Effect of a health education program about COVID-19 on the knowledge, attitude, and practices of paramedical students in Egypt: an interventional study

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Abstract

Background. In December 2019, an outbreak of novel coronavirus disease 2019, caused by severe acute respiratory syndrome coronavirus 2, has been reported in China.

Objective. This study aims to assess the knowledge, attitude, and practices (KAP) of Benha Health Technical Institute (BHTI) students and to evaluate the impact of a health education program about COVID-19 on their KAP.

Methods. This is an interventional study that recruited 398 students from BHTI and was conducted in 3 phases. Firstly, an assessment of students' KAP was done using a structured questionnaire concerning COVID-19. Secondly, an education program about COVID-19 was conducted. Lastly, the reassessment of KAP was carried out using the same questionnaire after one month.

Results. The median knowledge, attitude, and practice scores among the studied students in the pre-interventional stage were 12, 15, and 26 which had significantly increased to 15, 16, and 28 respectively after the intervention. The knowledge score of the participants was significantly affected by students' age and grade of education; the attitude score was affected by age, gender, and grade of education, while the practice score was only affected by participants' age.

Conclusion. The educational program significantly increased the KAP of BHTI students.

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Informed consent: before participation, informed written consent was obtained from all participants.

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Introduction

In December 2019, an outbreak of novel coronavirus disease occurred in Wuhan, China. The causative agent of the disease is the severe acute respiratory syndrome coronavirus 2.[1,2] The World Health Organization (WHO) named it Coronavirus Disease 2019 (COVID-19),[3] and declared it a public health pandemic, on March 11, 2020.[4] Since that time, it had affected the entire world in a very short time.[5]

The disease can spread either directly through the droplets of a diseased person,[6] or indirectly through touching a contaminated surface.[7] The course of the disease is usually unpredictable and ranges from asymptomatic to mild respiratory infections up to pneumonia and even to acute respiratory distress syndrome.[8]

The WHO recommends controlling the spread of the disease through hand washing, social distancing, respiratory hygiene (covering the mouth and nose when coughing or sneezing), and avoiding close contact with anyone showing symptoms.[9]

Unfortunately, Egyptian society has limited infection control precautions, laboratory capacity, surveillance programs, and public health resources; therefore, the response to the COVID-19 pandemic is a great challenge.[10]

As far as we know, the battle against COVID-19 is still ongoing, and in order to ensure final success, people's compliance with control measures, which is affected significantly by their knowledge, attitudes, and practices (KAP) towards the disease, is critical.[11,12]

Therefore, understanding public perceptions and their responses to COVID-19 is vital in the ongoing planning and implementation of effective pandemic responses.[13] Also, public education is considered one of the most important measures that can help control the disease.[14]

Objectives

The main objectives of the study are to assess the KAP of Benha Health Technical Institute (BHTI) students and to create and implement an education program about COVID-19 to assess its impact on their KAP.

Materials and Methods

This interventional study was conducted on both undergraduates and complementary education students of BHTI, Egypt. The study was conducted only on one group (intervention group), with no control group. The study was conducted in 3 stages (Figure 1). Firstly, a descriptive design was conducted to assess students' KAP by using a self-administered questionnaire.[15] Secondly, implementing an interventional health education program about COVID-19 for 3 months. The third stage was carried out after 1 month of the health education program using the same questionnaire to assess the outcome (whether there was an improvement in KAP about COVID-19 or not).

Sampling

The sample size was calculated using Cochran's formula, confidence interval 95%, and power 80%.[16,17] The calculated minimum sample size was 384 participants. As recommended by a previous study,[18] the sample size was adjusted and increased by 15% to allow for non-responders, dropouts, or missed data. The final sample size was 444 participants.

A stratified random sampling technique was used. Only 398 students participated in the study with its 3 phases. As represented in Figure 1, out of the randomly selected original sample size (444 students), only 398 students actually participated in the study with its 3 phases (9 students were non-respondent with a response rate of 97.9%, 6 questionnaires were incomplete and 31 dropouts).

