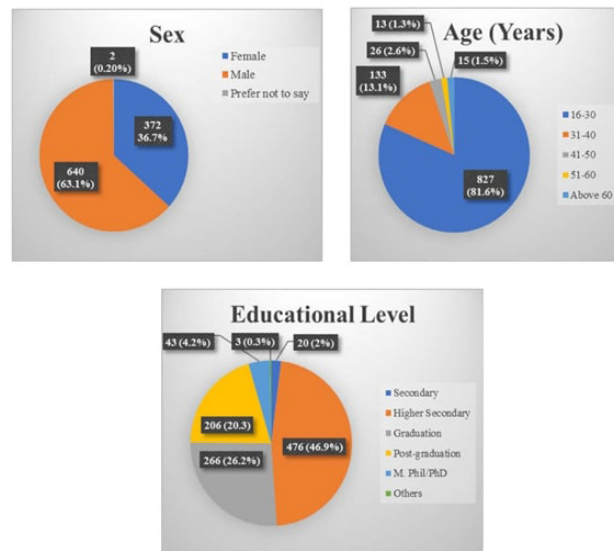


Figure 1: Socio-demographic characteristics of participants (n=1014)

The questionnaire prepared for the survey was divided into three phases where the first phase was designed to know the knowledge and awareness of the respondents, second phase was designed to analyze their risk perceptions and third one was about the actions and precautionary behavior of respondent against the risk of COVID-19. All the responses were analyzed and tabulated according to participant's response frequency and percentage (Table I). The first phase about the knowledge and awareness which was further analyzed according to score (Table II). In first phase, 99.8% of the participants had knowledge about the origin of the COVID-19 outbreak and 96.6% of the participants deemed that virus is responsible for the disease. But participants were in dilemma about people who are at a more fatal risk in COVID-19. 61.2% of them deemed that older are at a more fatal risk where 80.2% of them were agreed that people with certain medical conditions like cancer, chronic kidney disease, COPD etc. are at a more fatal risk in COVID-19. Maximum respondent thought that only supportive care for symptoms of COVID-19 is the only option to treat the affected patients (74.9%) as there is no available preventive medicine or effective vaccine against coronavirus to treat COVID-19 (70.7 and 74% respectively). In second phase, maximum respondents thought that personal protective measures they were taking to try to limit the spread of corona virus will make a difference (82.6%). Most of the respondents were agreed that cleaning hand and working area frequently with soap/detergent/sanitizer/disinfectant, social distancing and wearing mask before

Table I: Knowledge and awareness about COVID-19 as well as risk perceptions, actions and precautionary behavior on COVID-19 among the participants (n=1014)

Related questions	No. of Participants	%
I. Knowledge and awareness		
1. From where the COVID-19 outbreak got started?		
Wuhan, China	1012	99.8
Tokyo, Japan	1	0.1
I don't Know	1	0.1
2. Which one is responsible for COVID-19?		
Virus	980	96.6
Bacteria	6	0.6
Fungus	1	0.1
A bio-weapon	19	1.9
I don't know	8	0.8
3. Getting sick with the corona virus COVID-19 can be fatal.		
Strongly disagree	31	3.1
Disagree	39	3.8
Neutral	194	19.1
Agree	151	14.9
Strongly agree	599	59.1
4. COVID-19 symptoms are usually appeared within		
1-7 Days	171	16.9
2-14 Days	759	74.9
5-10 Days	40	3.9
10-20 Days	25	2.5
I don't know	19	1.9
5. Both symptomatic and asymptomatic patient can spread COVID-19.		
Yes	926	91.3
No	63	6.2
I don't know	25	2.5
6. Is there any preventive medicine available against COVID-19?		
Yes	67	6.6
No	717	70.7
Maybe	201	19.8
I don't Know	29	2.9
7. Is there any effective vaccine available against COVID-19?		
Yes	83	8.2
No	750	74.0
Maybe	145	14.3
I don't know	36	3.6
8. What is the current effective treatment for COVID-19?		
Antibiotic drug available	58	5.7
Antiviral drug available	99	9.8
Supportive care for symptoms	759	74.9
I don't know	98	9.7
9. Can antibiotics treat this disease?		
Yes	106	10.5
No	567	55.9
Maybe	244	24.1
I don't know	97	9.6
10. Does novel corona virus cause permanent damage to some organs of patient even after recovery?		
Yes	287	28.3
No	286	28.2
Maybe	248	24.5
I don't know	193	19.0
II. Risk perceptions		
11. Do you think the personal protective measures you are taking to try to limit the spread of corona virus make a difference?		
Yes	838	82.6
No	44	4.3
Not sure	132	13.0
12. Do you think that washing hands and cleaning working area frequently with soap/detergent/sanitizer/disinfectant is sufficient for preventing COVID-19?		
Yes	372	36.7
No	396	39.1
Maybe	238	23.5
I don't know	8	0.8
13. Social distancing can prevent COVID-19.		
Strongly disagree	15	1.5
Disagree	28	2.8
Neutral	169	16.7
Agree	289	28.5
Strongly agree	513	50.6
14. Do you know the difference between quarantine and isolation?		
Yes	970	95.7
No	44	4.3
15. Can wearing mask before going outside prevent COVID-19?		
Yes	576	56.8
No	76	7.5
Maybe	356	35.1
I don't know	6	0.6

