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Knowledge, attitude and practices (KAP) toward COVID−19 and its prevention among graduate students at Bahir Dar University, northwestern Ethiopia: A cross−sectional study

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ABSTRACT

Objective: SARS-CoV-2 infection is an ongoing public health emergency of international significance. Considering that there is no specific drug and 100% effective vaccine yet, knowledge, attitude and practices (KAP) toward COVID-19 are crucial to prevent and manage the pandemic. This study aimed to assess knowledge, attitude and practices toward COVID-19 prevention measures of graduate students at a university in northwestern Ethiopia.

Methods: A cross-sectional study design was conducted between September to December 2020. A structured questionnaire was used to collect data on socio-demographic characteristics and KAP of 407 randomly selected individuals. The data were exported to SPSS version 23.0, and bivariate and multivariate logistic regressions were used for analyses. Variables with $P<0.25$ in the bivariate logistic regression analysis were retained into the multivariable logistic regression models. The values were considered to be statistically significant ($P\leqslant0.05$). The data quality control was tested by using 5% pretest.

Results: Among 407 participants, 267 (65.6%) had sufficient knowledge, 239 (58.7%) had positive attitude and 189 (46.4%) had good practices toward COVID-19. Marital status (*AOR* 0.38; 95%*CI* 0.11-0.95; *P*=0.040) and student admission type (*AOR* 0.32; 95%*CI* 0.15-0.68; *P*=0.003) had a statistically significant association with knowledge of students. Residence (*AOR* 0.18; 95%*CI* 0.09-0.34; $P<0.01$) (*AOR* 0.16; 95%*CI* 0.07-0.36; $P<0.01$), family size (*AOR* 0.45; 95%*CI* 0.23-0.87, *P*=0.017) (*AOR* 0.29; 95%*CI* 0.14-0.60; *P*=0.001), student admission type (*AOR* 0.11: 95%*CI* 0.04-0.29, $P<0.01$) (*AOR* 0.01; 95%*CI* 0.00-0.05; $P<0.01$) and monthly income (*AOR* 0.17; 95%*CI* 0.05-0.58; *P*=0.005) (*AOR* 0.08; 95%*CI* 0.02-0.32; $P<0.01$) were significantly associated with positive attitude and good practices, respectively. Besides, good practices such as avoiding handshaking and physical distancing were performed in the least amount of participants.

Conclusions: The scores of KAP among graduate students toward COVID-19 are low. It is recommended that university administrators reinforce proactive and effective measures to develop good knowledge, positive attitude, and better practices regarding COVID-19 for the students.

KEYWORDS: COVID-19; Attitude; Knowledge; Practices; Student; Ethiopia

Significance

In order to create awareness among the high-risk groups in Ethiopia, insight into the gaps of knowledge, attitude and practices regarding COVID-19 is essential. Some studies have been conducted to evaluate perception since the onset of the epidemic, but significant proportions of the participants still have misunderstanding about COVID-19. This study enabled us to identify the baseline knowledge, misunderstandings, attitudes, and wrong practices related to COVID-19. This will facilitate recommendations on issues and barriers related to developing effective public health interventions for future pandemics.

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1. Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19, has had a significant impact on human health globally, infecting a large number of people, causing severe disease and associated long-term health sequelae, resulting in excess mortality, especially among the older and vulnerable populations, interrupting routine healthcare services, disruptions to travel, trade, education, and many other social functions, and comprehensively hurting people's physical and mental health[1].

In Ethiopia, the first case of COVID-19 was detected on March 13, 2020[2]. The number of cases was increasing exponentially although the government of Ethiopia has implemented a range of stringent policies, including nationwide lockdown, varying levels of contact tracing and self-isolation or quarantine, as well as promoting public health measures such as hand washing, respiratory etiquette, and social distancing. Over the past three years, Ethiopia has seen a shift in behavior, medicine, social life, especially economy due to the pandemic[3].

People's adherence to control measures is affected by their knowledge, attitudes, and practices (KAP) toward COVID-19. Hence, appropriate KAP toward the preventive measures are required to cease the spread of the COVID-19 outbreak. However, previous studies indicated that the communities had shown poor knowledge and negative attitude toward the preventive measures of COVID-19 pandemic[4]. Therefore, the behavior of the general public, which is influenced by people's knowledge and perceptions play the crucial role in controlling and reducing the morbidity and mortality due to COVID-19[5]. This study aimed at determining and identifying the levels of KAP gaps towards COVID-19 among graduate students who come from the diverse segments of society in the country.

2. Methods

2.1. Study setting and design

A cross-sectional study design was conducted between September to December 2020 to determine the levels of KAP toward COVID-19 prevention measures among graduate students at Bahir Dar University, northwestern Ethiopia. Bahir Dar is one of the leading tourist destinations in Ethiopia, with a variety of attractions in the nearby Lake Tana and Blue Nile River. The city is situated 565 km northwest from the capital city Addis Ababa. Bahir Dar University is among the largest universities in Ethiopia, with more than 52 830 students in its 219 academic programs, 69 undergraduate, 118 masters, and 32 PhD programs and the total number of graduate students in 2020/2021 is 5 117 of this 4 203 is under graduate and 769 post graduate[6].

