Nutritional knowledge attitudes and practices towards the prevention and control of COVID-19 among educated young adults in Bangladesh

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Background: To strengthen the immune system and reduce the risk of infectious diseases like novel coronavirus disease (COVID-19), a sound knowledge, attitude, and practice about healthy eating patterns and well-balanced diet ensuring proper nutrition is highly important. However, the relevant information is quite limited and still unknown in Bangladesh. The objective of this study was to assess the levels of nutritional knowledge, attitudes, and practices towards the prevention and control of COVID-19 among the educated young adult population in Bangladesh.

Methods: This cross-sectional study was carried out among 166 educated young adults (aged 20–40 years) recruited conveniently using online social media platforms. A Google form link of the structured questionnaire was distributed to the potential respondents through Facebook and Messenger, and also invited to participate. Participant's self-reported responses were recorded. Both descriptive and comparative (Chi-square) statistics were used.

Results: Of all [mean ± standard deviation (SD) age 27.4±3.5 years], majority were men (54.8%). Around two-third of the respondents had an average level of nutritional knowledge (65.4%), attitudes (68.1%) and practices (68.6%) about prevention and control of COVID-19, while the good levels were found in around one-fifth of them. And, the level of nutritional practices was found to be significantly related to sex (P=0.012).

Conclusions: Majority of the study population had an average level of nutritional knowledge, attitudes, and practices towards the prevention and control of COVID-19. It demands nutrition-related health promotion and health educational programs for the population.

Keywords: Nutrition; knowledge attitude and practice; novel coronavirus disease (COVID-19); prevention and control; educated young adults

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Introduction

Since 2020, the whole world is going through a pandemic situation posed by novel coronavirus disease (COVID-19), which has become a major public health threat globally (1). As there is no specific or effective treatment yet of this deadly disease, all potential therapeutics, interventions, and prevention strategies are crucial that can reduce the incidence or severity of the disease (2). Healthy nutrition is vitally important and it is advised and suggestive to take a well-balanced diet and nutritious foods during the COVID-19 pandemic (2-4). Nutrition boosts up the immune system and a better immune system fights against the infectious diseases well. Thus, nutrition plays a vital role to prevent and control infections and their consequences (3,5-7). It is recommended that healthy food intake should be a high priority and people should be mindful of healthy eating practices in order to lower the susceptibility to and long-term complications from COVID-19 (6). Available reports show that educated people usually comply better with the preventive and treatment measures of any given

disease (8). Thus, it is assumed that young educated individuals may have a good knowledge about nutritional impact on the prevention and control COVID-19. However, the relevant information focusing on this highly important issue is quite limited and is still unknown in Bangladesh. This study aimed at assessing the nutritional knowledge, attitudes, and practices (KAPs) about the prevention and control of COVID-19 among educated young adults in Bangladesh. We present this article in accordance with the STROBE reporting checklist (available at https://jxym.amegroups.com/article/view/10.21037/jxym-22-50/rc).

Methods

Design, setting and population

This cross-sectional study was carried out in 2021 among a total of 166 young adults (aged 20–40 years) recruited conveniently using online social media platforms. The potential respondents were invited to participate in this study by distributing a Google form link of the questionnaire through Facebook and Messenger.

Instrument and technique

The structured questionnaire was adopted using existing literature comprising of socio-demographic variables (e.g., sex, age, education, occupation, and area of living) and the variables related to nutritional knowledge (10 items), attitudes (9 items), and practices (11 items) towards the prevention and control of COVID-19 (total 30 items). The knowledge domain (measured with dichotomous response scale 'Yes' and 'No') consisted of the information related to the prevention and control of COVID-19. The attitude domain (measured with three-point categorical response scale 'Agree', 'Neutral' and 'Disagree') consisted of the information related to the thoughts and beliefs about cause and treatment as well as prevention of COVID-19. The practice domain (measured with three-point categorical scale 'Always', 'sometimes', and 'Never') consisted of health seeking behaviors. The self-reported responses were recorded automatically in the Excel sheet created from the Google form.

Scoring of the variables

For the knowledge domain, a composite score ranging 0–10

Highlight box

Key findings
- Around two-third of the study population had an average level of nutritional knowledge (65.4%), attitudes (68.1%) and practices (68.6%) about prevention and control of novel coronavirus disease (COVID-19).
- The level of nutritional practices was found to be significantly related to sex.

What is known and what is new?
- It is recommended to take a well-balanced diet and nutritious foods during COVID-19 pandemic to prevent and control the disease.
- Educated people comply better with the preventive measures of any given disease.
- This study explored the information related to nutritional knowledge, attitude and practice (KAP) regarding the prevention and control COVID-19 among young adult educated individuals in Bangladesh, which is quite limited globally and is still unknown in Bangladesh.

