

Knowledge And Practice on COVID-19

A Practicum on COVID-19 preventive knowledge and practice among the male and female students from 6th-9th standards of schools and from equivalent grade levels of madrasas in Sadar and Pekua Upazillas of Cox's Bazar District, Bangladesh

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Abstract

Introduction: With the establishment of COVID-19 vaccination program for young and adult population, community's resilience on COVID-19 prevent measures are still being crucial. After reopening of school and educational institutions, these congregational places become potential arena for disease transmission and outbreak of infection. The community members particularly students themselves, teachers and parents are the critical persons in participation of collaborative efforts for acquiring of knowledge and practice are of utmost importance in COVID-19 prevention. The ultimate aim of this study is to assess students' knowledge and practice concerning COVID-19 prevention in Cox' Bazar of Bangladesh.

Methodology: This study utilized the primary data set of a cross-sectional study conducted from mid-November 2022 to December 2022, to the male and female students (Grade 6th- 9th and equivalent) at purposively selected schools and madrasas of Cox's Bazar Sadar and Pekua Upzailas of Cox's Bazar District, Bangladesh.

Results: Among 2255 students analyzed, 555 (69.12% of total male students) of male students 1055 (72.66 % of total female students) of female students have good knowledge and practice level on COVID-19 preventive measures in compared to the rest of the students. The students revealed a good understanding of the mode of transmission, symptoms, preventive measures, handwashing knowledge and practice, wearing of masks and vaccination status with the correct response rate of 90%. There was a statistically significant association between the knowledge level of students and location ($p < 0.05$), type of institutions ($p < 0.05$), only male in age ($p < 0.005$), classes ($p < 0.05$), education of father ($p < 0.05$), education of mother ($p < 0.05$) and source of information ($p < 0.05$) as stated by *Chi-squared* test results. Moreover, the *Chi-square* test also showed the statistically significant association between practice level of students and location in female ($p < 0.05$), age ($p < 0.05$), classes ($p < 0.05$), education of father ($p < 0.05$), education of mother ($p < 0.05$) and source of information ($p < 0.05$). In knowledge, the students had higher odds of having good knowledge except in association with their social demographic characters (AOR: >1 , $p < 0.05$) except in Pekua (AOR: 0.42, 95% CI: 0.37– 0.59, $p < 0.05$) and male of class 7 (AOR:0.78, 95%CI:0.59-1.04, $p < 0.05$). In practice, the students had good practice with their sociodemographic background except in Pekua (AOR:0.57, 95%CI: 0.46-0.71, $p < 0.05$).

Conclusion: This study revealed that knowledge levels are 69.12% for male and 72.66% for female while adherence to the practice were 68.87% and 69.70% on COVID-19 preventive measures respectively. Health education forums such as school information sessions and SBCC sessions in collaboration among program implementers, teachers and parents should pay great attention to enhance the students' understanding about prevention and transmission to reinforce their capacity of preventing the family members and themselves from COVID-19 infection.

Keywords: knowledge, practice, COVID-19, preventive measures, male and female students, Cox's Bazar Sadar, Pekua, school, madrasa.

1. Introduction

1.1 Background

Since World Health Organization's announcement on COVID-19 as a public health emergency, all the countries including Bangladesh confronted the disastrous effects (WHO, 2021). For the country such as Bangladesh with the highest population density in the world (Anwar et al., 2020) and the nation of LMICs with over 37 million children of school going age (UNICEF, 2021) and these children are learning their education in government formal schools and religious based schools called madrasas (Bangladesh Education Statistics, 2021). With the surge of COVID-19 infection, the government of Bangladesh had decided to cancel the school schedules of all formal and non-formal education sectors since March, 2020 amidst the dilemma the dilemma of close or open the educational institutions (Islam et al., 2021).

The tragic impacts of COVID-19 pandemic had been suffered in all sectors including health and education portions of both the developed world and LMICs (Gautam et al, 2022). However, education for children is essential and to resume schools after settlement of the calamity of the pandemic because prolonged closure of the schools have documented negative impacts on well-being and learning ability of children (UNICEF, 2020). This is a particular issue for LMICs like Bangladesh because prolonged school closure has proven increased student drop-out rate and new and exacerbated inequalities especially in most vulnerable groups (UNESCO, 2020). Hence, by the stewardship of UNICEF and UNESCO, the Government of Bangladesh has convinced to reopen the school by integrated approach of scaling-up of vaccination program to school children and promoting the knowledge, and practice of COVID-19 prevention activities for school children (Financial Express, 2022).

With the support of UNFPA and the World Bank, after successful phase 1 implementation of Community Support Team (CST) program in 2021, BRAC has extended its 2nd phase of CST program in Cox's Bazar, which include mask distribution, SBCC activities, information sessions for students, meeting with school committees, Interactive Personal Theatre and establishment of handwashing stations (BRAC, 2021). The program focuses on community's resilience on COVID-19 preventive measures by reinforcing awareness. BRAC has also focused its activities on congregational places of schools and madrasas because of potential areas of disease transmission. The young age population suffers less than the older people when contracted with

the COVID-19, however, they become the carrier after contacting the infected persons and may transmit infection to their vulnerable family members when they go back to home (Harvard Gazette, 2020). Therefore, adherence to the practice of COVID-19 prevention protocols by the students has become an important component to decrease transmission by them to others. Furthermore, the school is a place for large gatherings and there may be potential risks of disease outbreak if someone has undetected and subclinical infection (Lopes-Junior et al., 2021). After developing the School Reopening Framework by collaboration of UNESCO, UNICEF and the World Bank, the schools were reopened by implementation of COVID-19 safety measure activities in schools to reduce the potential risks of COVID-19 transmission and strengthen the public awareness on preventive knowledge and practice simultaneously with effective vaccination program in Bangladesh (Kabir et al., 2021).

1.2 Justification of the study

After the COVID-19 vaccination has been implemented across Bangladesh with good indicator achievements, community engagement is still necessary for the symptomatic surveillance for burden decreasing and reducing of transmission among the risk communities (Chowdhury, 2021). Therefore, the knowledge and practice of the community to adhere to the COVID-19 preventive measures are being crucial among the communities particularly in congregational places such as schools, madrasas and mosques (BRAC, 2021). However, a research article unveiled that in the general population of Bangladesh, females adhere more to the COVID-19 preventive measures than males (Sultana et al., 2021). For university students, the female students have better knowledge and practice on COVID-19 preventive measures than male students (Rahman et al., 2021). We could find research papers on COVID-19 knowledge and practice by individualized, institutionalized and industrialized approaches except for secondary school level. Therefore, we can hypothesize that this survey assessment will reflect and fill the gap about the knowledge and practice on COVID-19 preventive measures of secondary school students and we can also see the gender disparities on knowledge and practice of COVID-19 among the secondary school students after the survey. Moreover, we could believe that this survey results will have positive contribution in future scaling-up of behavioral changes implementation activities of public health programs

1.3 Objectives of the study

1.3.1 General objective

To make an assessment on the knowledge and practice of COVID-19 prevention among the students of 6th-9th standards of schools and equivalent grades of madrasas in Cox's Bazar District

1.3.2 Specific objectives

- (1) To ensure the knowledge of COVID-19 preventive measures among the male and female students of 6th-9th standards of schools and equivalent grades of madrasas in Cox's Bazar District
- (2) To ensure the practice of COVID-19 preventive measure among the male and female students of 6th-9th standards of schools and equivalent grades of madrasas in Cox's Bazar District
- (3) To compare the gender-based perception on COVID-19 preventive measures among the male and female students of 6th-9th standards of schools and equivalent grades of madrasas in Cox's Bazar District

1.4 Operational Definitions

1.4.1 Knowledge on COVID-19 Prevention

The proportion of students who have good knowledge on COVID-19 preventive measures such as mask wearing, proper handwashing, social distancing, vaccination and avoidance of crowded places.

1.4.2 Practice on COVID-19 Prevention

The proportion of students who actually adhere on COVID-19 preventive measures such as mask wearing, proper handwashing, social distancing, vaccination and avoidance of crowded places.

2. Conceptual Framework

The knowledge and practices of both male and female students from 6-9th standards of schools and equivalent grades of madrasas in Cox's Bazar Sadar and Pekua Upazilas of Cox's Bazar District are dependent variables of this study. The assessment of knowledge is conducted in five aspects, which are mode of transmission, symptoms, knowledge on preventive measures, proper handwashing and knowledge on vaccination. For the assessment of adherence on COVID-19

preventive measures, we conducted in three aspects of mask wearing behavior, proper handwashing practice and their vaccination status. For independent variables, the socio-economic characteristics of the respondents like age, sex, education status, their institutions, family members, the education of their fathers and mothers are utilized to recognize the association with students’ knowledge and practice on COVID-19 preventive measures.