Data collection tools

A pre-designed and coded questionnaire in the Arabic language was filled out by the research participants.[15] It included 4 sections. The first section included socio-demographic data. As stated in Figure 2, the second section included 18 items that measure COVID-19-related knowledge. Each question of the knowledge section was rated in such a way that a score of 1 was given to correct responses and a score of 0 was used for incorrect answers. The third section included 6 items that measured their COVID-19-related attitude. A three-point Likert scale was used from 1 (disagree) to 3 (agree) with a neutral midpoint (point 2). While the fourth part contained 12 items that measured their COVID-19-related practice. A three-point Likert scale was employed from 1 (never) to 3 (always).

Health educational program

The main objectives of the program are to increase awareness and improve the positive attitude and good practices among BHTI students regarding COVID-19. The methods used to conduct the program were lectures, demonstrations, videos, Powerpoint presentations, group discussions, and booklets. Implementation of the health education program consisted of 5 stages based on behavioral change theories. In the pre-contemplation stage (weeks 1-2), face-to-face communication was conducted with the students, aimed at building a trusting relationship between the authors and the students. The students were invited to talk freely about their prior knowledge, about the disease, and what they feel about it. They were also asked to express their degree of practicing the preventive measures. In the contemplation stage (weeks 3-4), health education was conducted using PowerPoint presentations and booklet distribution. In the preparation stage (weeks 5-6), demonstration sessions for healthy practices (*e.g.* hand washing, and how to wear and put off the mask) were included. It also included a lot of videos about the disease. In the action stage (weeks 7-8), group discussions were conducted by the students. During these sessions, the students explained their understanding and feelings towards the disease. The WHO Mythsbrust was used to explain any wrong practices.[19] In the maintenance stage (weeks 9-12), at the meetings, the students were encouraged to explain their new plans to further pursue their goals. Meanwhile, fellow students, especially those who claimed to follow healthy behavior, were invited to share their own experiences. The goal was to encourage those students who still did not follow healthy behavior to make a change. In addition, the authors made a WhatsApp group for all participants for various reasons: first, to send educational materials to the students daily; second, to answer any inquiries for the students and third, to maintain good morals among the students.

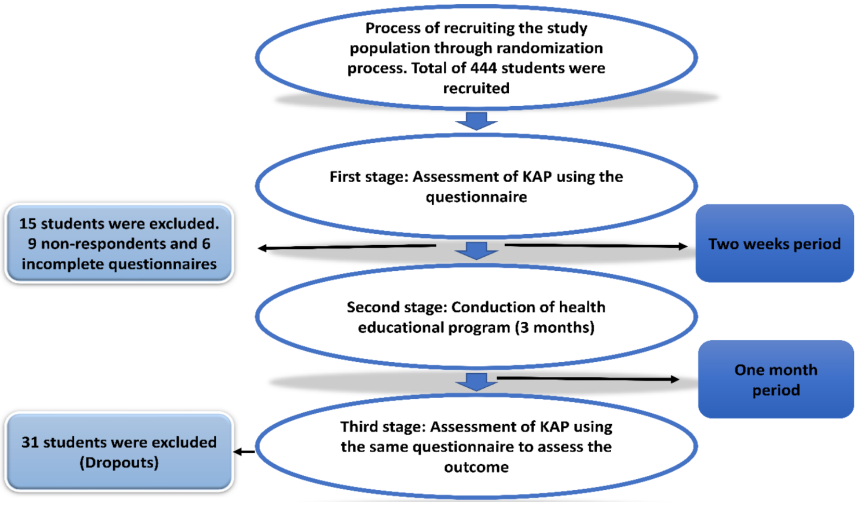

Figure 1. The flow chart of the study shows the number of participants, stages of the study, and losses to follow-up in each group.

Ethical and administrative approval

Approval from the Research Ethics Committee in Benha Faculty of Medicine was obtained (Code M.D 3-1-21). Additionally, official permission was obtained from the Dean of BHTI to conduct this study. Furthermore, before participation, informed written consent was obtained from all participants.