What is the implication, and what should change now?
- We assessed to what extent the educated young adults are aware and what they believe and practice regarding the potential role of nutrition and nutrients to prevent and control COVID-19, which reflects that there is a gap in their KAP.
- We suggest that nutrition-related health promotion and health educational programs are needed to design and implement among the population.

Table 1 Socio-demographic characteristics of the respondents (n=166)

Variables	Number	Percentage
Sex		
Men	91	54.8
Women	75	45.2
Age (years)		
Below 28	84	50.6
28 and above	82	49.4
Level of education (n=165)		
HSC	17	10.3
Graduation	79	47.9
Master	69	41.8
Occupation		
Employed	70	42.2
Business	5	3.0
Homemaker	7	4.2
Others	84	50.6
Area of living		
Urban	96	57.8
Rural	70	42.2

HSC, Higher Secondary Certificate.

was calculated. Each item was treated as well as scored as correct [1]; or incorrect [0], and the sum of the 10 scored items was obtained. For the attitude domain, a composite score ranging 0–9 was calculated. Each item was treated as well as scored as positive response [1]; or negative response [0], and the sum of the 9 scored items was obtained. For the practice domain, a composite score ranging 0–22 was calculated. Each item was scored 2 for 'always', 1 for 'sometimes', and 0 for 'never', and the sum of the 11 scored items was obtained. Finally, the levels of KAPs were categorized as poor, average, and good when the respective composite scores were < mean – 1SD, within mean ± 1SD, and > mean + 1SD, respectively, according to the Bell Curve Theory.

Statistical analysis

The data from the Excel sheet were transferred into the Statistical Package for the Social Sciences (SPSS) software version 21 for processing and analyzing. Descriptive statistics (univariate analysis) was done for all of the variables and was expressed as number, percentage, mean and standard deviation. Comparative statistics (Chi-square test) was done to assess the relationship of levels of nutritional knowledge, attitudes, and practices with the socio-demographic factors. $P<0.05$ level was considered as the level of statistical significance.

Ethical statement

This study was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and the Bangladesh Medical and Research Council (BMRC). Ethical clearance for the study protocol was taken from the Ethical Review Committee (ERC) of Center for Noncommunicable diseases Prevention Control Rehabilitation & Research (Reference No. CeNoR/EA/2102). Written informed consent was taken in the 1st section of the Google form describing all the ethical considerations prior to filling out the form.

Results

The *Table 1* describes socio-demographic information of the respondents. Of all (mean ± SD age 27.4±3.5 years), the majority were men (54.8%), completed graduation education (47.9%), were employed (42.2%), and lived in urban areas (57.8%).

Most of the respondents reported that consuming plenty of fruit and vegetables (84.3%), adequate fluids (74.5%), and vitamins and minerals (81.8%) helps to prevent and control COVID-19. Nearly three-quarter of them (73.2%) reported protein-rich foods are necessary in this regard (*Table 2*). Seven in every ten (70.6%) agreed that consuming fruit and vegetables is effective in preventing and treating COVID-19, whereas 53.0% believed that a balanced diet can prevent the disease. Half of them (49.7%) agreed that supplementary foods should be included within our diet. However, over one-third believed that an overconsumption of hot-tempered foods (such as garlic and ginger) can prevent the disease (*Table 3*).

A vast majority of the respondents (81.9%) reported they washed hands always before eating and drinking anything. Around 3 in every 5 always sanitized fruits and vegetables before consuming (62.8%), purchased food materials at

Table 2 Nutritional knowledge about prevention and control of COVID-19 among educated young adults in Bangladesh (n=166)

Variables	Number	Percentage
Can consuming plenty of fruit and vegetables help to prevent & control COVID-19?		
Yes	140	84.3
No	26	15.7
Can drinking fluids adequately help to prevent & control COVID-19? (n=165)		
Yes	123	74.5
No	42	25.5
Can consuming certain foods affect the prevention and treatment of COVID-19? (n=165)		
Yes	116	70.3
No	49	29.7
Can consuming vitamins and minerals help to prevent & control COVID-19? (n=165)		
Yes	135	81.8
No	30	18.2
Can avoiding greasy and salty foods help to prevent & control COVID-19? (n=160)		
Yes	92	57.5
No	68	42.5
Is consuming carbohydrates necessary to prevent & control COVID-19? (n=164)		
Yes	89	54.3
No	75	45.7
Is consuming protein-rich foods necessary to prevent & control COVID- 19? (n=164)		
Yes	120	73.2
No	44	26.8
Can consuming more plant oil than animal oil help to prevent & control COVID-19? (n=164)		
Yes	93	56.7
No	71	43.3
Can cooking food well kill coronavirus? (n=165)		
Yes	104	63.0
No	61	37.0
Can herbal medicine help to treat COVID-19? (n=164)		
Yes	60	36.6
No	104	63.4

COVID-19, coronavirus disease 2019.