2.2. Sample size determination and sampling techniques

The sample size of the study was determined using single population proportion formula by taking 50% proportion with confidence interval at 95% and 5 % margin of error[7].

Multistage sampling was employed to select the study subjects. A simple lottery method was applied to select the campuses from the university. The educational units in the campuses were stratified into colleges or faculties and then students were stratified by their areas of studies or department. Finally, students were selected by simple random sampling technique.

2.3. Inclusion criteria and exclusion criteria

Students who were enrolled during 2020/21 academic year and participated several training at different departments of Bahir Dar University and those who consented to participate in the study were included. Those who were unwilling to participate in the study were excluded from the study. Then, the final sample size was 422.

2.4. Data collection

2.4.1. Questionnaire survey

A standard KAP questionnaire was compiled and adapted from previous studies of various articles[8–13]. A structured questionnaire was used to collect data on socio-demographic characteristics, knowledge and attitude of the study participants about the modes of SARS-CoV-2 transmission, symptoms, its preventive measures and practices toward COVID-19. The questionnaire was prepared in the English version and translated into the local language (Amharic), and then translated back to English to ensure consistency.

Knowledge score was assessed using eight questions with each correct response given a score of 1 while wrong or unsure response scored as 0. Those whose score are equal to mean score (18.66±4.15) or above were taken as having good knowledge while those with score of less than the mean were considered as having poor knowledge about COVID-19. The score of the attitude based on 5 points Likert scale, in which the score of 1 to 5 was given from strongly disgree to strongly agree. The responses were summed up and a total score was obtained for each respondent. The mean score was calculated and respondents with score of greater than or equal

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to the mean score (2.49±0.39) were considered as having positive attitude while those with score of less than the mean score were taken as having negative attitude toward COVID-19. The levels of practices scores were also determined through twelve questions using Likert's type scale. The scoring system ranging from never (score 0), sometimes (score 1), always (score 2) were used. An individual was claimed as having good practices when his/her overall practices score (4.66±2.01) was equal to or more than the mean practices score, while has poor practices when his/her overall practices score was less than the mean practices score[10,14].

2.4.2. Data analysis

The congregated data were analyzed using SPSS version 23.0. Descriptive statistics were carried out to measure relative frequencies and percentages of the variables. Logistic regression analysis was performed to examine associations between variables by using an odds ratio. Odds ratios were calculated with 95% confidence interval. Variable having significance at *P*-values 0.25 in univariate test were selected and entered for multivariate logistic regression analysis to identify the most important predictors of COVID-19 disease[15]. The values were considered to be statistically significant when $P \leqslant 0.05$.

2.4.3. Data quality control

The items of the questionnaire were adapted after making some modifications from the coronavirus disease indicator survey questionnaires, which were in use for similar previous KAP studies. Before going to the actual data collection, pretest of the questionnaire was conducted on 5% of the total sample size that was not part of the study population to ensure the validity of the data collection tool. *R*-square value is 0.6 and above, then the instrument was considered satisfactory[16] using results from the pretested questionnaire. Any incomplete and ineligible questionnaires were corrected accordingly and revisions were made to the questionnaire.

2.5. Ethics approval and consent to participate

The study was reviewed and approved by the Ethical Review Committee under the research and community service coordinating office of College of Science, Bahir Dar University, Ethiopia (SCRCSC/102/02/12). Informed written consent was obtained from the study participants and all participants who agreed to take part in the survey signed a consent form.

3. Results

3.1. Socio–demographic information

From the total of 422 subjects, 407 (96.4%) responded to the questionnaire, of which 253 (62.2%) were males. The median age of the participants was 23±3.64 years. Majority 221 (54.3%) of the study participants were in the range of 21-23 years old and 308 (75.7%) were single, while in terms of family size 53.8% had more than four family members. Concerning other socio-demographic factors, 345 (84.8%) students were undergraduate and the highest number of participants were follow regular program 363 (89.2%). Most participants (226, 55.5%) had a monthly income of less than 1000 Ethiopian birr (ETB) (Table 1).

3.2. Knowledge toward COVID–19

Good and poor knowledge among study respondents were found to be 267 (65.6%) and 140 (34.4%), respectively. Most (91.4%) of the participants knew that the disease could be transmitted by droplets when an infected person coughs, sneezes, 92.6% replied COVID-19 could be transmitted via touching and shaking hands with an infected person, and 78.1% believed the disease might be caused by the use of objects used by an infected person. Almost all respondents identified the etiologic agent of the disease correctly, 369(90.7%) mentioned virus and 72.7% of participants correctly described incubation period of COVID-19 (Table 2).

In this study, 362 (88.9%), 375 (92.1%), 349 (85.7%) and 314 (77.1%) of the participants correctly identified the major sign and symptoms that patients with COVID-19 can present with fever and cough, difficulty of breathing, nasal and throat congestion, fatigue, respectively. This study revealed that 365 (89.7%) and 343 (84.3%) of the study participants, respectively, identified that people with chronic disease and elderly people were more susceptible to COVID-19. In response to knowledge about prevention strategies, majority of the respondents knew about preventive methods of COVID-19. Avoiding contact with infected individuals using face mask and hand washing were mentioned by the 363 (89.2%), 358 (88.0%), 350 (86.0%) of the respondents, respectively (Table 2).