Data management

All statistical work was carried out using SPSS, version 25 (SPSS Inc., Chicago, USA), and GraphPad Prism, version 9.4.1 (GraphPad, San Diego, USA). Quantitative data were tested for normality using the Kolmogorov-Smirnov test. P≤0.05 was considered statistically significant, and P≤0.01 was considered highly significant. Chi-square and Fisher's Exact tests were used to test the significant differences between categories. Mann-Whitney, Kruskal-Wallis, and Wilcoxon signed rank tests are non-parametric tests that were used to compare different groups.

Results

Pre-interventional KAP scores and KAP levels are presented in Table 1 and Figure 3 There was a statistically significant difference between undergraduates and complementary education students in terms of knowledge and practice scores and levels (P≤0.05). On the contrary, undergraduates and complementary education students did not show any significant difference between them in terms of attitude score and level (P>0.05).

KAP scores following the participants' sociodemographic characteristics are presented in Figure 4. There was a statistically significant difference in knowledge, attitude as well as practice score regarding age (P≤0.05), and also, a statistically significant difference in attitude score between males and females was observed (P≤0.05). Table 1 also shows that there was a statistically significant difference in knowledge as well as attitude scores between different grades of education (P≤0.05).

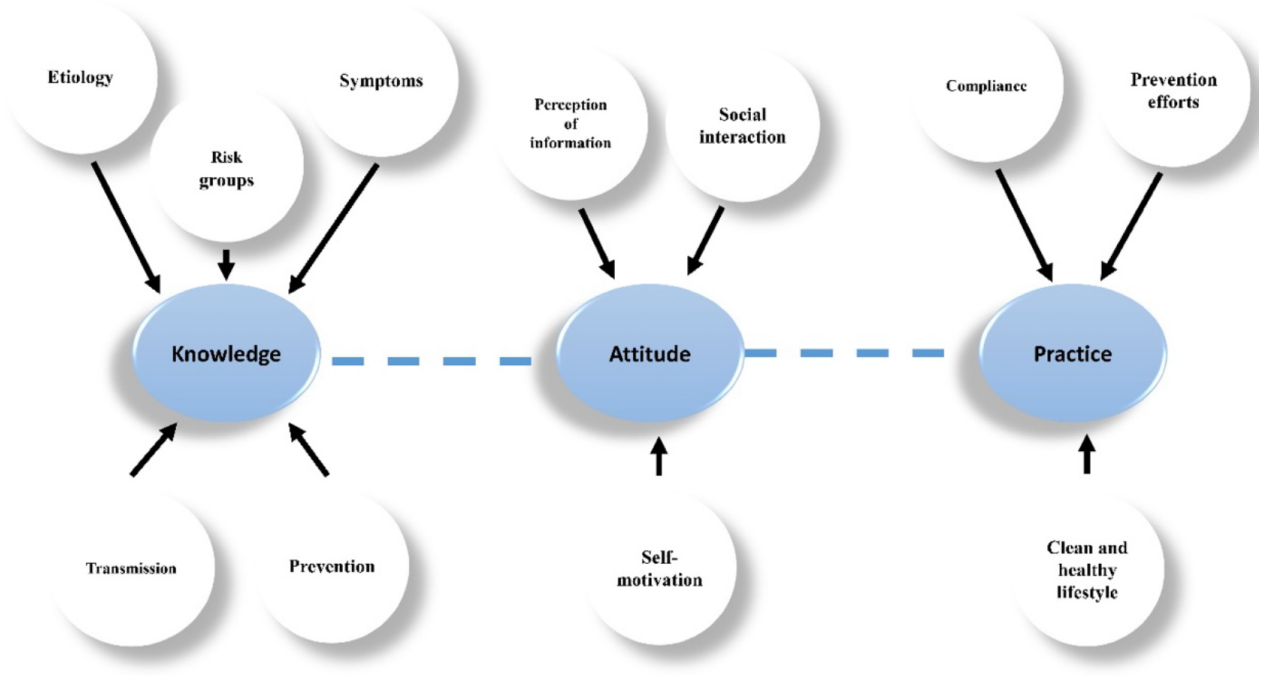

Figure 2. Theoretical framework used in the questionnaire.