Table 3 Nutritional attitudes about prevention and control of COVID-19 among educated young adults in Bangladesh (n=166)

Variables	Number	Percentage
I believe that a vegetarian diet is better than any other diet to prevent & control COVID-19 (n=165)		
Agree	72	43.6
Neutral	62	37.6
Disagree	31	18.8
Consuming fresh (uncooked) foods is of a higher nutritional value to prevent & control COVID-19 (n=165)		
Agree	93	56.4
Neutral	40	24.2
Disagree	32	19.4
Eating the meat of wild animals can cause COVID-19 (n=163)		
Agree	54	33.1
Neutral	54	33.1
Disagree	55	33.7
Consuming fruit and vegetables is effective in preventing and treating COVID-19 (n=163)		
Agree	115	70.6
Neutral	31	19.0
Disagree	17	10.4
A balanced diet can prevent COVID-19		
Agree	88	53.0
Neutral	48	28.9
Disagree	30	18.1
Consuming fast food is the main cause of COVID-19 (n=165)		
Agree	27	16.4
Neutral	30	18.2
Disagree	108	65.5
Supplementary foods should be included within our diet to prevent & control COVID-19 (n=165)		
Agree	82	49.7
Neutral	55	33.3
Disagree	28	17.0
I think herbal medicine can help to treat COVID-19 (n=165)		
Agree	41	24.8
Neutral	70	42.4
Disagree	54	32.7

Table 3 (*continued*)

Table 3 (*continued*)

Variables	Number	Percentage
An overconsumption of hot-tempered foods such as garlic and ginger can prevent the disease (n=164)		
Agree	56	34.1
Neutral	54	32.9
Disagree	54	32.9

COVID-19, coronavirus disease 2019.

healthy places (58.9%) and used personal dishes while eating (60.7%). Around half of them always avoided eating at crowded and unhealthy places (47.6%) and consumed more vegetables, salad, garlic and onion (46.3%). To further strengthen their immune system, 61.0% consumed vitamin-C rich fruits such as orange, lemon, etc. and one-third consumed supplementary foods (32.3%) and dairy products rich in vitamin-D and sea foods (33.5%) always. And, when affected by COVID-19, 48.5% tended (or will tend) to consume food materials rich in protein such as eggs, meat and cereals on an always basis (*Table 4*).

When categorized, around two-third of the respondents had average levels of nutritional knowledge (65.4%), attitudes (68.1%) and practices (68.6%) about the prevention and control of COVID-19 (*Table 5*). And, there was no significant relationship of any socio-demographic factors with the level of nutritional knowledge (*Table 6*) and attitudes (*Table 7*). However, the level of nutritional practices was found to be significantly related (P=0.012) to sex (*Table 8*).

Discussion

The current study sought for the exploration of nutritional KAPs towards the prevention and control of COVID-19 among educated young adult generations in Bangladesh. To the best of our knowledge, perhaps this is the first ever study in this country as well as a global perspective that assessed to what extent the educated young adults are aware and what they believe and practice regarding the potential role of nutrition and nutrients to prevent and control COVID-19.

In this study, we found most (around two-third) of the educated young adult population of the country possessed average levels of nutritional KAPs. This finding indicates

Table 4 Nutritional practices about prevention and control of COVID-19 among educated young adults in Bangladesh (n=166)

Variables	Number	Percentage
I wash my hands before eating or drinking anything		
Always	136	81.9
Sometimes	18	10.8
Never	12	7.2
I avoid eating fresh (uncooked) food (n=163)		
Always	50	30.7
Sometimes	81	49.7
Never	32	19.6
Before consuming fruits and vegetables, I sanitize them (n=164)		
Always	103	62.8
Sometimes	42	25.6
Never	19	11.6
I avoid eating at crowded and unhealthy places (n=164)		
Always	78	47.6
Sometimes	75	45.7
Never	11	6.7
I avoid eating fast foods (n=165)		
Always	42	25.5
Sometimes	107	64.8
Never	16	9.7
I use more packed foods (n=165)		
Always	43	26.1
Sometimes	101	61.2
Never	21	12.7
I use supplementary foods more to strengthen my immune system (n=161)		
Always	52	32.3
Sometimes	85	52.8
Never	24	14.9
I consume hot-tempered food materials such as ginger, cinnamon and saffron to prevent COVID-19 (n=163)		
Always	44	27.0
Sometimes	90	55.2
Never	29	17.8