In this study, the respondents' source of information about COVID-19 was primarily mass media (355, 87.2%) while 254 respondents (62.4%) obtained information via social media (facebook, Instagram, whatsup and telegram). Other sources mentioned were from hospital and health extension 175 (43%), 143 (35.1%) neighbors/friends, 142 (34.9%) family, 114 (28%) teachers (Figure 1).

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Table 1. Socio-demographic characteristics of participants and *Chi*-square analysis of association of KAP toward COVID-19 [*n* (%)].

Variables	Category	Number examined	Knowledge score		Attitude score		Practices score	
			Good	Poor	Positive	Negative	Good	Poor
Sex	Male	253(62.2)	165(65.2)	88(34.8)	144(56.9)	109(43.1)	110(43.5)	143(56.5)
	Female	154(37.8)	102(66.2)	52(33.8)	95(61.7)	59(38.3)	79(51.3)	75(48.7)
	χ^2, *P*		0.044, 0.834		0.899, 0.343		2.354, 0.125	
Age (years)	18-20	35(8.6)	16(45.7)	19(54.3)	18(51.4)	17(48.6)	11(31.4)	24(68.6)
	21-23	221(54.3)	137(62.0)	84(38.0)	112(50.7)	109(49.3)	86(38.9)	135(61.1)
	⩾24	151(37.1)	114(75.5)	37(24.5)	109(72.2)	42(27.8)	92(60.9)	59(39.1)
	χ^2, *P*		13.963, 0.001		17.959, <0.01		20.945, <0.01	
Marital status	Single	308(75.7)	175(56.8)	133(43.2)	149(48.4)	159(51.6)	104(33.8)	204(66.2)
	Divorced/Widow/Widower	4(1.0)	3(75.0)	1(25.0)	3(75.0)	1(25.0)	3(75.0)	1(25.0)
	Married	95(23.3)	89(93.7)	6(6.3)	87(91.6)	8(8.4)	82(86.3)	13(13.7)
	χ^2, *P*		43.887, <0.01		56.348, <0.01		81.933, <0.01	
Religion	Orthodox	258(63.4)	170(65.9)	88(34.1)	145(56.2)	113(43.8)	114(44.2)	144(55.8)
	Protestant	106(26.0)	67(63.2)	39(36.8)	67(63.2)	39(36.8)	55(51.9)	51(48.1)
	Muslim	32(7.9)	23(71.9)	9(28.1)	22(68.8)	10(31.3)	17(53.1)	15(46.9)
	Catholic	11(2.7)	7(63.6)	4(36.4)	5(45.5)	6(54.5)	3(27.3)	8(72.7)
	χ^2, *P*		0.856, 0.836		3.682, 0.298		3.991, 0.262	
Residence	Rural	155(38.1)	67(43.2)	88(56.8)	34(21.9)	121(78.1)	13(8.4)	142(91.6)
	Urban	252(61.9)	200(79.4)	52(20.6)	205(81.3)	47(18.7)	176(69.8)	76(30.2)
	χ^2, *P*		55.545, <0.01		139.763, <0.01		145.717, <0.01	
Family size	⩽4	188(46.2)	150(79.8)	38(20.2)	155(82.4)	33(17.6)	137(72.9)	51(27.1)
	>4	219(53.8)	117(53.4)	102(46.6)	84(38.4)	135(61.6)	52(23.7)	167(76.3)
	χ^2, *P*		31.155, <0.01		81.130, <0.01		98.161, <0.01	
Education level	Undergraduate	345(84.8)	206(59.7)	139(40.3)	178(51.6)	167(48.4)	127(36.8)	218(63.2)
	Postgraduate	62(15.2)	61(98.4)	1(1.6)	61(98.4)	1(1.6)	62(100.0)	0(0.0)
	χ^2, *P*		34.839, <0.01		47.474, <0.01		84.365, <0.01	
Student admission type*	Regular	363(89.2)	248(68.3)	115(31.7)	227(62.5)	136(37.5)	188(51.8)	175(48.2)
	Extension	44(10.8)	19(43.2)	25(56.8)	12(27.3)	32(72.7)	1(2.3)	43(97.7)
	χ^2, *P*		10.989, 0.001		20.130, <0.01		38.687, <0.01	
Monthly income	<1000	226(55.5)	115(50.9)	111(49.1)	83(36.7)	143(63.3)	49(21.7)	177(78.3)
	1000-1500	94(23.1)	71(75.5)	23(24.5)	73(77.7)	21(22.3)	59(62.8)	35(37.2)
	>1500	87(21.4)	81(93.1)	6(6.9)	83(95.4)	4(4.6)	81(93.1)	6(6.9)
	χ^2, *P*		54.959, <0.01		107.311, <0.01		141.933, <0.01	

*Regular: a student who enrolled on-campus; Extension: a program for persons not regularly enrolled as students, frequently provided through evening classes or classes in off-campus centers.