Table 1. Knowledge, attitude and practice scores according to educational category (pre-intervention).

	Undergraduates (No=302)	Complementary education students (No=96)	Total (No=398)	P
Knowledge score Median (IQR)	12.0 (11.0-13.0)	13.0 (12.0-14.0)	12.0 (11.0-14.0)	<0.001*
Attitude score Median (IQR)	14.0 (12.0-16.0)	15.0 (13.0-16.0)	14.0 (12.0-16.0)	>0.05*
Practice scores Median (IQR)	26.0 (23.0-29.0)	27.0 (24.3-29.8)	26.0 (23.0-29.0)	≤0.05*

IQR, interquartile range; *Mann-Whitney test.

There was a statistically significant positive correlation between knowledge and attitude scores (P≤0.05), and also between knowledge and practice scores (P≤0.05). Table 2 also displays a statistically significant positive correlation between attitude and practice scores (P≤0.05). Table 3 shows that the educational program significantly increased the knowledge and attitude scores of both undergraduates and complementary education students after the intervention (P<0.001), On the other side, the educational program significantly increased the practice score in undergraduates and total sample only, but it did not affect the complementary education students' practice score.

Discussion

In the present study, the effect of an education program about COVID-19 on KAP was assessed.

This study clarified that more than two-thirds of students (71.9%) showed a poor knowledge score level. This finding is in line with studies conducted in Egypt,[20] and Saudi Arabia,[21] which revealed that the majority of the studied students (85.3% and 95.8% respectively) had unsatisfactory knowledge. Many studies,[22-25] however, found that the majority of students (72.5%, 82%, 80.9%, and 83.5% respectively) posed a good knowledge level

Table 2. Correlation between knowledge, attitude, and practice scores of the studied sample (pre-intervention).

Score	Correlation coefficient*	P
Knowledge-attitude	R_{ho}=0.111	≤0.05
Knowledge-practice	R_{ho}=0.118	≤0.05
Attitude-practice	R_{ho}=0.098	≤0.05