Table 4 (*continued*)

Table 4 (*continued*)

Variables	Number	Percentage
To further strengthen my immune system, I consume fruits containing vitamin-C such as orange, lemon, etc. (n=164)		
Always	100	61.0
Sometimes	60	36.6
Never	4	2.4
To prevent COVID-19, I consume more vegetables, salad, garlic, and onion (n=164)		
Always	76	46.3
Sometimes	71	43.3
Never	17	10.4
To strengthen the immune system, I consume dairy products rich in vitamin-D and sea foods (n=164)		
Always	55	33.5
Sometimes	89	54.3
Never	20	12.2
To prevent the disease, I tend to consume hot drinks (n=164)		
Always	63	38.4
Sometimes	77	47.0
Never	24	14.6
If affected by COVID-19, I tend (or will tend) to consume food materials rich in protein such as eggs, meat and cereals (n=163)		
Always	79	48.5
Sometimes	70	42.9
Never	14	8.6
I use rich sources of minerals more, such as sea food (n=161)		
Always	34	21.1
Sometimes	105	65.2
Never	22	13.7
To prevent COVID-19 or while affected, I drink 6–8 glasses of water or other liquids each day (n=164)		
Always	103	62.8
Sometimes	47	28.7
Never	14	8.5

Table 4 (*continued*)

Table 4 (*continued*)

Variables	Number	Percentage
When (or if) affected, I (or I will) use more carbohydrates such as rice, bread types and cereals (n=161)		
Always	56	34.8
Sometimes	71	44.1
Never	34	21.1
I purchase food materials at healthy places (n=163)		
Always	96	58.9
Sometimes	57	35.0
Never	10	6.1
I use personal dishes while eating (n=163)		
Always	99	60.7
Sometimes	52	31.9
Never	12	7.4
I eat the meat of wild animals (n=164)		
Always	25	15.2
Sometimes	33	20.1
Never	106	64.6

COVID-19, coronavirus disease 2019.

Table 5 Levels of nutritional knowledge, attitudes, and practices about prevention and control of COVID-19 among educated young adults in Bangladesh (n=166)

Variables	Number	Percentage
Level of knowledge (n=156)		
Good	36	23.1
Average	102	65.4
Poor	18	11.5
Level of attitudes (n=160)		
Good	31	19.4
Average	109	68.1
Poor	20	12.5
Level of practices (n=153)		
Good	24	15.7
Average	105	68.6
Poor	24	15.7

COVID-19, coronavirus disease 2019.

Table 6 Relationship of level of nutritional knowledge about prevention and control of COVID-19 with socio-demographic characteristics among educated young adults in Bangladesh (n=156)

Variables	Level of nutritional knowledge, n (%)			χ^2 value	P
	Good	Average	Poor		
Sex				3.852	0.146
Men	20 (22.7)	54 (61.4)	14 (15.9)		
Women	16 (23.5)	48 (70.6)	4 (5.9)		
Age (years)				1.085	0.581
Below 28	17 (21.0)	56 (69.1)	8 (9.9)		
28 and above	19 (25.3)	46 (61.3)	10 (13.3)		
Education (n=155)				3.583	0.167
Up to graduation	23 (25.6)	60 (66.7)	7 (7.8)		
Masters	12 (18.5)	42 (64.6)	11 (16.9)		
Occupation				5.533	0.063
Employed	18 (27.7)	36 (55.4)	11 (16.9)		
Others	18 (19.8)	66 (72.5)	7 (7.7)		
Area of living				2.975	0.226
Urban	22 (25.0)	53 (60.2)	13 (14.8)		
Rural	14 (20.6)	49 (72.1)	5 (7.4)		

COVID-19, coronavirus disease 2019.