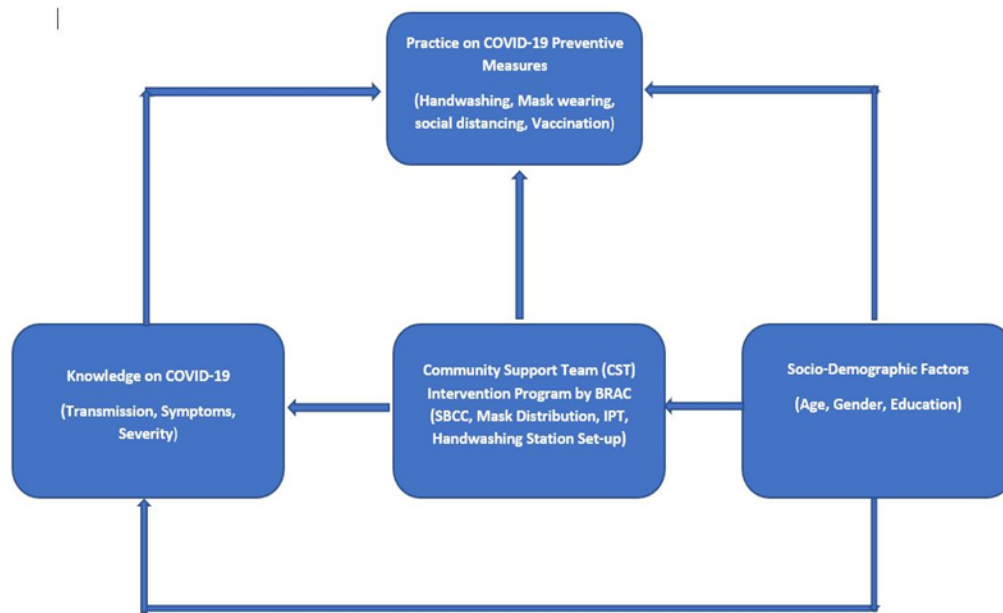


Figure 1: Conceptual Framework

3. Methodology of the study

3.1 Study Design and Duration

We used a subset of primary data that were collected through a cross-sectional survey conducted by the BRAC James P Grant School Public Health, BRAC University from mid-November 2022 to early-December 2022 in Cox’s Bazar Sadar and Pekua Upazilas of Cox’s Bazar’s District, Bangladesh.

3.2 Study Location

Bangladesh is a South Asian country of over 166 million people and is composed of sixty-four districts (World Bank., 2020). The study areas are Cox’ Bazar Sadar and Pekua Upazilas of

Cox's Bazar District in Chittagong division. Cox' Bazar is located 395 kilometers away from Dhaka (Bangladesh Bureau of Statistics, 2019). According to the 2011 census data, Cox's Bazar population is 2,289,990 and the male-female ratio is almost 1:1.25 (City Population, 2016a). Among the upazilas of Cox's Bazar District, Cox' Bazar Sadar has highest population. According to report of ACAP's analysis hub, Cox's Bazar Sadar is known as Cox's Bazar Municipality Area (49.3 literacy rate) whereas Pekua Upazaila (39.4 literacy rate) is called as rural area of Cox's Bazar.

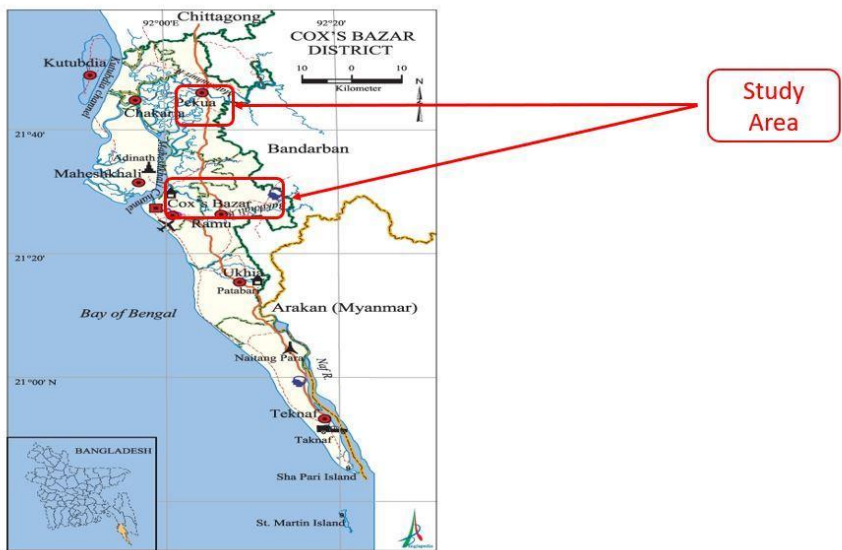


Figure 2:Map showing Cox's Bazar Sadar and Pekua Upzailas of Cox's Bazar District, Bangladesh (ACAPS, 2020)

3.3 Study population

The study population are all male and female students of 6th-9th standards by convenient sampling at purposely selected schools and madrasas of Cox's Bazar Sadar and Pekua. The students absent in survey conducting days and incomplete survey forms were excluded from the study.

3.4 Sample size calculation

The students were chosen by convenient sampling from 6th-9th standards of selected 12 educational institutions (Cox's Bazar Sadar and Pekua Upzailas) which represents the student number from Cox's Bazar District (intervention area of CST program) were enrolled for the

study. For calculation of sample size, we used the prevalence-based sampling formula for this quantitative descriptive study.

The formula,

$$n = Z^2 \frac{P(1-P)}{e^2}$$

Was used for this calculation where 95% confidence interval, 5% margin of error and prevalence of mask wearing 88% from base line survey were assumed. And the estimated sample size would be 163. Moreover, we have to consider for design effect, sex categorization and adjusted for anticipated 20% non-response rate, the final estimated sample size was 611. However, as part of our Summative Learning Project and part on ongoing project, we conducted the survey to all of the students who attend the classes during the survey days. Therefore, our sample size was 2255 students of 6th -9th standards from both schools and madrasas who were present in the classes during the survey days.

3.5 Data collection method and Study Tool

Structured questionnaire adopted from WHO COVID-19 prevention guidelines (WHO, 2020) and data supporting software such as surveyCTO were used. The enumerators attended a two-day training session on the questionnaire and the detailed data collection procedure beforehand. The questionnaire was developed in English, then the researchers translated it into Bangla before receiving feedback and validation from the experts. The tool was pre-tested to reduce the chance of error and improve the overall data collection process. For data security and sharing, the complete standard operating procedures were maintained by the primary research team. A data sharing and usage agreement were signed by the secondary researchers before getting access to the data set.

3.6 Study variables

3.6.1 Dependent variable

Knowledge of male and female students regarding COVID-19 preventive measures were assessed based on the scoring results of five questions of mode of transmissions (0-2 points), symptoms (0-5 points), knowledge on preventive measures (0-5 points), accurate knowledge on handwashing time (0-1 point) and the perception on vaccination (0-1 point). For the practice portion of COVID-19 preventive measures, we developed four questions regarding with

handwashing practice (0-7 points), adherence on proper handwashing practice (0-1 point), practice on wearing of masks (0-3 points) and vaccination (0-1 point) for assessment of the practice on COVID-19 preventive measures. We adapted the scoring method used by Ferdous et al. (2020) in the study of knowledge, attitude and practices regarding COVID-19 outbreaks in Bangladesh: An online-based cross-sectional study (Ferdous et al., 2020).

The total score for knowledge ranged from 0 to 14 and the total score for practice was ranged 0-13 and categorized the total knowledge and practice scores as “Good” and “Poor” considering the median value as the cut-off point (i.e., good knowledge or good practice less than or equal to the median- cut-off value ≥ 7 ; poor knowledge or practice: greater than the median, cut-off value < 7).

3.6.2 Independent variables

The independent variables are socioeconomic characteristics of age, sex, their education institutions, address, current education status, the education status of their fathers and mothers. Other information such as their source of information of knowledge and their institutional facilities were added for assessment to their adherence to knowledge and practice on preventive measures.

3.7 Data cleaning

Outliers for continuous variables were identified by box and whisker plot. The outliers were reviewed to avoid the over or under-estimation of the results. The outliers for the age variable were kept intact due to the insignificant effect on the total sample of 2255.

For missing values, we counterchecked with the codebook to know the effect on the total sample size and decided to remove the missing values and non-responded answers on social demographic factors.

3.8 Data analysis

The data were analyzed using Stata SE7® (version 17). The quantitative variables were summarized using descriptive statistics expressed in frequency, percentages, and standard deviations (\pm SD) for each study area. Initially, *Chi*-squared test was performed to identify the association between knowledge and practice of male and female students and independent

variables in Cox's Bazar Sadar and Pekua Upazilas. The association which revealed a p -value of less than 5% was considered statistically significant.

Then all variables were utilized for multivariate analysis and set the statistical significance level at 5%. Crude odds ratio (COR) and adjusted odds ratio (AOR) were mentioned together with a 95% confidence interval and p -value.