(continue.....)

(continued.....)

Related questions	No. of Participants	%
II. Risk perceptions		
16. Weather and temperature can decrease the spreading of corona virus.		
Strongly disagree	264	26.0
Disagree	175	17.3
Neutral	332	32.7
Agree	119	11.7
Strongly agree	124	12.2
17. In your locality the price and availability of protective equipment such as face masks, eyeglasses and hand sanitizer are within the reasonable limit.		
Strongly disagree	212	20.9
Disagree	181	17.9
Neutral	293	28.9
Agree	180	17.8
Strongly agree	148	14.6
18. Drinking warm water or gargle with hot water/mouth wash will protect you from COVID-19.		
Strongly disagree	57	5.6
Disagree	91	9.0
Neutral	331	32.6
Agree	299	29.5
Strongly agree	236	23.3
19. Do you think Bangladesh will overcome this pandemic situation within 2020?		
Yes	210	20.7
No	328	32.3
Maybe	372	36.7
No comment	104	10.3
III. Actions and precautionary behavior		
20. Do you wash your hands at least 20 seconds with soap?		
Yes	799	78.8
No	35	3.5
Sometimes	180	17.8
21. Before going to outside do you wear mask?		
Yes	955	94.2
No	12	1.2
Sometimes	47	4.6
22. Do you clean or change your mask regularly?		
Yes	935	92.2
No	51	5.0
Maybe	26	2.6
I don't use mask	2	0.2
23. For COVID-19 preventive measures have you taken any medicine or supplements during this pandemic without doctor's prescription?		
Yes	232	22.9
No	782	77.1

going outside can prevent spreading COVID-19 (36.7%, 50.6% and 56.8% respectively). Many respondents were neutral when the question was about the effect of temperature and weather on spreading the disease (32.7%). Moreover, most of the respondents have the knowledge about social distancing and the difference between quarantine and isolation (95.7%). Peoples were neutral about drinking warm water or gargle with hot water/mouth wash will give protection from COVID-19 (32.6%). However, most of the peoples were in dilemma that may be Bangladesh will overcome this pandemic within 2020 (36.7%).

In third phase the actions and precautionary behavior of respondents were analyzed. Most of the respondents wash their hands at least 20 seconds, wear mask before going outside and change or clean their mask regularly (78.8%, 94.2 and 92.2 respectively). But one alarming issue was also revealed that 22.9% respondents were taking medicine or other supplements during this COVID-19 pandemic without any consultation of doctor. All the phases, questions and respective frequency are tabulated in Table I.

Table II: Association between socio-demographic characteristics and level of knowledge of participants about COVID-19

Socio-demographic characteristics		Knowledge group		Total	Chi-square (χ^2) statistic	p-value
		≤50% Correct Count (%)	>50% Correct Count (%)			
Sex	Female	65 (17.47%)	307 (82.53%)	372 (100%)	2.8	0.247
	Male	96 (15%)	544 (85%)	640 (100%)		
	Prefer not to say	1 (50%)	1 (50%)	2 (100%)		
Age (years)	16-30	142 (17.17%)	685 (82.83%)	827 (100%)	9.196	0.056
	31-40	12 (9.02%)	121 (90.98%)	133 (100%)		
	41-50	2 (7.69%)	24 (92.31%)	26 (100%)		
	51-60	4 (30.77%)	9 (69.23%)	13 (100%)		
	Above 60	2 (13.33%)	13 (86.67%)	15 (100%)		
Educational level	Secondary	10 (50%)	10 (50%)	20 (100%)	34.002	0.000*
	Higher Secondary	90 (18.91%)	386 (81.09%)	476 (100%)		
	Graduation	42 (15.79%)	224 (84.21%)	266 (100%)		
	Post-graduation	15 (7.28%)	191 (92.72%)	206 (100%)		
	M. Phil/PhD	4 (9.30%)	39 (90.70%)	43 (100%)		
	Others	1 (33.33%)	2 (66.67%)	3 (100%)		

*Significant using chi-square test where P value < 0.05

Knowledge and awareness about COVID-19

The motive of this study was to find out the knowledge level of participants about COVID-19 according to their socio-demographic status. Knowledge score depended on level of knowledge and awareness, so it was calculated based on that topic. 10 questions were knowledge related, among them the correct answer was considered 0-5 as “knowledge score ≤50%” and 6-10 as “knowledge score >50%”.