Table 7 Relationship of level of nutritional attitudes about prevention and control of COVID-19 with socio-demographic characteristics among educated young adults in Bangladesh (n=160)

Variables	Level of nutritional attitudes, n (%)			χ^2 value	P
	Good	Average	Poor		
Sex				0.634	0.728
Men	19 (21.1)	59 (65.6)	12 (13.3)		
Women	12 (17.1)	50 (71.4)	8 (11.4)		
Age (years)				0.991	0.609
Below 28	18 (22.2)	54 (66.7)	9 (7.1)		
28 and above	13 (16.5)	55 (69.6)	11 (16.3)		
Education (n=159)				1.698	0.428
Up to graduation	17 (18.5)	66 (71.7)	9 (9.8)		
Masters	13 (19.4)	43 (64.2)	11 (16.4)		
Occupation				3.090	0.213
Employed	12 (17.9)	43 (64.2)	12 (17.9)		
Others	19 (20.4)	66 (71.0)	8 (8.6)		
Area of living				0.207	0.902
Urban	17 (18.5)	64 (69.6)	11 (12.0)		
Rural	14 (20.6)	45 (66.2)	9 (13.2)		

COVID-19, coronavirus disease 2019.

Table 8 Relationship of level of nutritional practices about prevention and control of COVID-19 with socio-demographic characteristics among educated young adults in Bangladesh (n=153)

Variables	Level of nutritional practices, n (%)			χ^2 value	P
	Good	Average	Poor		
Sex				8.848	0.012
Men	11 (12.8)	55 (64.0)	20 (23.3)		
Women	13 (19.4)	50 (74.6)	4 (6.0)		
Age (years)				1.138	0.566
Below 28	11 (14.9)	49 (66.2)	14 (18.9)		
28 and above	13 (16.5)	56 (70.9)	10 (12.7)		
Education (n=152)				2.860	0.239
Up to graduation	12 (14.3)	55 (65.5)	17 (20.2)		
Masters	12 (17.6)	49 (72.1)	7 (10.3)		
Occupation				1.569	0.456
Employed	8 (11.8)	48 (70.6)	12 (17.6)		
Others	16 (18.8)	57 (67.1)	12 (14.1)		
Area of living				1.371	0.504
Urban	16 (18.0)	61 (68.5)	12 (13.5)		
Rural	8 (12.5)	44 (68.8)	12 (18.8)		

COVID-19, coronavirus disease 2019.

that the majority was averagely aware and motivated about the potential impact of nutrition and nutrients in order to prevent and control the life threatening COVID-19, and also practiced the same to do so. However, we found there is a clear downward gap in the good levels of knowledge, attitudes, and practices among the population, representing 23.1%, 19.4%, and 15.7%, respectively. It indicates that the population may have some barriers or a lackadaisical attitude to practice properly even after knowing good in this regard. Also, sex could be a potential factor regarding this issue as per our findings that poor level of nutritional practices was significantly higher in men, while good level of practices was found to be higher in women (*Table 8*). Comparing our findings in several relevant items of KAPs domains of this study with a relevant study carried out in Iran that evaluated nutritional knowledge, attitude, and behaviors regarding COVID-19 among the general population, our study population reflected better outcomes in general, mainly in the attitude and practice domains (9).

Perhaps, this is because only educated young adults were recruited in this study.

However, some recent reports suggest that overnutrition could be detrimental to the recovery from different bacterial and viral infections. From the pathophysiological point of view, the reports indicate that overnutrition plays a decisive role in inflammatory process in infectious diseases influencing negatively in the recovery process, mainly in the acute stage. Therefore, a balanced or an optimal level of nutrition has been proposed (10-12). The mentionable limitations of this study could be non-randomization and small samples (which may reflect limited specific population generalizability). We didn't measure the non-response rate. And, there might also be a chance of social desirability bias because of the self-reported nature of the responses, especially in the practice domain. However, findings of this baseline study will be helpful for the policymakers to insight how the educated young adult population in Bangladesh possesses knowledge and attitude regarding the potential

role of nutrition to combat the deadly COVID-19 as well as practice to do so.

Conclusions

Around two-third of the study population had an average level of nutritional KAPs towards the prevention and control of COVID-19, while the good levels were found in around one-fifth of them. Respondent's level of practices was found to be significantly related to sex. Nutrition-related health promotion and health educational programs are needed to design and implement among the population. Further large scaled studies are required to explore the situation more clearly.

Acknowledgments

Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://jxym.amegroups.com/article/view/10.21037/jxym-22-50/rc

Data Sharing Statement: Available at https://jxym.amegroups.com/article/view/10.21037/jxym-22-50/dss

Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at https://jxym.amegroups.com/article/view/10.21037/jxym-22-50/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and the Bangladesh Medical and Research Council (BMRC). Ethical clearance for the study protocol was taken from the Ethical Review Committee (ERC) of Center for Noncommunicable diseases Prevention Control Rehabilitation & Research (Reference No. CeNoR/EA/2102). Informed consent was taken in the 1st section of the Google form describing all the ethical considerations prior to fill out the form.

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