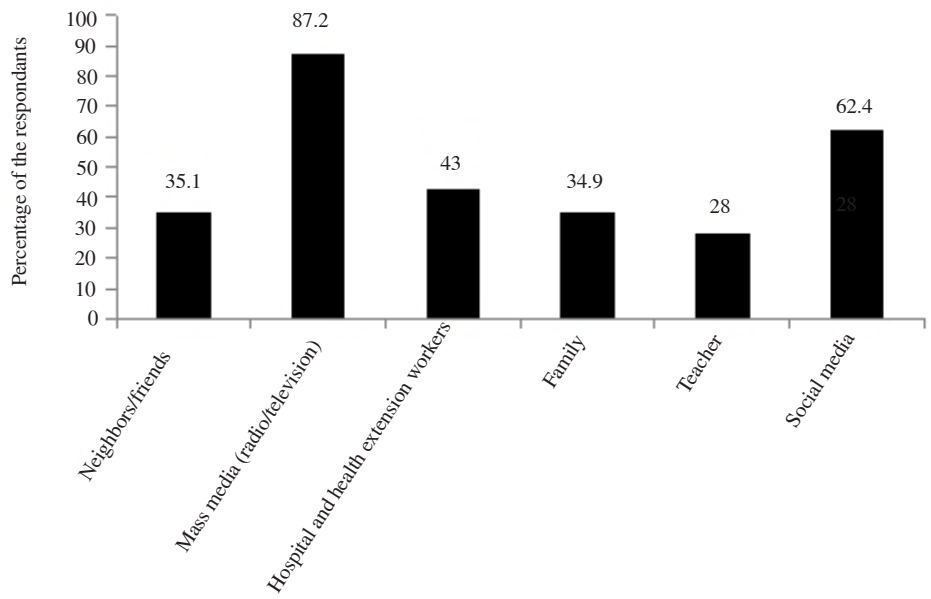

Figure 1. Sources of information about COVID-19 among graduated students in Bahir Dar University, 2020.

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Table 2. Knowledge of graduate students toward COVID-19, Bahir Dar University, 2020 [*n*(%)].

Knowledge items	Response
Etiologic agent of COVID-19	
Virus	369(90.7)
Bacteria	11(2.7)
I don' know	27(6.6)
Incubation period of COVID-19	
1-14days	296(72.7)
3-7days	7(1.7)
More than 14 days	94(23.1)
I don't know	10(2.5)
The main transmission route of COVID-19	
Air droplets after sneezing or coughing	372(91.4)
Touching and shaking hands with an infected person	377(92.6)
The use of objects used by an infected person	318(78.1)
Sexual intercourse and blood transfusion	177(43.5)
The signs and symptoms of the COVID-19 virus disease	
Fever and Cough	362(88.9)
Nasal and throat congestion	349(85.7)
Difficulty of breathing	375(92.1)
Diarrhea	165(40.5)
Fatigue	314(77.1)
Vulnerable group of COVID-19	
Being old aged	343(84.3)
Young	249(61.2)
People with preexisting disease	365(89.7)
Pregnant women	279(68.6)
What can be done to prevent corona virus	
Using face mask	358(88.0)
Hand washing	350(86.0)
Avoiding contact with infected individuals reduces risk of infection	363(89.2)
Avoiding touching nose, mouth and eyes reduces risk of infection	324(79.6)
Adhere to hygiene	310(76.2)
Pay attention to other health habits	323(79.4)
What can be done to treat corona virus disease	
Supportive treatment	264(64.9)
Elderly patients, health practitioners, people wtih chornic diseases or diseases affecting the immune system have to review the health facility when feeling symptoms of the diseases	347(85.3)
By using traditional medicine	73(17.9)
Corona virus disease directly leads to death	249(61.2)
Sufficient knowledge	267 (65.6)
Insufficient knowledge	140 (34.4)

Note: Sufficient knowledge is defined by a score≥18.66 ±4.15; insufficient knowledge is defined by a score <18.66 ±4.15 (see Methods for details).

3.3. Attitude toward COVID –19

Overall, 239 (58.7%) of the study participants had positive attitude while 168(41.3%) had negative attitude toward COVID-19. Over half (51.6%) and 46.2% of the study participants strongly agreed that COVID-19 infection is preventable and curable disease, respectively. While 50.1% of participants strongly agreed that COVID-19 virus is a dangerous disease (Table 3).

3.4. Practices toward COVID–19

The proportion of study participants who had poor practices toward COVID-19 prevention and control measures was slightly higher (53.6%) than those who had good (46.4%) practices (Table 4).

The rates of practices significantly differed across demographic groups. Small number of the participants had not visited any crowded place (15.5%) and wore masks when going out (30.0%). However, 30% of the participants visited crowded places and 60 (14.7%) did not wear masks when leaving home. About one third (33.7%) of the respondents avoided handshaking and always and relatively similar proportion of respondents 126 (31.0%) used disinfectant while touching objects and surfaces. A total of 136 respondents (33.4%) always practiced physical distancing as a preventive measure. A total of 163 (40%) students responded that regular hand washing with water and soap can prevent COVID-19 pandemic. Similarly, 148 (36.4%) of the participants replied that always cover their mouth and nose while coughing or sneezing. Whereas, more than half (54.3%) of the participants replied that sometimes cover their mouth and nose while coughing or sneezing (Table 4).