Sex variable had three categories (Female, male, prefer not to say). Result revealed that male participants had slightly more knowledge and awareness about COVID-19 compared to female participants (85% vs 82.53%; Table II). There were only two participants who didn't want to mention their sex and one of them answered correctly with knowledge score more than 50%. Here the association between sex variable and knowledge score was considered to find out if there any significant difference occurred or not. Since both were categorical variable, chi-square (χ^2) statistic (2.8) was tested where p-value was found 0.247 that means there was no significant difference between sex and knowledge.

Then age variable was considered where the variable was divided into five categories (i.e., 16-30, 31-40, 41-50, 51-60 and above 60). Among all of the age groups, 41-50 years aged persons answered maximum answer correctly (92.31%) compared to other age group participants (31-40 with 90.98%, above 60 with 86.67%, 16-30 with 82.83%) whereas the participants who belong 51-60 years age group, didn't answer the questions appropriately (69.23%). That may interpret that according to this analysis 41-50 years aged participants had higher knowledge and 51-60 years old person's knowledge level was low about COVID-19. The association between age groups and knowledge score was analyzed and p-value was found 0.056 which was not significant at 5% level of significance, but it was significant at 10% level of significance. That means, significant difference occurred between these

two variables at 10% level of significance.

Another socio-demographic characteristic variable was educational level. The categories were secondary, higher secondary, graduation, post-graduation, M. Phil/PhD and others. The participants who completed post-graduation (92.72%) and M. Phil/PhD (90.70%) degree had more knowledge and awareness about COVID-19 than others. Among rest of the categories, graduation completed participants had more knowledge (84.21%) than higher secondary (81.09%) and secondary (50%). Here the chi-square statistic (34.002) was used to measure the association between educational level and knowledge score and p-value found 0.000 which was significant, that means there was significant difference between educational level and knowledge.

Here three combinations, sex vs knowledge score, age group vs knowledge score and educational level vs knowledge score were considered. Among all of them, educational level showed significant with knowledge score at 5% level of significance, age group showed significant with knowledge score at 10% level of significance. But sex variable and knowledge score were not significant at all. So, further analysis of phases (risk perceptions, actions and precautionary behavior) were done according to age group and educational level.

Relationship between educational level and risk perceptions, actions, precautionary behavior

The question no 1-9 listed in Table III were considered as risk perceptions and question no 10-13 were considered as actions and precautionary behavior. Here the association between educational level and risk perceptions of participants were analyzed. Washing hands and cleaning working area, social distancing, difference between quarantine and isolation, wearing mask, weather and temperature, price and availability of protective equipment, drinking warm water, overcome of pandemic situation had significant difference with educational level because the p-value was <0.05 for all of this cases. Only the variable personal protective

Table III: Association between educational level and risk perceptions, actions, precautionary behavior of participants (n=1014)

Topic	Related questions	χ^2	df	p-value
Risk perceptions	1. Do you think the personal protective measures you are taking to try to limit the spread of corona virus make a difference?	12.40	10	0.259
	2. Do you think that washing hands and cleaning working area frequently with soap/detergent/sanitizer/disinfectant is sufficient for preventing COVID-19?	52.65	15	0.000*
	3. Social distancing can prevent COVID-19.	45.94	20	0.001*
	4. Do you know the difference between quarantine and isolation?	33.77	5	0.000*
	5. Can wearing mask before going outside prevent COVID-19?	62.38	15	0.000*
	6. Weather and temperature can decrease the spreading of corona virus.	40.77	20	0.004*
	7. In your locality the price and availability of protective equipment such as face masks, eyeglasses and hand sanitizer are within the reasonable limit.	35.48	20	0.018*
	8. Drinking warm water or gargle with hot water/mouth wash will protect you from COVID-19.	40.93	20	0.004*
	9. Do you think Bangladesh will overcome this pandemic situation within 2020?	29.62	15	0.013*
Actions and precautionary behavior	10. Do you wash your hands at least 20 seconds with soap?	48.49	10	0.000*
	11. Before going to outside do you wear mask?	4.65	8	0.794
	12. Do you clean or change your mask regularly?	5.15	12	0.953
	13. For COVID-19 preventive measures have you taken any medicine or supplements during this pandemic without doctor's prescription?	28.89	4	0.000*

*Significant using chi-square test where P value < 0.05

measures taken was not significant with educational level as the p-value was 0.259 which was >0.05. After that the association between educational level and actions, precautionary behavior of participants was analyzed. Here, washing hands at least 20 seconds, preventive measure taken without doctor's prescription showed significant difference with educational level and rest of two questions (que. 11 & que. 12) were not significant.