*Spearman correlation coefficient

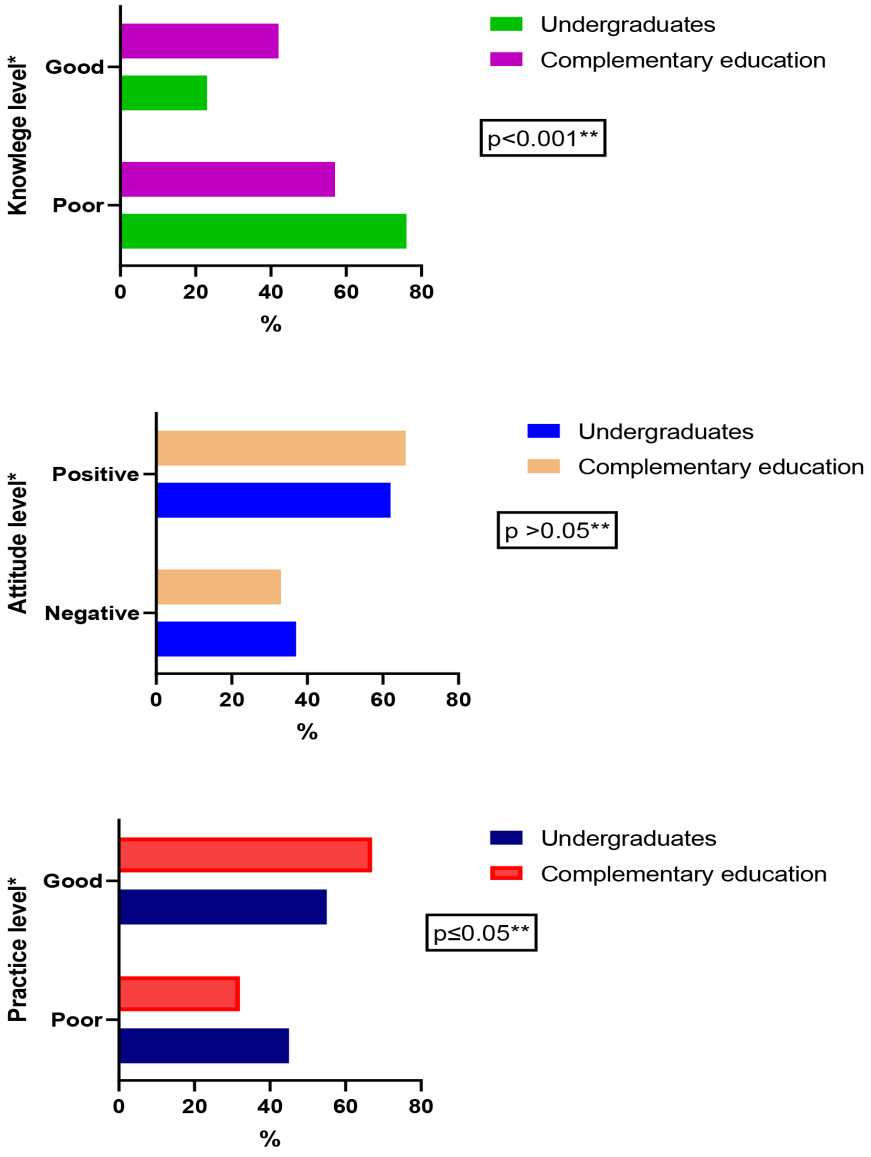

Figure 3. Knowledge, attitude and practice levels according to educational category (pre-intervention). *Knowledge score level, poor (0-13), good (14-18); attitude score level: negative (0-13), positive (14-18); practice score level: poor (0-25 points), good (26-36 points); **Chi-square test.