3.5. Bivariate and multivariate analyses of KAP score levels and its associated factors

Variables having significance at *P*-value 0.25 in univariate test were selected and entered for multivariate logistic regression analysis. Those variables with $P \leqslant 0.05$ in multivariate analyses were considered significantly difference. Accordingly, single students were 62% less likely to be knowledgeable about COVID-19 compared to students married and it was statistically significant (*AOR* 0.38; 95%*CI* 0.11-0.95; *P*=0.040). Moreover, regular students showed higher level of knowledge about COVID-19 compared to the extension students (*AOR* 0.32; 95%*CI* 0.15-0.68; *P*=0.003) (Table 5).

The results of the questionnaire relating to attitude were summarized in Table 5. Residence, family size, student admission type and monthly income showed significantly associated with attitude scores of participants ($P \leqslant 0.05$). Students living in the rural had 82% less likely to have positive attitude toward COVID-19 compared to those living in the urban (*AOR* 0.18; 95%*CI* 0.09-0.34; $P < 0.01$). Participants with more than four family members had 55% less likely to have positive attitude toward COVID-19 compared to those with 4 family members (*AOR* 0.45; 95%*CI* 0.23-0.87; *P*=0.017). Extension students had 89% less likely to have positive attitude toward COVID-19 compared to those who were enrolled in regular program (*AOR* 0.11; 95%*CI* 0.04-0.29; $P < 0.01$). Moreover,

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students whose monthly income less than 1 000 ETB were 83% less likely to have positive attitudes toward COVID-19 compared those who earn>1 500 ETB (*AOR* 0.17; 95%*CI* 0.05-0.58; *P*=0.005). While, no statistically significant association was observed between age, marital status, education level and attitude score ($P \leqslant 0.05$).

As depicted in Table 6, practices score of participants was significantly associated with residence, family size, student admission type, monthly income. Subjects from rural residence had 84% less likely to have good practices on the prevention and control measures compared to those from urban setting (*AOR* 0.16; 95%*CI* 0.07-0.36, $P<0.01$). On the other hand, participants with family sizes greater than four were 71% less likely to have good practices on the prevention and control measures compared to those with four and above family members (*AOR* 0.29; 95%*CI* 0.14-0.60, *P*=0.001). The proportion of extension students and students with monthly income of less than 1 000 ETB who have good practices regarding COVID-19 is much lower than regular students and students with monthly income of more than 1 000 ETB. However, gender, age, marital status and education level were not significantly associated with practices scores of students toward COVID-19 pandemic prevention and control measures (Table 6).

Table 3. Attitude of graduate students toward COVID-19, Bahir Dar University, 2020 [*n*(%)].

Attitude items	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Is COVID-19 infection preventable	5(1.2)	18(4.4)	14(3.4)	160(39.3)	210(51.6)
Do you think COVID-19 is a dangerous disease	7(1.7)	19(4.7)	20(4.9)	157(38.6)	204(50.1)
Do you think COVID-19 is curable	3(0.7)	23(5.7)	40(9.8)	153(37.6)	188(46.2)
Is it important to report a suspected case to health authorities	3(0.7)	19(4.7)	16(3.9)	132 (32.4)	237(58.2)
The government should isolate infected patients in special hospitals	3(0.7)	15(3.7)	15(3.7)	138(33.9)	236(58.0)
Do you think that health education can help to prevent the disease	16(3.9)	14(3.4)	41(10.1)	144(35.4)	192(47.2)
Would you like to be vaccinated	41(10.1)	32(7.9)	43(10.6)	107(26.3)	184(45.2)
Do you think COVID-19 can be treated at home	26(6.4)	27(6.6)	45(11.1)	125(30.7)	184(45.2)
Do you think Lockdown is a good strategy considering the situation in our country	72(17.7)	58(14.3)	29(7.1)	76(18.7)	172(42.3)
Positive attitude			239(58.7)		
Negative attitude			168(41.3)		

Note: Positive attitude is defined by a score ⩾2.49±0.39; negative attitude is defined by a score <2.49±0.39 (see Methods for details).

Table 4. Practices of graduate students toward COVID-19, Bahir Dar University, 2020 [*n*(%)].

Practices items	Response		
	Never	Sometimes	Always
I wash hands by water and soap	24(5.9)	220(54.1)	163(40.0)
I avoid touching the eyes, nose, and mouth	35(8.6)	234(57.5)	138(33.9)
I cover my the nose and mouth during sneezing	38(9.3)	221(54.3)	148(36.4)
I use face mask to cover my nose and mouth in crowded places	60(14.7)	225(55.3)	122(30.0)
If you have flu symptoms appeared, I avoid normal activities such as going to work for school, travel, shopping.	107(26.3)	196(48.2)	104(25.6)
If you have one of the symptoms of the disease do you go to the hospital	98(24.1)	184(45.2)	125(30.7)
Do you prefer to stay at home, in a room with the window open	89(21.9)	186(45.7)	132(32.4)
I avoid unnecessary travel or outing during the outbreak	69(17.0)	195(47.9)	143(35.1)
I avoid shaking others	85(20.9)	185(45.5)	137(33.7)
I avoid close contact with anyone who has a fever or cough/ physical distancing	57(14.0)	214(52.6)	136(33.4)
I clean and disinfect after touching objects and surfaces	71(17.4)	210(51.6)	126(31.0)
Do you participate in meetings, religious activities, events, and other social gatherings or any crowded place in areas	63(15.5)	222(54.5)	122(30.0)
Good practices		189(46.4)	
Bad practices		218(53.6)	

Note: Good practices is defined by a score ⩾4.66 ±2.01; bad practices is defined by a score <4.66 ±2.01 (see Methods for details).