3.9 Ethical Consideration

The primary data were collected after getting approval from the Institutional Review Board (IRB) of BRAC, JPGSPH. Both assent (the students were under age of 18) and consent forms were developed before the application of ethical approval. The forms were read out to the participants, the guardian teachers and school/madrasa principals and they had to put their signatures or thumbprints on the forms before the start of an interview. The benefits and risks of partaking in the survey were clearly explained to the interviewees and their participation was voluntary. The respondents had the right to

withdraw whenever they felt uncomfortable in responding to any of the questions. Privacy, confidentiality, and anonymity were maintained for each interview and throughout the entire study.

4. Results

The total number of observation (students) was 2255, and the observed numbers were described in sociodemographic characteristics by categorizing of variables, frequencies and percentage. Prior to the analysis of knowledge and practice regarding with COVID-19 preventive measures, we made a data cleaning process for individual variable of each response for credible analysis results of knowledge and practice.

4.1 Sociodemographic characteristics of the caregivers

The students' age ranged from 10 – 18 years, and their mean age was 13.75 (\pm 4.2) years. The students were categorized into two age groups i.e., <15 years and \geq 15 years (Annex Table of Sociodemographic Characteristics of Students). Among them, 1082 (35.2 %) were male and 1173 (64.8 %) were female of the students. We conducted survey in both school and madrasas of Cox's Bazar and the proportion of students from the educational institutions were 1972 (64.15%) students from schools and 1102 (35.85%) from madrasas respectively. Our survey study focused the secondary school students of Grade 6 to 9 from schools and equivalent classes from

madrasas. The respective proportion of students were; class 6 and equivalent 777(25.28 %), class 7 and equivalent 802 (26.09 %), class 8 and equivalent 772 (25.11 %) and class 9 and equivalent 708 (23.03 %). In our surveys, most of the students knew about the COVID-19 information from their fathers, mothers and caretakers, the response rate was 41.93%. And the proportions of response rate regarding with source of information were from TV (10.27%), from radio (8.52%), from school information sessions of change agents (3.88%), from SBCC sessions of BRAC (2.02%), from teachers (19.98%) and from newspaper (13.4%) respectively. (Annex Table 1)

4.2 Assessment of knowledge of students regarding with COVID-19 preventive measures

The knowledge of students was summarized five themes concerning COVID-19 preventive measures, which are- (1) mode of transmission, (2) symptoms, (3) preventive measures, (4) knowledge on accurate time for handwashing, and (5) knowledge on vaccination.

4.2.1 Knowledge of students regarding with mode of transmission

Regarding knowledge about the mode of transmission, 1499 (86.80%) of responses were “from infected person”, in comparison of male and female ratio, male responded this answer in 529 (87.44%) and female students responded this answer in 970 (86.45%) in proportionate of their respective sample population (Table 2). The majority of students acknowledged this correct answer on mode of transmission was 86.80%. For the other two answers of “from animal” and “from touching of contaminated materials”, students responded 53.27 % and 30.50% respectively (Annex Table 2).

4.2.2 Knowledge of students regarding with symptoms

On the aspect of symptoms, fever was mentioned by 2069 (94.56%) of responses, followed by cough in 67.14% and headache in 52.93% respectively. When we compared between the male and female students regarding with COVID-19 symptoms, both male and female students responded in nearly same rate of response – fever (92.99% from male and 95.42% from female), cough (52.08% from male and 68.89% from female) and headache (50.91 % from male and 54.02%) (Annex Table 2).

4.2.3 Knowledge of students regarding with preventive measures

Concerning the knowledge on preventive measures, students responded that “wearing of masks” in 92.57% followed in order by- “handwashing” in 86.68%, “social distancing” in 83.51%, “vaccination” in 60.42% and “avoiding of crowd” in 39.09% respectively. We compared the knowledge on preventive measures between male and female students, the response rate was almost same, for wearing of masks (92.14% from male and 92.81% from female), for handwashing (85.93% from male and 807.1% from female), for social distancing (84.54% from male and 82.95% from female), for vaccination (56.91% from male and 62.37% from female) and for avoiding of crowd (41.95% from male and 37.49% from female) respectively (Annex Table 2).

4.2.4 Knowledge of students regarding with duration of handwashing

In respect of knowledge on accurate duration for handwashing, male student responded more in correct answer of “20 seconds or more” than the female students. Their response rate of correct answer was 89.91% from male students and 84.16% from female students in respective of their sample proportion (Annex Table 2).

4.2.5 Knowledge of students regarding with vaccination

Before the doing composite knowledge score, we made the scoring system based on most accurate answers. According to this knowledge score, the male students were 69.12% and female students were 72.66% of good knowledge on preventive measures of COVID-19. The overall mean knowledge score is 69.95 (± 5.16) as a combined result of both male and female student (Annex Table 2).

4.2.6 Composite knowledge of students regarding with preventive measures

Before the doing composite knowledge score, we made the scoring system based on most accurate answers. According to this knowledge score, the male students were 69.12% and female students were 72.66% of good knowledge on preventive measures of COVID-19. The overall mean knowledge score is 69.95 (± 5.16) as a combined result of both male and female student (Annex Table 2).

4.3 Assessment of practice of students regarding with COVID-19 preventive measures

The practice of students related with COVID-19 prevention was summarized four themes, which are- (1) frequencies of handwashing with soap or hand sanitizer, (2) duration of handwashing, (3) mask wearing practice, and (4) numbers of getting vaccinated.

4.3.1 Practice of students regarding with proper handwashing method

Regarding practice about the frequencies of handwashing with soap or hand sanitizer 89.60% of responses were “before meal”, in comparison of male and female ratio, male responded this answer in 87.30% and female students responded this answer in 90.85% in proportionate of their respective sample population (Table 3). The majority of students acknowledged this correct answer on “before meal” 89.60% followed by “after toilet” 84.33%, “after touching materials” 69.48%, “after playing” 68.23% respectively. For the answer of “after touching with other”, both male and female students responded 44.95 % and 39.78% respectively (Annex Table 3).

4.3.2 Practice of students regarding with duration of handwashing

On the aspect of practice on duration of handwashing, the answer “20 seconds or more” was unveiled 85.37% of responses, whereas the response for “10 seconds” was only 11.88%. For the most reasonable answer which we added in composite score of practice was “20 seconds or more”. For this answer, 88.29% was responded by male students and 83.75% of response was from female students (Annex Table 3).

4.3.3 Practice of students regarding with wearing of mask

Concerning the practice of wearing of masks by students, they responded that 90.08% of students wore the masks when they go outside of the home. Both male and female students answered in same proportion of wearing of masks when they go outside of the home (86.62% by male and 892.01% by female). Moreover, the students also responded that they wear the mask when they talk with other (58.34% of responses) and followed by the responses of “I wear mask when I feel I like it” in 34.16%. (Annex Table 3).

4.3.4 Practice of students regarding with vaccination

As to the practice on vaccination, 86.02% of all responses were that they got vaccinated full doses of two times. Both the male and female students responded in same proportion that they

have got vaccinated. The results showed that male students have got vaccinated 84.21% and female students get vaccinated 87.03%. (Annex Table 3).

4.3.5 Composite practice of students regarding with preventive measures

Before the doing composite practice score, we made the scoring system based on most accurate answers. According to this practice score, the male students were 68.87% and female students were 69.70% of good practice on preventive measures of COVID-19. The overall mean knowledge score is 67.41 (\pm 5.16) as a combined result of both male and female student (Annex Table 3).

4.4 Association between students' knowledge and sociodemographic characteristics (Bivariate Analysis)

We could see that both male and female students from Cox's Bazar Sadar have good knowledge ($p < 0.05$) in comparison with students from Pekua (Table 1). And the male students have significant association between their knowledge and age whereas the female students do not have significant association (Table 1). For the male students, the students from Grade 8 to 9 and equivalent classes have good knowledge on COVID-19 preventive measures than Grade 6 and 7 and equivalent classes while female students from all classes have good knowledge on it (Table 1). Moreover, we could find that the male students with good knowledge for COVID-19 preventive measures received their information mostly from school information session of change agents and their father, mother and caretaker. So did the female students (Table 1). However, there is less significant association between good knowledge of male students and educational status of their parents, we could see that the both the male and female students received good knowledge of COVID-19 preventive measures when their parent's education was college level and above (Table 1).