Relationship between age group and risk perceptions, actions, precautionary behavior

The association between age group and risk perceptions of participants was analyzed (Table IV). Personal protective measures, social distancing, difference between quarantine and isolation, wearing mask, weather and temperature change, price and availability of protective equipment, drinking warm water, overcome of pandemic situation had no significant difference with age group. That means, this type of items did not show any effect with age group. Only the variable washing hands and cleaning working area were significant with age group. After that the association between age group

and actions, precautionary behavior of participants was analyzed. Here, preventive measure taken without doctor's prescription showed significant difference with age group and rest of three questions (que. 10, que. 11 & que. 12) were not significant.

Self-medication practice during the COVID-19 pandemic

Self-medication practice during this pandemic is an important issue. It is not wise to take any preventive measure like taking medicine and other supplements without doctor's prescription. For COVID-19 preventive measure, 77.97% male participants didn't take any medicine or supplements compare to female participants (75.54%) during this pandemic without doctor's prescription which did not vary a lot (Table V). According to age group, 41-50 year aged participants were more conscious about health, 92.31% participants did not take any medicine or supplements without doctor's prescription, whereas other age groups such as 16-30, 31-40, 51-60 and above 60 showed similar response 79.56%, 63.16%, 46.15% and 66.67%, respectively. That means among these groups,

Table IV: Association between age group and risk perceptions, actions, precautionary behavior of participants (n=1014).

Topic	Related questions	χ^2	df	p-value
Risk perceptions	1. Do you think the personal protective measures you are taking to try to limit the spread of corona virus make a difference?	8.53	8	0.384
	2. Do you think that washing hands and cleaning working area frequently with soap/detergent/sanitizer/disinfectant is sufficient for preventing COVID-19?	22.88	12	0.029*
	3. Social distancing can prevent COVID-19.	11.79	16	0.758
	4. Do you know the difference between quarantine and isolation?	4.05	4	0.400
	5. Can wearing mask before going outside prevent COVID-19?	16.49	12	0.170
	6. Weather and temperature can decrease the spreading of corona virus.	16.001	16	0.453
	7. In your locality the price and availability of protective equipment such as face masks, eyeglasses and hand sanitizer are within the reasonable limit.	16.82	16	0.398
	8. Drinking warm water or gargle with hot water/mouth wash will protect you from COVID-19.	22.69	16	0.122
	9. Do you think Bangladesh will overcome this pandemic situation within 2020?	17.39	12	0.136
Actions and precautionary behavior	10. Do you wash your hands at least 20 seconds with soap?	3.231	8	0.919
	11. Before going to outside do you wear mask?	4.65	8	0.794
	12. Do you clean or change your mask regularly?	5.15	12	0.953
	13. For COVID-19 preventive measures have you taken any medicine or supplements during this pandemic without doctor's prescription?	28.89	4	0.000*

*Significant using chi-square test where P value < 0.05

Table V: Frequency and percentage of preventive measure taken without doctor's suggestion according to socio-demographic characteristics

Socio-demographic characteristics		For COVID-19 preventive measures have you taken any medicine or supplements during this pandemic without doctor's prescription		Total
		No	Yes	
Sex	Female	281 (75.54%)	91 (24.46%)	372 (100%)
	Male	499 (77.97%)	141 (22.03%)	640 (100%)
	Prefer not to say	2 (100%)	0	2 (100%)
Age (years)	16-30	658 (79.56%)	169 (20.44%)	827 (100%)
	31-40	84 (63.16%)	49 (36.84%)	133 (100%)
	41-50	24 (92.31%)	2 (7.69%)	26 (100%)
	51-60	6 (46.15%)	7 (53.85%)	13 (100%)
	Above 60	10 (66.67%)	5 (33.33%)	15 (100%)
Educational level	Secondary	14 (70%)	6 (30%)	20 (100%)
	Higher Secondary	384 (80.67%)	92 (19.33%)	476 (100%)
	Graduation	208 (78.20%)	58 (21.80%)	266 (100%)
	Post-graduation	138 (66.99%)	68 (33.01%)	206 (100%)
	M. Phil/PhD	35 (81.40%)	8 (18.60%)	43 (100%)
	Others	3 (100%)	0 (0%)	3 (100%)