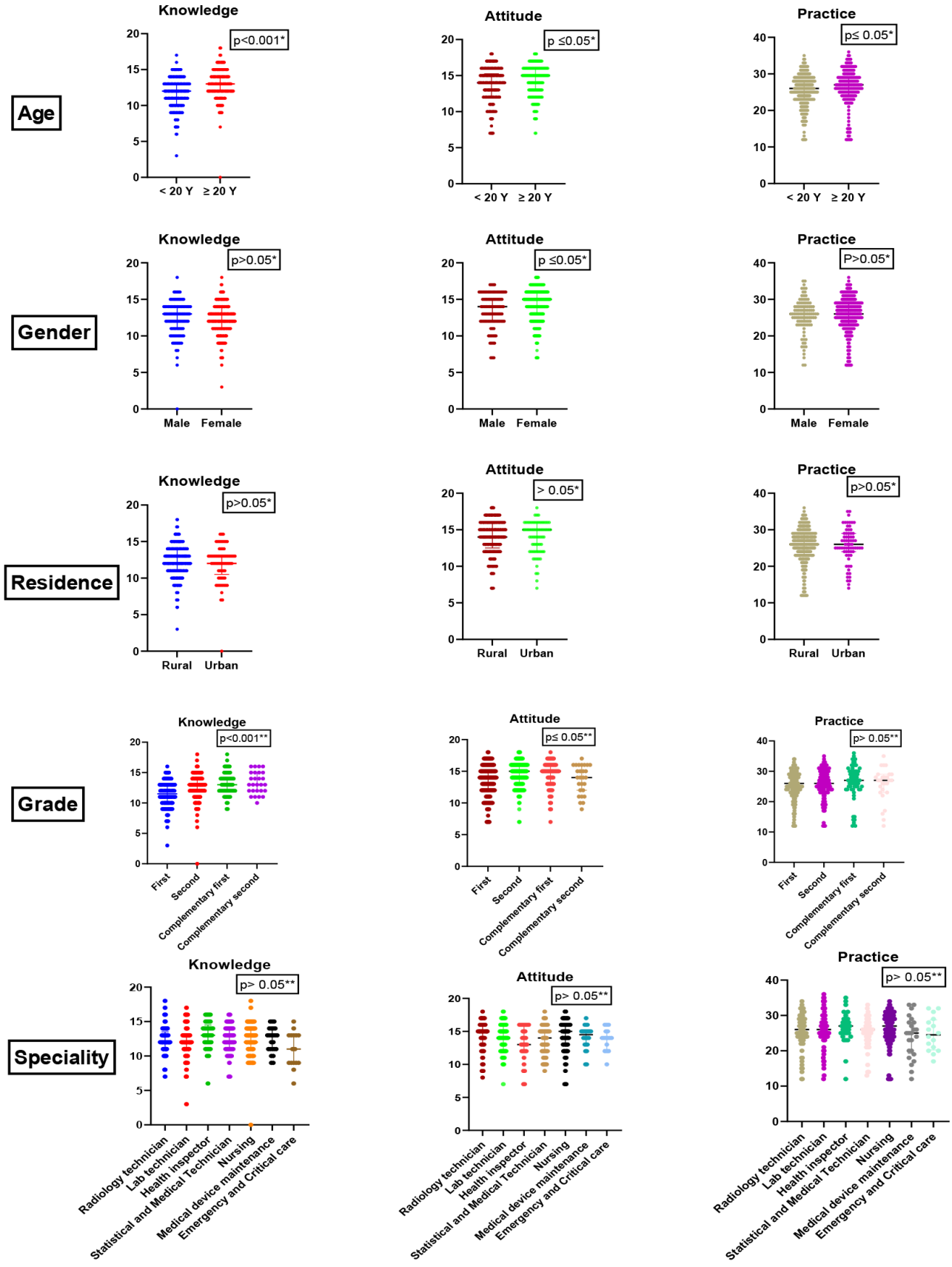

Figure 4. Comparisons of knowledge, attitude and practice scores in relation to the sociodemographic characteristics of the studied sample (pre-intervention).

about COVID-19. The reason for this discrepancy might be due to the differences in the tool used for the assessment of knowledge and the time of data collection. This study displayed that a positive attitude level was achieved by around two-thirds of the study group (63.6 %). Many studies indicate that participants were divided approximately in half between positive attitudes and negative attitudes.[21,22,26]

Positive attitude was achieved by 42.3%,[21] 47.5%,[22] 67.5%,[26] of the studied group respectively. On the contrary, a study conducted in Bangladesh revealed that only 16.81% had a high attitude level, followed by 51.05% with a moderate attitude level.[27] Positive attitudes and high confidence in the control of COVID-19 can be explained by the government's unprecedented actions and prompt response in taking stringent control and precautionary measures against COVID-19, to safeguard citizens and ensure their well-being. These measures include lockdown, and suspension of all domestic and international flights, prayer at mosques, schools, and universities, and a national curfew imposed on citizens.

This study showed that good practice was achieved by more than half of the participants (58.0%). This is in line with a study conducted in Saudi Arabia,[22] which clarified that the study participants reported a balance between inactive and proactive practices about COVID-19 (44.6% *vs* 55.4% respectively). Conversely, the percentage is slightly different from other studies,[26,27] that revealed that around two-thirds of the study population (73.4%, and 74.8% respectively) had a high and moderate practice score level. On the other side, a minority of students showed a good or satisfactory practice level in different studies in Egypt (7.0%),[20] Saudi Arabia (5.6%),[21] and Bangladesh (39.5%).[28] But, another study, also conducted in Egypt,[24] showed different results: all participants had good practice about COVID-19. The possible justification of this disparity might be a difference in sources of information, information-seeking behavior, frequency of media exposure, knowledge, phase of the outbreak in the study area, and worry related to the outbreak of study participants which lead to a variation in the application of recommended actions and behaviors to prevent COVID-19.