Table 1: Association between knowledge level of the students and their sociodemographic characteristics (results from bivariate analyses)

Background Characteristics	Male (N=803)			Female (N=1452)		
	Poor Knowledge	Good Knowledge (%)	P-Value*	Poor Knowledge	Good Knowledge (%)	P-Value*

	(%)			(%)		
	N= 248	N=555		N=397	N=1055	
Name of Upazilas						
Cox'Bazar Sadar	74(26.24)	208(73.76)	0.036	102 (17.53)	480(82.47)	<0.00 1
Pekua	174 (33.4)	347(66.6)		295(33.91)	575(66.09)	
Type of Institutions						
School	190(32.26)	399 (67.74)	0.162	255(29.75)	602(70.25)	0.013
Madrasa	58(27.1)	156(72.9)		142(23.87)	453(76.13)	
Age of Students						
< 15 years	184(33.7)	362(66.3)	0.012	285(27.8)	740(72.20)	0.539
>= 15 years	64(24.9)	193(75.1)		112(26.23)	315(73.77)	
Current Grade Stydyng In						
Class 6 and equivalent	82(40.8)	119(59.2)	<0.00	111(31.18)	245(68.82)	0.001
Class 7 and equivalent	101(43.91)	129(56.09)	1	93(29.06)	227(70.94)	
Class 8 and equivalent	37(18.69)	161(81.31)		127(29.81)	299(70.19)	
Class 9 and equivalent	28 (16.09)	146(83.91)		66(18.86)	284(81.14)	
Family Members of Student						
Family members <5	51(35.66)	92(64.34)	0.172	55(29.57)	131(70.43)	0.465
Family members >=5	197(29.85)	463(70.15)		342(27.01)	924(72.99)	
Education of Father						
Never went to school or finished less than class 5	23(28.4)	58(71.6)	0.085	43(34.13)	83(65.87)	<0.00 1
Finished Class 5	53(32.32)	111(67.78)		100(28.82)	247(71.18)	
Finished Class 10	54(32.14)	114(67.86)		57(21.92)	203(78.08)	
Studied Until College	9(17.31)	43(82.69)		9(10.11)	80(89.89)	
Studied More than College	20 (23.26)	66 (76.74)		25(20.16)	99(79.84)	
I don't know	89(35.32)	163(64.68)		163(32.21)	343(67.79)	

Education of Mother						
Never went to school or finished less than class 5	14(25)	42(75)	0.072	34(30.36)	78(69.64)	<0.001
Finished Class 5	56(34.36)	107(65.64)		91(27.91)	235(72.09)	
Finished Class 10	58(26.98)	157(73.02)		90(20.64)	346(79.36)	
Studied Until College	18(29.51)	43(70.49)		15(16.85)	74(83.15)	
Studied More than College	14(20.9)	53(79.1)		22(30.99)	49(69.01)	
I don't know	88(36.51)	153(63.49)		145(34.69)	273(65.31)	
Source of Information						
From TV	43(59.72)	29(59.72)	<0.001	79(52.67)	71(47.33)	<0.001
From Radio	34(50.75)	33(49.25)	1	62(52.99)	55(47.01)	1
From School Information sessions of Change agents	4 (16.67)	20(83.33)		21(36.84)	36(63.16)	
From BRAC SBCC session	5(50.00)	5(50.00)		8(23.53)	26(76.47)	
From Teacher	69(49.64)	70(50.36)		94(30.23)	217(69.77)	
From Newspaper	42(36.52)	73(63.48)		33(17.74)	153(82.26)	
From Mother/Father/caretaker	51(13.56)	325(86.44)		100 (16.75)	497(83.25)	

Note: * indicates statistical significance (i.e., $p < 0.05$) of the association between students' knowledge and independent variable Chi-square test

4.5 Association between student's practice and sociodemographic characteristics (Bivariate analysis)

We could see that both male and female students from Cox's Bazar Sadar have good practice, however, the female students from Cox's Bazar Sadar have the highest proportion of good practice in COVID-19 preventive measures ($p < 0.001$) (Table 2). And we see the association with age, the male students greater than 15 years of age have significant practice on COVID-19 preventive measures while the female students of both age group have equal value on good practice (Table 2). As per assessment on good knowledge, for the male students, the students from Grade 8 to 9 and equivalent classes have good practice on COVID-19 preventive measures

than Grade 6 and 7 and equivalent classes. Meanwhile, female students from Grade 8 to 9 and equivalent classes have good practice ($p<0.001$) on COVID-19 preventive than the female students of Grade 6 and 7 and equivalent (Table 2). Moreover, we could find that the male students with good practice for COVID-19 preventive measures received their information mostly from school information session of change agents and their father, mother and caretaker. So did the female students (Table 2). However, there is less significant association between good practice of male students and educational status of their parents, we could see that the both the male and female students received the information to adhere good practice of COVID-19 preventive measures when their parent's education was college level and above (Table 2).

Table 2: Association between practice level of the students and their sociodemographic characteristics (results from bivariate analyses)

Background Characteristics	Male (N=803)			Female (N=1452)		
	Poor Practice (%) N= 250	Good Practice (%) N=553	P-Value*	Poor Practice (%) N=440	Good Practice (%) N=1012	P-Value*
Name of Upazilas						
Cox's Bazar Sadar	83(29.43))	199(70.57))	0.444	127(12.82))	455(78.18)	<0.001
Pekua	167(32.05))	354(67.95))		313(35.89))	657(64.02)	
Type of Institutions						
School	178(30.22))	411(69.78))	0.354	263(30.69))	594(69.31)	0.701
Madrasa	72(33.64)	142(66.36))		177(29.75))	418(70.25)	
Age of Students						
< 15 years	187(34.25))	359(65.75))	0.005	311(30.34))	714(69.66)	0.961

>= 15 years	63 (24.51)	194(75.49)		129(30.21)	298(69.79)	
Current Grade Studying In						
Class 6 and equivalent	98(48.76)	103(52.24)	<0.001	137	219(61.52)	<0.001
)		(38.48)		
Class 7 and equivalent	85(36.96)	145(63.04)		106(33.13)	214(66.88)	
))		
Class 8 and equivalent	35(17.68)	163(32.32)		112(26.29)	314(73.71)	
))		
Class 9 and equivalent	32(18.39)	142(81.61)		85(24.29)	265(75.71)	
)				
Family Members of Student						
Family members <5	45(31.47)	98(68.53)	0.924	60(32.26)	126(67.74)	0.534
Family members >=5	205(31.06)	455		380(30.02)	886(69.98)	
)	(68.49))		
Education of Father						
Never went to school or finished less than class 5	22(27.16)	59 (72.84)	0.002	51(40.48)	75(59.52)	<0.001
Finished Class 5	66(40.24)	98(59.76)		86(24.78)	261(74.22)	
Finished Class 10	53(31.55)	115(68.45)		75(28.85)	185(71.15)	
)				
Studied Until College	11(21.15)	41 (78.85)		17(19.1)	72(80.9)	
Studied More than College	14(16.28)	72 (83.72)		30(24.19)	94(75.81)	
I don't know	84(33.33)	168(66.67)		181(35.77)	325(64.23)	
))			
Education of Mother						
Never went to school or finished less than class 5	20(35.71)	36(64.29)	0.244	35(31.25)	77(68.75)	0.001
Finished Class 5	57 (34.97)	106(65.03)		95(29.14)	231(70.86)	
)				

Finished Class 10	61(28.37)	154(71.63)		106(24.31)	330(75.69)	
Studied Until College	17(27.37)	154(71.63)		21(23.6)	68(76.4)	
Studied More than College	14(20.9)	53(79.1)		25(35.21)	46(64.79)	
I don't know	81(33.61)	160(66.39)		158(37.8)	260(62.2)	
Source of Information						
From Tv	54(75.0)	18(25.0)	<0.00	91 (60.67)	59(39.33)	<0.001
From Radio	41(61.19)	26(38.81)	1	60(52.18)	57(48.72)	
From School information sessions of Change agents	12(50.0)	12(50.0)		29(50.88)	28(49.12)	
From BRAC SBCC session	3(30.0)	7(70.0)		13(38.24)	21(61.76)	
From Teacher	61(43.88)	78(56.12)		118(37.94)	193(62.06)	
From Newspaper	33(28.7)	82(71.3)		45(24.19)	141(75.81)	
From Mother/Father/caretaker	46(12.23)	330(87.77)		84(14.07)	613(85.93)	

Note: * indicates statistical significance (i.e., $p < 0.05$) of the association between students' knowledge and independent variable after Chi-square test

4.6 Association of COVID-19 prevention knowledge of students and their sociodemographic characteristics (multivariate analysis)

Upazila: In Pekua, the odds of having good knowledge of the students who know COVID-19 preventive measures were 0.4 times (AOR: 0.42, 95% CI: 0.37 – 0.59, $p < 0.001$)

Institutions: In madrasa, the odds of having good knowledge of students were 1.42 times (AOR: 1.42, 95% CI: 1.14 – 1.49, $p = 0.001$) (Table 3).

Class Grade: In classes, the odds of being good knowledgeable students were class 8 and equivalent (AOR: 1.22 95% CI: 0.92 – 1.61, $p = 0.0051$) and class 9 and equivalent was 2.06 times (AOR: 2.06, 95% CI: 0.2.83 – 1.9, $p < 0.001$) higher than those from the poor group after

adjusting the covariates (Table 3).

Gender: the female students were 1.16 times of good knowledge (AOR: 1.16, 95% CI: 0.94 – 1.43, $p < 0.022$) (Table 3).