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Table 5. The factors associated with knowledge and attitude regarding COVID-19.

Variable	Knowledge			Attitude		
	COR[#] (95%*CI*)	*AOR*[&] (95%*CI*)	*P*	*COR* (95%*CI*)	*AOR* (95%*CI*)	*P*
Age (years)						
18-20	0.27(0.13-0.59)	0.67(0.28-1.61)	0.373	0.41(0.19-0.87)	1.41(0.50-3.98)	0.521
21-23	0.53(0.33-0.84)	1.18(0.68-2.05)	0.565	0.40(0.25-0.62)	0.80(0.42-1.52)	0.490
⩾24[a]	1.00	1.00		1.00	1.00	
Marital status						
Single	0.09(0.04-0.21)	0.38(0.11-0.95)	0.040*	0.09(0.04-0.18)	0.67(0.22-2.03)	0.479
Divorce/Widow/widower	0.20(0.02-2.25)	0.42(0.02-11.97)	0.611	0.28(0.03-2.97)	1.33(0.00-643.73)	0.928
Married[a]	1.00	1.00		1.00	1.00	
Residence						
Rural	0.20(0.10-0.31)	0.44(0.24-0.79)	0.006	0.06(0.04-0.11)	0.18(0.09-0.34)	<0.01*
Urban[a]	1.00	1.00		1.00	1.00	
Family size						
⩾4	0.29(0.19-0.45)	0.88(0.48-1.60)	0.677	0.13(0.08-0.21)	0.45(0.23-0.87)	0.017*
⩽4[a]	1.00	1.00		1.00	1.00	
Educational program enrolled						
Undergraduate	0.02(0.00-0.18)	0.15(0.02-1.37)	0.093	0.02(0.00-0.13)	0.30(0.03-2.88)	0.294
Postgraduate[a]	1.00	1.00		1.00	1.00	
Student admission type						
Extension	0.35(0.19-0.67)	0.32(0.15-0.68)	0.003*	0.23(0.11-0.45)	0.11(0.04-0.29)	<0.01*
Regular[a]	1.00	1.00		1.00	1.00	
Monthly income (ETB)						
⩽1000	0.08(0.03-0.18)	0.47(0.16-1.34)	0.156	0.03(0.01-0.08)	0.17(0.05-0.58)	0.005*
1000-1500	0.23(0.09-0.59)	1.02(0.34-3.09)	0.966	0.18(0.06-0.51)	0.79(0.21-2.98)	0.724
⩾1500[a]	1.00	1.00		1.00	1.00	

[a]Reference category; [#]Crude Odd Ratio; [&] Adjusted Odd Ratio; * $P \leqslant 0.05$

Table 6. The factors associated with practices regarding COVID-19.

Variable	*COR*[#] (95%*CI*)	*AOR*[&] (95%*CI*)	*P*
Gender			
Male	0.73(0.49-1.09)	0.69(0.34-1.40)	0.308
Female[a]	1.00	1.00	
Age (years)			
18-20	0.29(0.13-0.64)	0.92(0.26-3.31)	0.899
21-23	0.41(0.27-0.62)	1.23(0.54-2.79)	0.623
⩾24[a]	1.00	1.00	
Marital status			
Single	0.08(0.04-0.15)	0.43 (0.12-1.54)	0.194
Divorce/ Widow/widower	0.48(0.05-4.93)	6.83(0.00-7342.07)	0.839
Married[a]	1.00	1.00	
Residence			
Rural	0.04(0.02-0.07)	0.16(0.07-0.36)	<0.01*
Urban[a]	1.00	1.00	
Family size			
⩾4	0.12(0.07-0.18)	0.29(0.14-0.60)	0.001*
⩽4[a]	1.00	1.00	
Education level			
Undergraduate	0.00(0.00, -)	0.00(0.00, -)	0.997
Postgraduate[a]	1.00	1.00	
Student admission type^			
Extension	0.02(0.00-0.16)	0.01(0.00-0.05)	<0.01*
Regular[a]	1.00	1.00	
Monthly income (ETB)			
⩽1000	0.02(0.01-0.05)	0.08(0.02-0.32)	<0.01*
1000-1500	0.13(0.05-0.32)	0.56(0.15-2.13)	0.394
⩾1500[a]	1.00	1.00	

[a]Reference category; [#]Crude Odd Ratio; [&]Adjusted Odd Ratio; *$P \leqslant 0.05$; ^Regular: a student who enrolled on-campus; Extension: a program for persons not regularly enrolled as students, frequently provided through evening classes or classes in off-campus centers.