participants aged within 51-60 years had taken medicine frequently without doctor's prescription. If educational level is considered, 81.40% participants who completed M. Phil/PhD degree didn't take any medicine or supplements without doctor's prescription. Whereas the percentage were obtained as 80.67%, 78.20%, 70% and 66.99% for the participants who completed higher secondary, graduation, secondary and post-graduation degree respectively. It clearly indicates that among all level participants, mostly higher secondary completed participants took medicine without doctor's prescription. These results clearly reveal that highly educated people are more concern in Bangladesh in taking any medicine without doctor's consultation whereas a certain age group like senior adults are less concern about the issue.

DISCUSSION

The first known COVID-19 case was reported on 8 March 2020 by the Bangladesh epidemiology institute, IEDCR (34). The World Health Organization (WHO) declared the disease as the pandemic on 11th of March 2020 and this is the first pandemic caused by a coronavirus (19). Bangladesh is one of the most densely populated countries in the world with more than 164 million people could be associated with a great risk of infection spread and mortality. Bangladesh authority has taken various steps to control and limit the spread of the disease. General public knowledge, awareness, attitude and precautionary behavior along with government approaches can only reduce the transmission of the highly contagious infectious disease. Therefore, it is very important to assess individual knowledge about the nature of the virus, its spreading pattern, symptoms, preventive measures and understanding their risk perception. The current study, which was conducted one week from 13 to 19 August 2020 after the end of whole country lockdown (1st June 2020) and six months of first diagnosis of the disease in Bangladesh. Here we attempted to explore the level of COVID-19 related knowledge, awareness, current preventive practice, risk

perception and correlation between these with major socio-demographic variables among the citizens.

The present study reported 74% of participants believed that COVID-19 is fatal disease and most of the general people have accurate knowledge on incubation period (75%). Previously Zannatul *et al.* reported that 96% respondents think it is a dangerous disease and 91% stated correct incubation period of the virus (38). More than 90% participants agreed that both asymptomatic and symptomatic patient can transmit infection. Nearly 55% participants answered antibiotic can not be used to treat COVID-19 infection and around 75% believed supportive care of the symptoms is the only effective treatment option and 28% agreed that novel corona virus can cause permanent damage to some organs of patient even after recovery. Male participants had more knowledge and awareness on COVID-19 than the counterparts and participant's aged range within 31 to 50, participants who have post graduation degree also showed better understanding of the disease. But knowledge level of young adult (16-30 years), 51-60 years old person's and participants completed only secondary level education was low about COVID-19.

Washing hands, cleaning working area frequently and stopping contact between people are most important safety measures to prevent COVID-19 infection but many participants who completed interviews did not response positive with these guidelines which is alarming. This question response also varied significantly according to participants age distributions. The overall risk perception, precautionary behavior of participants had significant difference with educational level. The positive response rates were 24% and 53% on question 16 (Weather and temperature can decrease the spreading of corona virus) and question 18 (Drinking warm water or gargle with hot water will protect from COVID-19), respectively.

Actions and precautionary behavior such as wearing mask outside, washing hands at least 20 seconds and cleaning used mask regularly or wearing fresh mask are

imperative to prevent transmission and around 79%, 94% and 92% participants practiced these preventive measures frequently. Previous survey reported 93% and 98% participants practicing hand washing and wearing mask frequently indicated our survey respondents (79%) were slightly more reluctant on wearing mask outside (38). Nearly 1 participant out of 4 has taken medicines or supplements for preventive purpose during this pandemic without doctor's prescription. Individuals who only completed post-graduation level education were more prone to take medications without prescription.

CONCLUSION

Overall, the participants in current study had good knowledge, risk perceptions and awareness about COVID-19. General people risk perceptions, actions and precautionary behavior which are very valuable to reduce the community transmission of the infection, were varied according to their socio-demographic characterizations. Based on our results a satisfactory level of related knowledge on COVID-19 was observed however many participants are still in some uncertainty on risk perception, spread methods and preventive measures. This cross-sectional study was mainly performed and acquired information through social media platforms and the internet, which definitely has some positives and negatives. The findings of our study should not be generalized to the whole country population. This study found some gaps in specific aspects of preventive practice according to socio-demographic variations that should be focused on in future awareness and public health educational campaigns. In conclusion, more effort, awareness programs, actions on COVID-19 are needed to increase the knowledge, perception and precautionary behavior among all classes of inhabitants to limit the spread of the disease.

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