Age: There were no significant association the knowledge level and age of students (Table 3).

Family Members: The student with more than family members five was better knowledge in preventive measures in 1.34 times (AOR:1.34, 95%CI: 1.01-1.78, $p < 0.035$) (Table 3).

Education of Father: In adjusted model, the good knowledgeable students who father attended until college had significant association of 2.61 times (AOR: 2.61, 95% CI: 0.94 – 1.43, $p < 0.022$) than that of other groups (Table 3).

Education of mother: There was no significant association between the level of knowledge of students and their mother’s education status (Table 3).

Source of Information: For source of information, the significant associations were from teachers (AOR: 1.79, 95% CI: 1.04 – 4.44, $p < 0.001$), from newspaper (AOR: 3.06, 95% CI: 2.06 – 4.53, $p < 0.001$), and from father, mother and caretaker (AOR: 1.05, 95% CI: 3.87– 7.56, $p < 0.001$) respectively (Table 3).

Table 3: Association between knowledge level of the students and their sociodemographic characteristics (results from multivariable analyses)

Background Characteristics	Unadjusted Model		Adjusted Model	
	COR with 95% CI	P-Value	AOR with 95% CI	P-Value
Name of Upazila				
Cox's Bazar Sadar	1.00		1.00	
Pekua*	0.50(0.41,0.61)	<0.001	0.42(0.37,0.59)	<0.001
Type of institution				
School	1.00		1.00	
Madrasa	1.35(1.11, 1.59)	0.002	1.42(1.14,1.79)	0.001

Class Grade				
Class 6 and equivalent	1.00		1.00	
Class 7 and equivalent*	0.97(0.75,1.24)	0.002	0.78(0.59, 1.04)	0.144
Class 8 and equivalent*	1.48(1.15, 1.9)	<0.001	1.22(0.92, 1.61)	0.051
Class 9 and equivalent*	2.42(1.82,3.28)	<0.001	2.06(1.51, 2.83)	<0.001
Gender				
Male	1.00		1.00	
Female	1.18(0.98, 1.43)	0.075	1.16(0.94, 1.43)	0.022
Age				
< 15 years	1.00		1.00	
>= 15 years*	1.21(1.00, 1.51)	0.047	0.77(0.58,1.02)	0.072
Total number of family members				
Family members <5	1.00		1.00	
Family members >=5	1.12(0.95,1.5)	0.117	1.34(1.01,1.78)	0.035
Education of Father				
Never went to school or less than class 5	1.00		1.00	
Finished Class 5	1.09(0.71,1.5)	0.609	0.96(0.64,1.4)	0.853
Finished Class 10	1.32(0.92,1.92)	0.118	1.06(0.68, 1.43)	0.788
Studied Until College*	3.19(1.80,6.51)	<0.001	2.61(1.31,5.14)	0.003

Studied More than College*	1.71(1.12,2.64)	0.016	1.62(0.91, 2.89)	0.101
I don't know	0.93(0.67, 1.34)	0.712	0.85(0.55,1.31)	0.473
Education of Mother				
Never went to school or less than class 5	1.00		1.00	
Finished Class 5	0.93(0.63,1.32)	0.715	0.71(0.45,1.9)	0.121
Finished Class 10	1.3(0.92,1.91)	0.115	0.91(0.58,1.42)	0.727
Studied Until College	1.47(0.85,2.36)	0.18	0.85(0.46, 1.59)	0.627
Studied More than College	1.13(0.68,1.8)	0.628	0.71(0.36,1.35)	0.297
I don't know	0.73(0.5,1.05)	0.98	0.68(0.42, 1.09)	0.112
Source of Information				
From TV	1.00		1.00	
From Radio	1.12(0.75, 1.65))	0.576	1.04(0.69,1.58)	0.816
From School Information Session of Change Agents*	2.71(1.59, 4.69)	<0.001	1.82(0.69,1.58)	0.36
From BRAC SBCC session*	2.92(1.48,5.85)	0.003	2.15(1.04,3.21)	0.38
From Teachers*	2.14(1.54,2.97)	<0.001	1.79(1.04,4.44)	<0.001
From Newspaper*	3.67(2.53,5.33)	<0.001	3.06(2.06,4.53)	<0.001
From Mother/Father/caretaker*	6.64(4.84,9.11)	<0.001	1.05(3.87,7.56)	<0.001

Note: * indicates statistical significance (i.e., $p < 0.05$) of the association between students' knowledge and independent variable after adjustment

4.7 Association between practice level of students and their sociodemographic characteristics (multivariate analysis)

Upazilas: In Pekua, the odds of having good practice of the students who know COVID-19 preventive measures were 57 % (AOR: 0.57, 95% CI: 0.46 – 0.71, $p < 0.001$) (Table 4).

Institutions: There was no significant association between practice and s educational institution (Table 4).

Class Grade: In classes, the odds of being good knowledgeable students were class 8 and equivalent (AOR: 2.19, 95% CI: 1.62 – 2.96, $p < 0.001$) and class 9 and equivalent was 2.46 times of good practice on COVID-19 preventive measures (AOR: 2.06, 95% CI: 1.69-3.57, $p < 0.001$) higher than those from the poor group after adjusting the covariates (Table 4).

Gender: There was no significant association between gender and practice (Table 4).

Age: There were no significant association between age of students and their practice (Table 4).

Family Members: There were no significant association between family members and preventive measures (Table 4).

Education of Father: adjusted model, the good knowledgeable students who father attended until college had significant association of 2.19 times (AOR: 2.19, 95% CI: 1.33-3.63, $p = 0.002$) and the fathers of students of more than college had 2.05 association of good practice (AOR:2.05, 95%CI: 1.32-3.18, $p = 0.001$) than that of other groups (Table 4).

Education of Mother: There were no significant association between the practice of preventive measures and education level of mother (Table 4).

Source of Information: For source of information, the significant associations among good practice of COVID-19 preventive measures were from SBCC sessions of BRAC (AOR: 2.29, 95% CI: 1.14 – 4.61 $p = 0.019$), from teachers (AOR: 2.33, 95% CI: 1.64 – 3.31, $p < 0.001$), from newspaper (AOR: 4.25, 95% CI: 2.87-6.31, $p < 0.001$), and from father, mother and caretaker (AOR: 9.92, 95% CI: 7.02– 14.02, $p < 0.001$) respectively (Table 4).

Table 4: Association between practice level of the students and their sociodemographic characteristics (results from multivariable analyses)

Background Characteristics	Unadjusted Model		Adjusted Model	
	COR with 95%CI	P-Value	AOR with 95%CI	P-Value

Name of Upazila				
Cox's Bazar Sadar	1.00		1.00	
Pekua*	0.61(0.51,0.67)	<0.001	0.57(0.46,0.71)	<0.001
Type of institution				
School	1.00		1.00	
Madrasa	0.89(0.81, 1.18)	0.89	1.11(0.89,1.39)	0.34
Class Grade				
Class 6 and equivalent	1.00		1.00	
Class 7 and equivalent	1.37(1.07,1.74)	0.002	1.14(0.86,1.51)	0.328
Class 8 and equivalent*	2.36(1.84,3.04)	<0.001	2.19 (1.62,2.96)	<0.001
Class 9 and equivalent*	2.53(1.94,3.31)	<0.001	2.46(1.69,3.57)	<0.001
Gender				
Male	1.00		1.00	
Female	1.03(0.86 1.25)	0.682	1.05(0.84,1.30)	0.652
Age				
< 15 years	1.00		1.00	
>= 15 years	1.18(0.97, 1.44)	0.086	0.78(0.58,1.03)	0.087
Total number of family members				
Family members <5	1.00		1.00	
Family members >=5	1.07(0.83,1.38)	0.575	1.21(0.91, 1.61)	0.183

Education of Father				
Never went to school or less than class 5	1.00		1.00	
Finished Class 5	1.28(0.91,1.81)	0.149	1,18(0.64,1.4)	0.418
Finished Class 10	1.27(0.89,1.81)	0.174	1.01(0.68, 1.43)	0.984
Studied Until College*	2.19(1.33,3.63)	0.002	1.53(1.31,5.14)	0.162
Studied More than College*	2.05(1.32,3.18)	0.001	1.87(0.91, 2.89)	0.035
I don't know	1.01(0.73,1.39)	0.935	0.89(0.55,1.31)	0.603
Education of Mother				
Never went to school or less than class 5	1.00		1.00	
Finished Class 5	1.07(0.74,1.56)	0.691	0.79(0.51,1.24)	0.316
Finished Class 10	1.41(0.97,2.03)	0.066	0.97(0.62, 1.54)	0.931
Studied Until College	1.43(0.87,2.33)	0.148	0.83(0.45,1.52)	0.554
Studied More than College	1.23(0.75,2.01)	0.399	0.66(0.34,1.27)	0.216
I don't know	0.85(0.59,1.22)	0.394	0.85(0.53,1.23)	0.502
Source of Information				
From TV	1.00		1.00	
From Radio	1.54(1.03,2.31)	0.033	1.47(0.97,2.24)	0.066
From School Information Session of Change Agents	1.83(1.09,3.07)	0.021	1.41(0.82,2.41)	0.214