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4. Discussion

In this study, 65.6% of the students had sufficient knowledge regarding COVID-19. This finding is lower than studies conducted in Chinese students (82.3%)[17], Ethiopia in Amhara region (70%)[18], Nigeria (99.5%)[11], Saudi Arbia (81.64%)[19], India (83%)[20] and Malaysia (80.5%)[21]. For some of the basic knowledge about the symptoms of COVID-19, such as fever and cough, difficulty of breathing, nasal and throat congestion, and fatigue, 88.9%, 92.1%, 85.7% and 77.1% of the participants were found to have good knowledge. These results concur with those reported in Indian[8] and Saudi Arabia[19]. Almost all (90.7%) respondents identified the infectious agent was virus. This finding is lower than the study in China and Nigeria, which are 97.3%[17] and 91.9%[11], but however much better than a study from Indonesia, which showed that only 39%[10]. The disparity may be due to different factors in the perception of the exact etiology of the disease which may be influenced by educational status.

We found that the majority of the respondents knew that the COVID-19 disease could be transmitted by droplets when an infected person coughs and sneezes, and associated the risk of contracting COVID-19 with touching, shaking hands and objects shared with infected person. The results are consistent with a study conducted in Cameroon[22], indicating the student respondents have adequate knowledge about the COVID-19 transmission. It is suggested that education campaigns should focus on adhering to the health habits and treatment of COVID-19. The finding in our study showed that participants' sources of the information about COVID-19 were mass media (87.2%) and social media (62.4%). This is consistent with findings reported in Cameroon[22] and Addis Zemen, Ethiopia[23]. Government and university managers should deliver the correct information according to high quality scientific researches and experts' opinion to the public through mass media and social media to improve the level of knowledge regarding COVID-19.

The overall positive attitude score of the study participants towards prevention methods, severity of the disease, handling patients, and vaccine against COVID-19 was 58.7%. This result is relatively similar to a report from Cameroon (69%)[22], but much lower than the results reported in Nigeria (79.5%)[11], China (73.8%)[17] and Malaysia (83.1%)[21]. Maintaining optimistic attitudes towards COVID-19 is indispensable in the prevention and control of this disease. Positive outlook helps people make better health and life decisions and focus more on long-term goals. Holding positive beliefs about illness and having an optimistic outlook have been associated with increased well-being across a range of health conditions. Studies revealed that having a positive attitude can improve the management and outcomes of an illness[11].

The prevalence of poor practices in this study was higher than studies conducted in Ethiopia 47.3%[23], China 12.1%[17], Cameroon 39.2%[22]. This difference may be due to access to information and the socioeconomic status. The present study showed that the students from rural residence had less likely to have good practices on the prevention and control measures compared to those from urban areas. This result is similar to previous studies conducted in Indonesia[10], Cameron[22], and China[24]. This could be due to lack of information in rural areas, as there is no electricity and mobile networks that assist them to access the latest information about COVID-19.

This study depicted that practices score of participants was significantly associated with lower monthly income, which was supported by a study in China that reported high income was associated with proper practices of COVID-19[4]. People with a higher general income spent more time at home during stay-at-home orders compared to the people with low income who will not stop working to stay at home, instead decide to continue their daily activities to assure their basic needs.

It is not surprising that the gaps on attitude and practices level were generally found among rural residents and economic discrepancy could explain in part the differences in attitude and practices. These findings suggested that education programs targeting rural residents should be developed and awareness-raising and education campaigns should be accompanied by economic support.

In this study, 30% of the participants wore a mask when leaving home which was lower than study in China 98%[4], Nigeria 92%[11], Malaysia 51.2%[21]. Only one third of the participants avoided handshaking which was lower than study in Saudi Arabia[19]. This findings showed that too much attention is needed for the students to give health education and awareness creation about practices towards COVID-19.

Several limitations of this study should be acknowledged. The major limitation of the present study is involvement of only university students who are attending different courses at undergraduate and postgraduate levels thus findings of this study could not be generalized to entire population. Due to the questionnaire being self-completion type, respondents have no one to explain if they have questions thus there will be misunderstanding and also there is little to be done about ensuring that respondents answering truthfully.

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5. Conclusions

This study provided a comprehensive assessment of the KAP of graduate students at Bahir Dar University, northwestern Ethiopia toward COVID-19. In general, the scores of sufficient knowledge (65.6%), positive attitude (58.7%), and good practices (46.4%) of graduate students toward COVID-19 in the survey were lower as compared with most of similar studies conducted elsewhere. Marital status and student admission type were significantly associated with knowledge score about COVID-19. In addition, students with negative attitude about COVID-19 had also poor practices toward COVID-19. Therefore, we suggested to bolster the avenues for education among younger groups as it is important to trigger the full awareness and susceptibility toward COVID-19.

Conflict of interest statement

The authors declare that there is no conflict of interest.

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Authors' contributions

Tazebew B contributed to the design of the study, collected and analyzed data and wrote the first draft of the manuscript. Alehegn M participated in the designing of the study and coordinating the data collection process. Munshea A critically reviewed the manuscript. All authors read and approved the final manuscript.

References

[1] World Health Organization. *Novel coronavirus*. [Online] Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019. [Accessed on 16 October 2020].

[2] World Health Organization. *First case of COVID–19 confirmed in Ethiopia. 2020.* [Online] Available from:https://www.afro.who.int/news/first-case-covid-19-confirmed-ethiopia. [Accessed on 21 March 2020].