The study revealed that older students significantly had higher KAP scores in comparison with younger ones with a similar result in a cross-sectional study conducted in Bangladesh.[28] But this disagrees with other studies in Nepa,[26] and India,[29] which clarified that there was no statistically significant difference in knowledge score regarding the age of participants. This can be explained by the fact that older students had work experience and consequently better knowledge about the disease. Also, it is well known that students with a higher level of knowledge are usually more prone to follow the safety and preventive measures against the disease.

The study clarified that there was no significant difference in knowledge or practice scores between males and females, in line with similar results in other studies.[21,30] But, this is in contrast with a study conducted in Saudi Arabia,[22] where females showed significantly higher levels of knowledge, and males had significantly more proactive practices than their female counterparts. This finding may be attributed to a similar degree of access to information through print and electronic media and internet access. The lower practice level reported among male participants compared to females could be explained by the engagement of men in risky behaviors.

The current study also stated that significant females had a higher attitude score with similar results found in different studies.[20,30] But this goes against many studies that illustrated no statistically significant difference in attitude scores in terms of gender.[21,22,25-27,29]

This can be explained by different gender-related activities in the profession and family roles. This could also be explained by the higher perception of risk and more compliance with preventive behaviors among females.

The study revealed a statistically significant positive correlation between knowledge score and attitude score, knowledge score and practice score, and also, attitude score and practice score. A positive correlation between student knowledge and attitude, between knowledge and practice as well as attitude and practice was identified in some studies.[20,27] Some other studies explained that no correlation existed between knowledge and attitude and also knowledge and practice.[22,23] While another study found no significant correlation between attitude and practice scores.[26] This might be because knowledge is the main modifier of positive attitudes toward COVID-19: preventive practices, and these activities are practiced after having awareness and knowledge of the activities to be performed. Knowledge of COVID-19 decreases the risk of infection by improving patient practices.[31] The study showed a statistically significant difference between the KAP scores before and after the application of the education program. This is in line with an Egyptian interventional study that identified statistically significant differences in knowledge following the implementation of teaching guidelines.[20] This highlights the effectiveness of the educational program and provides the policy-maker an effective proof of the importance of conducting health education sessions about the disease to help control its spread.

Study limitations

The major problem affecting the data collection of this study was centered on the unwillingness of some of the respondents to

Table 3. Comparison between knowledge, attitude, and practice scores among the studied group (pre-intervention *vs* post-intervention).

	Pre-intervention Median (IQR)	Post-intervention Median (IQR)	P*	Percent change
Knowledge				25.6%
Undergraduates	12.0 (11.0-13.0)	15.0 (14.0-16.0)	<0.001	
Complementary education students	13.0 (12.0-14.0)	15.0 (14.0-16.0)	<0.001	
Total sample	12.0 (11.0-14.0)	15.0 (14.0-16.0)	<0.001	
Attitude				12.6%
Undergraduates	14.0 (12.0-16.0)	16.0 (15.0-17.0)	<0.001	
Complementary education students	15.0 (13.0-16.0)	16.0 (15.0-17.0)	<0.001	
Total sample	14.0 (12.0-16.0)	16 (15.0-17.0)	<0.001	
Practice				11.4%
Undergraduates	26.0 (23.0-29.0)	28.0 (26.0-31.0)	<0.001	
Complementary education students	27.0 (25.25-29.75)	28.0 (26.0-30.0)	> 0.05	
Total sample	26.0 (23.0-29.0)	28.0 (26.0-31.0)	<0.001	

IQR, interquartile range; *Wilcoxon signed rank test.

provide answers to the questions. Some participants showed little concern about the disease and were not actively participating in the group discussion session. Data used in the study analysis were self-reported, which could have reporting bias.

Conclusions

The knowledge score of the participants was significantly affected by the students' age and grade of education. The attitude score was affected by age, gender, and grade of education, while the practice score was only affected by the participants' age. The median KAP scores in the pre-interventional stage significantly increased after the intervention.

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