From BRAC SBCC session*	3.29(1.68,6.48)	0.001	2.29(1.14,4.61)	0.019
From Teachers*	2.85(2.04,3.98)	<0.001	2.33(1.64,3.31)	<0.001
From Newspaper*	5.38(3.68,7.85)	<0.001	4.25(2.87,6.31)	<0.001
From Mother/Father/caretaker*	12.21(8.75,17.02)	<0.001	9.92(7.02,14.02)	<0.001

Note: * indicates statistical significance (i.e., $p < 0.05$) of the association between students' practice and independent variable after adjustment

5. Discussion

There have been enormous articles regarding with COVID-19 infection however, the most important one has been highlighted that the community's knowledge and practice of COVID-19 and essential information on preventive measures (Saha et al., 2022). The studies conducted in Bangladesh which compared to the studies in China, Thailand and Pakistan, the knowledge and practice regarding COVID-19 preventive measures of general population in Bangladesh indicated suboptimal level particularly during the early period of pandemic (Ferdous et al., 2020). Until the establishment of vaccination program, the studies explicating the knowledge and practice on COVID-19 preventive measures among the students in Bangladesh had significantly implied that the ~50% of students had good knowledge and ~40% of students had good practice on COVID-19 preventive measures (Kumar et al., 2021). Moreover, among the studies, most had unveiled that female population had better knowledge and practice on COVID-19 preventive measures than the male population (Rahman et al., 2021).

Before we conducted the survey followed by phase 2 implementation BRAC' CST program in Cox's Bazar of Bangladesh, there was no research article regarding with knowledge and practice of COVID-19 preventive measures among the secondary student level. Moreover, in Bangladesh, the Dhaka and Chittagong divisions are highest population densities and more the 70% of confirmed cases and death cases were from these two areas and we could see the dynamics of up and down trend in these two areas following the flexible lockdown (Siam et al., 2020).

Therefore, since beginning of the early period of COVID-19 pandemic to this stable situation, the BRAC and other implementing has been focused the community engagement activities in these two divisions of community's awareness and resilience on COVID-19 preventive measures

(Dhaka Tribune, 2021). The most striking finding from this study was that there was no significant difference in both knowledge and practice level of male and female students from school and madrasa, however female students have better knowledge than that of male. For male students, the good knowledge level on COVID-19 preventive measures was 69.2 % while the 72.2% of female students were good knowledge with COVID-19 preventive measures. Besides knowledge, when we see the practice on COVID-19 preventive measures, the results were 68.87% for male students and 69.70% for female students respectively. There are valid articles and research papers which have explored that community engagement activities for communicable diseases could increase the knowledge and practice level of public particularly in LMICs (Questa et al., 2020). Moreover, the knowledge and practice of gender could be in same proportion when the implementations activities were conducted in same contextualized situation. (Vareed, 2014).

In comparison of their locations and knowledge and practice, though the number of participants from Pekua Upazila were larger than those of Cox's Bazar Sadar, the level of knowledge and adherence to practice on COVID-19 preventive measures were higher in residents of Cox's Bazar Sadar. In Bangladesh, urban residents have better knowledge and practice on COVID-19 preventive measures than rural population because of more literacy rate and narrow information gap (Ripon et al., 2021; Yue et al., 2021). Although Bangladesh is not a secular state, the role of religious leaders and religious institutions are very paramount and the considerable influence of madrasa is still crucial in education of Bangladesh (Roy et al., 2020). Because of their influential role, both the government and INGO such as UNICEF requested to these religious leaders for delivering of correct and relevant information on COVID-19 preventive measures for general population and madrasa students (UNICEF, 2020; Daily Star 2020). The location such as Cox's Bazar which is a famous travel destination with mass number of migrant population and refugee camps, we could say that Cox's Bazar is most vulnerable area of COVID-19 and the INGO like ICRC lead the dissemination of information about COVID-19 preventive measures through religious leaders (ICRC, 2020). Not only in Bangladesh with majority of Islamic population, but also other beliefs of Christian, Buddhism and Hinduism, most of the believers adhere the directions of their respected and influential religious leaders (Essa-Hadad, 2022; Wijesinghe, 2022).

The ages of both male and female students were 10 to 19 years and the students of Grade 8th -9th and equivalent classes were age of more than 15 years. Both Chi-square test and logistic regression analysis unveiled that both male and female students of Grade 8th-9th have better knowledge and practice than students of Grade 6th-7th and equivalent. However, when we see in grade comparison by gender aspect, only male students of Grade 9th were in better knowledge and practice than other Grades of male students whereas the female students of all Grades had equal knowledge and practice. An article conducted in Bangladesh revealed that the knowledge and practice on COVID-19 preventive measures were directly proportionate with age, education classes and female gender (Hossain et al., 2020), not only in Bangladesh, but also in cross-cutting themes of other studies in Nepal and systemic review over South Asian and Southeast Asian countries (Subedi et al., 2020; Rahman et al., 2022). The family members of the students are important because caring among the family members, good relationship dynamic between each other in such a crisis time was very crucial (Long et al., 2021). In our study, there were associations of knowledge and practice of among students and their family members, however, there was no statistically significant. Furthermore, the educational level of parents is very important to nurture not only for knowledge and practice on COVID-19 preventive measures but also in their education particularly during pandemic period (Khalid & Singal, 2021). In our study, parents' education level was either in college or beyond college level, there were significant association of good knowledge and practice on COVID-19 preventive measures of students, like similar articles in China and Bangladesh (Chen et al, 2021; Hossain et al., 2020). However, the knowledge and practice of students have more statistically significant in education of father than that of mother. According to Bangladesh Bureau of Statistic (2017), the school enrollment rate of male and female is nearly same, but the school competency rate of male is higher than that of female in Bangladesh and we could affirm that the father education status is more statistically significant on knowledge and practice (Ball, 2010). In our study, the students with good knowledge and practice received their information from their mothers, fathers, caretakers, teachers and newspaper. Among the 167 million of population in Bangladesh, the social media users were nearly 55.6 million with mean age of 29 (Dataportal, 2022), the listening habit of radio is still unchanged particularly in rural Bangladesh (Financial Express., 2022) and, according to survey of Prothom Alo, mean age of 15 years and above Bangladeshi people had the habit of reading newspaper (National Media Survey, 2022) and the news literacy

rate of Bangladesh is satisfiable state (UNICEF, 2020). Therefore, not only the parents but also the teachers of the students could get the correct and relevant information and disseminate the information to the students about preventive measures of COVID-19. Therefore, we could affirm that our findings on correlation of source of information of knowledge and practice on COVID-19 preventive measures of students could have correlation with statistically significance.

6. Strength of the study

Among 2255 of participants, there was only 20 missing values and response rate of the students was 73.2 % of students. This indicated the high enthusiasm of the students to participate in the study, good communication with local health authorities, implementers and widespread community mobilization and effectiveness of the program intervention beforehand the survey. Such a nearly hundred percent response rate may have led to improved generalizability of the findings and epitomized for others who want to replicate the way they coordinated with communities and authorities. Furthermore, with the good response rate, we deducted incomplete answers from social demographic factors we only counted for calculation from 2255 observations, therefore, we could say that the results of these survey and finding would be in high accuracy and validity.

7. Limitation of the study

In this study, the knowledge is being scored by their self-reported awareness and recall and this may lead to recall bias. In addition to that, this study focused in schools and madrasas in Cox's Bazar and we had limitation on time and arrangement issues. Moreover, we did not include attitude portion of their COVID-19 preventive measures and the efficacy of beliefs which can be conceptualized to include both response-efficacy and self-efficacy and we could only adopt and examine the limited perspectives (Lee et al., 2021).

8. Conclusion

This study demonstrates that both male and female students had good knowledge and practice regarding with COVID-19 preventive measures where the community received the BRAC program's intervention. Another important thing, for example, students responded "Yes" in one question on mode of transmission of "COVID-19 can transmit from animals". In real scenario, COVID-19 cannot transmit from animal and we excluded this answer in scoring. By seeing this,

we can estimate knowledge of students are unclear understanding of transmission and prevention of COVID-19 remains a challenge for correct knowledge of the respondents. Some respondents have a misconception about the symptoms and transmission of COVID-19 infection in both areas. These findings are demonstrating that the programs need to develop a strategy that can accelerate the retention of accurate and relevant knowledge among students and we could empower community participation in health campaigns concerning COVID-19 related information.