[3] World Health Organization. *WHO Coronavirus (COVID–19) Dashboard/ Ethiopia.* [Online] Available from: https://covid19.who.int/region/afro/country/et. [Accessed on 27 January 2023].

[4] Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, et al. Knowledge, attitudes, and practices towards COVID-19 among chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional survey. *Int J Biol Sci* 2020; **16**(10): 1745–1752.

[5] Geldsetzer P. Knowledge and perceptions of COVID-19 among the general public in the United States and the United Kingdom: A Cross-sectional online survey. *Ann Intern Med* 2020; **173**(2): 157-160.

[6] Bahir Dar University. *Brief history of Bahir Dar University*. [Online] Available from: https://www.bdu.edu.et/node/22. [Accessed on 19 April 2022].

[7] Naning L, Winn T, Rusli N. Practical issues in calculating the sample size for prevalence studies. *Arch Orofac Sci* 2006; **1**: 9–14.

[8] Singh JP, Sewda A, Shiv DG. Assessing the knowledge, attitude and practices of students regarding the COVID-19 pandemic. *J Health Manag* 2020; **22**(2): 281–290.

[9] Tadesse AW, Abebe NM, Tadesse SE, Wube MC, Abate AA. Preventive practices and associated factors towards COVID-19 among college students in Amhara Region, Ethiopia: A cross-sectional study. *Ethiop J Health Sci* 2021; **31**(1): 3–14.

[10]Saefi M, Fauzi A, Kristiana E, Adi WC, Muchson M, Setiawan ME, et al. Survey data of COVID-19-related knowledge, attitude, and practices among indonesian undergraduate students. *Data Brief* 2020; **31**: 105855. DOI: https://doi.org/10.1016/j.dib.2020.105855.

[11]Reuben RC, Danladi MMA, Saleh DA, Ejembi PE. Knowledge, attitudes and practices towards COVID-19: An epidemiological survey in North-Central Nigeria. *J Community Health* 2020; **46**(3): 457–470.

[12]Maheshwari S, Gupta P, Sinha R, Rawat P. Knowledge, attitude, and practices towards coronavirus disease 2019 (COVID-19) among medical students: A cross-sectional study. *J Acute Dis* 2020; **9**(3): 100-104.

[13]Medani KET, ALDuwayhis NM, Ameer AAA, ALMaymoni SK, ALOtaibi FA,ALHassan MA. Knowledge, attitude and practice of middle east respiratory syndrome corona virus (Mers-CoV), among male primary school students in Almajmaah City, Saudi Arabia. *Indo American Pharm Sci* 2018; **05**(12): 16288-16296.

[14]Huynh G, Nguyen T, Tran V, Vo K, Vo V, Pham L. Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. *Asian Pac J Trop Med* 2020; **13**(6): 260–265.

[15]Bursac Z, Gauss CH, Williams DK, Hosmer DW. Purposeful selection of variables in logistic regression. *Source Code Biol Med* 2008; **3**(17): 1–8.

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[16]Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika* 1951; **16**: 297-334.

[17]Peng Y, Pei C, Zheng Y, Wang J, Zhang K, Zheng Z, et al. A cross-sectional survey of knowledge, attitude and practices associated with COVID-19 among undergraduate students in China. *BMC Public Health* 2020; **20**(1): 1292.

[18]Asemahagn MA. Factors determining the knowledge and prevention practices of healthcare workers towards COVID-19 in Amhara region, Ethiopia: A cross-sectional survey. *Trop Med Health* 2020; **48**: 72.

[19]Al-Hanawi MK, Angawi K, Alshareef N, Qattan AMN, Helmy HZ, Abudawood Y, et al. Knowledge, attitude and practices toward COVID-19 among the public in the Kingdom of Saudi Arabia: A Cross-sectional study. *Front Public Health* 2020; **8**: 217.

[20]Pal R, Yadav U, Grover S, Saboo B, Verma A, Bhadada SK. Knowledge, attitudes and practices towards COVID-19 among young adults with Type 1 Diabetes Mellitus amid the nationwide lockdown in India: A cross-sectional survey. *Diabetes Res Clin Pract* 2020; **166**: 108344.

[21]Azlan AA, Hamzah MR, Sern TJ, Ayub SH, Mohamad E. Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. *PLoS One* 2020; **15**(5): e0233668.

[22]Ngwewondo A, Nkengazong L, Ambe LA, Ebogo JT, Mba FM, Goni HO, et al. Knowledge, attitudes, practices of/towards COVID 19 preventive measures and symptoms: A cross-sectional study during the exponential rise of the outbreak in Cameroon. *PLoS Negl Trop Dis* 2020; **14**(9): e0008700.

[23]Akalu Y, Ayelign B, Molla MD. Knowledge, attitude and practices towards covid-19 among chronic disease patients at addis zemen hospital, Northwest Ethiopia. *Infect Drug Resist* 2020; **13**: 1949–1960.

[24]Zhan SY, YYY, Fu CX. Public's early response to the novel coronavirus–infected pneumonia. *Emerg Microbes Infect* 2020; **9**: 534.

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