9. Implication and Recommendation

The largest proportion of students acquired their information of knowledge and practice on COVID-19 preventive measures from their parents and teachers and we could assume that the education status of the parents is directly proportionate to the COVID-19 knowledge of the students, we should focus in expansion of program for disseminating of knowledge about COVID-19 not only on students but also to parents and teachers. Another important thing is that only small portion of the students joined on school information sessions of changes agents and SBCC sessions of BRAC. We could obviously see the difference in knowledge and practice of students between schools and madrasa. Therefore, we could emphasize for elaborating of more campaign strategies to attract more students for participating in school information session and SBCC sessions and we should assign the school teachers as change agents. The factors which are misbelieved by the students should be highlighted in the program to take corrective action immediately.

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11. Annexes

11.1 Questionnaire

Variables	N	Questions	Answers
Student	o	Respondent ID	-----

Institution Id		Institution	(i) School (ii) Madrasa
Grade ID		Grade Studying In	(i) Grade 6 (ii) Grade 7 (iii) Grade 8 (iv) Grade 9
Location/ Address		Location/ Address of the institution	(i) Sadar (ii) Pekua
Gender	1	What is the Sex of respondent	(i) Male (ii) Female
Age	2	What is your age? (Year)	-----
Knowledge on COVID-19 mode of transmission	3	Do you know how COVID-19 can be transmitted to each other? (Multiple answers possible)	(i) From Infected Person (ii) From Animal (iii) Touching of contaminated materials (iv) Don't know
Knowledge on COVID-19 symptoms	4	Do you know what are the symptoms of COVID-19 infection? (Multiple answers possible)	(i) Fever (ii) Cough (iii) Headache (iv) Vomiting (v) Abdominal Pain (vi) Loose Motion (vii) Pain in body

			(viii) Don't Know
Knowledge on COVID-19 transmission prevention	5	How COVID-19 transmission can be prevented? (Multiple answers possible)	(i) Wearing of Masks (ii) Hand Washing (iii) Social Distancing (iv) Vaccination (v) Avoiding Crowd (vi) Don't know (vii) Others If other, please specify----- ----- -----
Source of Information for COVID-19 knowledge	6	How do you know the information on preventive measures? (Multiple answers possible)	(i) From mother/father/caretakers (ii) From teachers (iii) From SBCC sessions of BRAC (iv) From School Information Sessions of Change Agents (v) From TV (vi) From Radio (vii) From Newspaper (viii) Other sources of information For "Other Source of Information" ----- ----- -----

Practice on Handwashing	7	How often do you wash your hand with soap/sanitizer in a day? (Multiple answers possible)	<ul style="list-style-type: none"> (i) Before washing face (ii) After toilet (iii) Before meal (iv) After meal (v) After touching with other (vi) After touching the materials (vii) After playing
Duration of handwashing	8	Do you know how many seconds you should take to wash your hand?	<ul style="list-style-type: none"> (i) More than 20 seconds (ii) 20 seconds (iii) Less than 20 seconds
	9	How many seconds do you take when you wash your hand?	<ul style="list-style-type: none"> (i) More than 20 seconds (ii) Actual 20 seconds (iii) Less than 20 seconds (iv) Not sure
Handwashing stations	10	Do your school has handwashing stations?	<ul style="list-style-type: none"> (i) Yes (ii) No
	11	If your school has handwashing stations, they only provide water or water and soap or hand sanitizers?	<ul style="list-style-type: none"> (i) Water only (ii) Water and soap (iii) Water and soap and hand sanitizers
Wearing of Masks	12	Do you always wear the mask when you go outside or school?	<ul style="list-style-type: none"> (i) I wear the mask all the time (ii) I wear the mask most of the time (iii) I wear in the class time only (iv) I wear the mask rarely

			(v) I never wear the mask
Vaccination Knowledge	13	Have you heard that vaccination can prevent you from COVID-19 infection?	(i) Yes (ii) No (iii) Don't know
Vaccination Status	14	How many times did you get the vaccination?	(i) Never (ii) 1 time (iii) 2 times (iv) 3 times (v) More than 3 times

11.2 Consent Form

BRAC- James P Grants School of Public Health, BRAC University.

Study Title: A Practicum on COVID-19 preventive knowledge and practice among the male and female students from 6th-9th standards at schools and equivalent grade level of madrasas of Sadar and Pekua Upazillas of Cox's Bazar District, Bangladesh

Principal Investigator's name: Aung Phyto Hein. (18th MPH Cohort) at BRAC-James P Grants School of Public health, Mohakhali, Dhaka-1212. Phone -01894619507.

Email-aungphyoheinaph29@gmail.com .

Purpose of the research

Hello (Assalamualaikum/Nomoshkar). My name is and I work with the BRAC-James P Grants School of Public Health, BRAC University in Dhaka.

The Cox's Bazar was a major burden area of COVID-19 during the pandemic. In the area, the population density is high (9600/sq km). And we can still note that this area is a potential area of high COVID-19 transmission. Though, the vaccination program has expanded, the knowledge and adherence to COVID-19 preventive measures are still crucial for the community's resilience on COVID-19 particularly after schools and madrasas are reopened. The reinforcing programs of community's awareness are currently intervened in this area including schools and madrasas. For this reason, we are doing a survey on knowledge and adherence to the practice of COVID-19 preventive measures by students from Grade 6th to 9th and this will contribute us for further developing of intervention strategies and scaling-up of activities in future public health programs. And I would like to express my gratitude for your kind contribution of providing consent for this study.

Why are we inviting students to participate in the study?

We are trying to understand the existing knowledge and practice of COVID-19 preventive measures among the students from Grade 6th to 9th of both schools and madrasas of Sadar and Pekua Upazilllas of Cox's Bazar for the purpose I mentioned above. For this purpose, I am talking to the guardian teachers/school principals of a child who is in the 6th -9th standards (5-16 years old) and live in Sadar and Pekua. We are approaching you because you are a guardian teacher/school principal of a student in 6th -9th standards (5-16) years old. The consent you will provide is valuable to us. It will take around 10-15 minutes–1 hour. However, there will be no direct benefit for you for the giving consent to this study and you will not receive any compensation. Your contribution for consent is completely voluntary. There is no known risk in answering our questions. The information collected from this study will be kept covert by the research group of this study.

What is expected from the participants of the research study?

If you decide to make a consent for questioning to students for the research study, I will ask them a series of questions. These will include socio-demographic information and questions about their knowledge and practice in COVID-19 preventive measures. It will take around 40 minutes.

Risks & Benefits

There are no major risks involved in this study. However, presence of data may create discomfort to students and hamper their privacy. There is no monetary and other compensation benefit for participating in this study. Communities might benefit health effects from the improved knowledge and network connections through this research.

Privacy, anonymity and confidentiality

All collected data will be kept confidential as allowed by the law of this country. Confidentiality of the data will be strictly maintained. All the collected data and photos will be kept confidential and the digitally collected data will be erased after the completion of data analysis except Principal Investigator and Research Administration data base. We will use the information only for the purpose of the study, and we will not use their names in sharing and publishing the results of this study.

Future use of information

The information collected from this study may be shared with other researchers if needed, but we will strictly maintain all of the information in confidentiality and privacy.

Right not to participate and withdraw

Taking part in the study is completely voluntary. The students may choose not to answer any or all of the questions that will be asked about their knowledge and practice on the COVID-19 preventive measures related information. The students can drop out of this study at any time, even in the middle of an interview. They have their right to refuse participation in this study, which will not affect them anything.

Principle of compensation

We will not pay them money or any other compensation for attending in the study.

Persons to contact:

If you have any question, you can ask me at any time. If you have additional questions about the study, you may contact:

Mr. Aung Phyo Hein(18th MPH Cohort) at BRAC-James P Grants School of Public health, Mohakhali, Dhaka-1212 personally or at telephone number is 01894619507. If you have any query to know about your rights and benefits for participation in the study you may contact with Mr. Avijit Saha, Senior Research Associate, BRAC-James P Grants School of Public health, Phone: +880198679158.

For your any concern for any inquiry, you can contact:

Institutional Review Board (IRB), James P Grants School of Public Health, BRAC University, 6th Floor, Medona Tower, 28 Mohakhali Commercial Area, Bir Uttom A K Khadakar Road, 1213-Dhaka, Bangladesh. Phone: 01993379512. www.bracjpgsph.org/research-irb

If you agree to our proposal of enrolling your students/class/school/madrassa in our study, please indicate that by putting your signature or your left thumb impression at the specified space below

Thank you for your cooperation.

11.3 Assent Form

Participant Information Sheet and Assent Form

Study Title	A Practicum on COVID-19 preventive knowledge and practice among the male and female students from 6 th -9 th standards at schools and equivalent grade level of madrasas of Sadar and Pekua Upazillas of Cox's Bazar District, Bangladesh
Investigator	Aung Phyo Hein
	BRAC- James P Grants School of Public Health, BRAC University, Dhaka, Bangladesh
	Tel-01894619507

Hello (Assalamualaikum/Nomoshka).

My name is, we are interviewers from BRAC-James P. Grant School of Public Health, BRAC University. We are conducting a research study on measuring the knowledge and practice of COVID-19 prevention among the students of 6th- 9th standards at the schools and madrasas of Sadar and Pekua upazillas of Cox's Bazar District. The purpose of the study is to learn the knowledge and adherence on practice of COVID-19 preventive measures by the students because the schools are reopening at the moment and the Cox's Bazar area is high potential risk area of COVID-19 transmission and we have already known that high cases of situation in the pandemic in the area. Therefore, we assume that the knowledge and adherence on practice of COVID-19 preventive measures by the students.

As you are resident and student of this community and already faced these experiences and we believe that you have already known the community support program (CST) by BRAC. Therefore, we are inviting you to participate in this survey. The information you will provide is valuable to us. It will take around 10-15 minutes–1 hour. However, there will be no direct benefit for you for the participating in study and you will not receive any compensation. Your participation is completely voluntary and you can withdraw yourself from the interview/discussion at any moment if you want to, even after signing this consent form. There is no known risk in answering our questions. The information collected from this study will be kept covert by the research group of this study.

What is expected from the participants of the research study?

If you decide to participate of the research study, I will ask you a series of questions. These will include socio-demographic information and questions about your knowledge and practice in COVID-19 preventive measures. It will take around 40 minutes.

Do you agree with the interview or discussion to proceed? Yes No

Do you have any question or any clarification? Yes No

If yes, please specify

.....

.....

.....

If no, should I proceed?

Yes

No

	Name	Signature	Date	Phone Number
Participant				
Data Collector				

You can keep a signed copy of the Written Informed Assent for your own records and give another copy to the interviewer.

Identification of Investigator/Interviewer

If you have any question, the responsible person of this study:

Name: Aung Phyo Hein
Phone: 01894619507, BRAC James P Grant School of Public Health, BRAC University
6th Floor, Medona Tower,
28 Mohakhali Commercial Area,
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28 Mohakhali Commercial Area,

Bir Uttom A K Khandakar Road, Dhaka-1213, Bangladesh

a.saha@bracu.ac.bd

For your any concern for any inquiry, you can contact:

Institutional Review Board (IRB), James P Grants School of Public Health, BRAC University,
6th Floor, Medona Tower, 28 Mohakhali Commercial Area, Bir Uttom A K Khadakar Road,
1213-Dhaka, Bangladesh. Phone: 01993379512. www.bracjpgsph.org/research-irb

11.4 Annex Table 1: Sociodemographic characteristics students stratified by study

Background Characteristics		Total	Male	Female
		n = 2255	n = 803	N=1452
		n (%)	n (%)	n (%)
Name of Upazila	Cox' Bazar Sadar	864(38.31)	283(35.12)	582(40.08)
	Pekua	1391 (61.69)	521(64.88)	870 (69.92)
Type of Institution	School	1446 (64.12)	589 (73.35)	857 (59.02)
	Madrasa	809 (35.88)	214 (26.65)	595(40.98)
Age of Student	< 15 Years	1571 (69.67)	546 (68.00)	1025 (70.59)
	>= 15 Years	684(30.33)	257 (32.00)	427(29.41)
Classes of Student	Class 6 and equivalent	557 (24.70)	201 (25.030)	356(24.52)
	Class 7 and equivalent	550 (24.39)	230 (28.64)	320(22.04)
	Class 8 and equivalent	624(27.67)	198(24.66)	426(29.34)
	Class 9 and equivalent	524(23.24)	174(31.67)	350(24.10)
Family Members of the Student	Family member <5	329(14.59)	143(17.81)	186(12.81)
	Family member >=5	1926(85.41)	660(82.19)	1266(87.19)

Education of Father	Never went to school or finished class less than 5	207(9.18)	81(10.09)	126(8.68)
	Finished Class 5	511(22.66)	164(20.42)	347(23.90)
	Finished Class 10	428(18.98)	168(20.92)	260(17.91)
	Studied until college	141(6.25)	52(6.48)	89(6.13)
	Studied more than college	210(9.31)	86(10.71)	124(8.54)
	I don't know	758 (33.61)	252(31.38)	506(34.85)
Education of Mother	Never went to school or finished class less than 5	168(7.45)	56(6.97)	112(7.71)
	Finished Class 5	489(21.69)	163(20.30)	326(22.45)
	Finished Class 10	651(28.87)	215(26.77)	436(30.03)
	Studied until college	150 (6.65)	61(7.60)	89(6.13)
	Studied more than college	138(6.12)	67(8.34)	71(4.89)
	I don't know	659 (29.22)	241(30.01)	418(28.79)
Source of Information	From TV	222(9.84)	72(8.97)	150 (10.33)
	From Radio	184(8.16)	67(8.34)	117(8.06)
	From School Information Session of Change Agents	81(3.59)	24(2.99)	57(3.93)
	From SBCC Sessions of BRAC	44(1.95)	10 (1.25)	34(2.34)
	From Teachers	450(19.96)	139(17.31)	311(21.42)
	From Newspaper	301 (13.35)	115(14.31)	186(12.81)
	From Mother/Father/caretaker	973(43.15)	376(46.82)	597(41.12)

11.5 Annex Table 2: Scoring the knowledge of the students regarding with COVID-19 preventive measures

Knowledge Questions on COVID-19 preventive measures	Male	Female	Total
	n (%)	n (%)	N (%)
	n=803	n=1452	N= 2255
1. Knowledge of students regarding with mode of transmission			

From Infected Person	529(87.44)	970(86.45)	1499(86.80)
From Animal	334(55.21)	586(52.23)	920(53.27)
Touching of contaminated Materials	2016(34.05)	338(30.12)	544(30.50)
2. Knowledge of students regarding with symptoms			
Fever	716(92.99)	1353(95.42)	2069(94.56)
Cough	478(62.08)	991(68.89)	1469(67.14)
Loose Motion	145(18.83)	312(22)	457(20.89)
Pain in Body	211(27.4)	426(30.04)	637(29.11)
Headache	392(50.91)	766(54.02)	1158(52.93)
Abdominal Pain	161(20.91)	319(22.5)	480(21.94)
Vomiting	194(25.19)	384(27.08)	578(26.42)
Don't Know	9(1.17)	15(1.06)	24(1.1)
3. Knowledge of students regarding with preventive measures			
Wearing of Mask	727 (92.14)	1317(92.81)	2044(92.57)
Handwashing	678(85.93)	1236(87.1)	1914(86.68)
Social Distancing	667 (84.54)	1177(82.95)	1844(83.51)
Avoiding of Crowd	331 (41.95)	532(37.49)	863(39.09)
Vaccination	449 (56.91)	885(62.37)	1334(60.42)
Don't Know	6(0.76)	5(0.35)	11(0.55)
4. Knowledge of students regarding with duration of handwashing			
10 seconds	68 (8.47)	211 (14.53)	279 (12.37)
20 seconds or more	722 (89.91)	1222 (84.16)	1944 (86.21)
5. Knowledge of students regarding with vaccination			
Yes, I agree	692(86.18)	1287(88.64)	1979(87.76)
No, I don't agree	40 (4.98)	33(2.27)	73(3.24)
I don't know	36(4.48)	60(4.13)	96(4.26)
Composite Knowledge on COVID-19 Preventive Measures			
Poor Knowledge	248 (30.88)	397 (27.34)	645(28.60)
Good Knowledge	555 (69.12)	1055 (72.66)	1610 (71.40)

11.6 Annex Table 3: Scoring the practice of the students regarding with COVID-19 preventive measures

Practice on COVID-19 Preventive measures	Male	Female	Total
	n(%)	n(%)	n(%)
	N=803	N=1452	N=2255
1. Practice of students regarding with proper handwashing method			
Before meal	639(87.30)	1231(90.85)	1870(89.60)
After touching with others	329(44.95)	539(39.78)	868(41.95)
After toilet	610 (83.33)	1150 (84.87)	1760 (84.33)
After touching the materials	513(70.08)	937 (69.15)	1450(69.48)
After meal	411(56.15)	817(60.30)	1228(58.84)
Before washing face	410(56.01)	682(50.33)	1092(52.32)
After Playing	507(69.26)	917 (67.68)	1424(68.23)
2. Practice of students regarding with duration of handwashing			
10 seconds	74(9.22)	194(13.36)	268(11.88)
20 seconds or more	709 (88.29)	1216(83.75)	1925(85.37)
3. Practice of students regarding with wearing of mask			
When I have to go outside of my home	680(86.62)	1290(92.01)	1970(90.08)
While talking with others	460(58.6)	816(58.2)	1276(58.34)
I wear mask when I feel like it	293(37.32)	454(32.38)	747(34.16)
4. Practice of students regarding with proper handwashing method			
One Time	39(5.26)	68(5.1)	107(5.16)
Two Times	624(84.21)	1161(87.03)	1785(86.02)
More than Two Times	3(0.4)	14(1.12)	18(0.87)
Composite Practice on COVID-19 Preventive Measures			
Poor Practice	250(31.33)	440 (30.30)	690(30.60)
Good Practice	553(68.87)	1012(69.70)	1565(69.40)