

Brief Report

Cite this article: Fatima M, Habib A, Khan S, et al. Knowledge, attitude, practice, behavior and risk perception of COVID-19 pandemic among medical and non-medical university students. *Disaster Med Public Health Prep.* 17(e101), 1–4. doi: <https://doi.org/10.1017/dmp.2022.1>.

Keywords:


COVID-19; knowledge; attitude; practice; risk perception; students; university

Corresponding authors:

Tauqeer Hussain Mallhi,
Emails: thussain@ju.edu.sa,
tauqeer.hussain.mallhi@hotmail.com;
Yusra Habib Khan,
Emails: yhkhan@ju.edu.sa,
yusrahabib@gmail.com

*This article has been amended since its original publication to correct an error in the author affiliations. See <https://doi.org/10.1017/dmp.2022.221>

Knowledge, Attitude, Practice, Behavior and Risk Perception of COVID-19 Pandemic among Medical and non-Medical University Students

Madeeha Fatima¹, Aamna Habib¹, Saira Khan², Muhammad Hammad Butt³ ,
Tauqeer Hussain Mallhi⁴, Yusra Habib Khan⁴, Asifa Zaheer⁵, Muhammad
Umar Habib⁶, Abdul Qayyum Khan⁷, Muhammad Imran Khan⁸, Azhar Iqbal^{9,*},
Malik Hassan Mehmood¹⁰ and Imran Masood¹¹

¹Department of Pharmacy, The University of Faisalabad, Faisalabad, Pakistan; ²Department of Applied Psychology, Government College Women University, Faisalabad, Pakistan; ³Faculty of Pharmacy, University of Central Punjab, Lahore, Pakistan; ⁴Department of Clinical Pharmacy, College of Pharmacy, Jouf University, Sakaka, Kingdom of Saudi Arabia; ⁵Department of Physiology, Faisalabad Medical University/Allied hospital, Faisalabad Pakistan; ⁶Department of Surgery, District Head Quarter Hospital, Chiniot, Pakistan; ⁷School of Pharmacy, University of Management and Technology, Lahore, Punjab, Pakistan; ⁸Department of Pharmacy, Riphah International University, Lahore, Punjab, Pakistan; ⁹Department of Operative Dentistry & Endodontics, College of Dentistry, Jouf University, Sakaka, Kingdom of Saudi Arabia; ¹⁰Department of Pharmacology, Faculty of Pharmaceutical Sciences, Government College University Faisalabad, Faisalabad, Punjab, Pakistan and ¹¹Faculty of Pharmacy, The Islamia University of Bahawalpur, Bahawalpur, Punjab, Pakistan

Abstract

Objective: Coronavirus disease 2019 (COVID-19) pandemic has substantially affected students around the globe due to the closure of educational institutes. However, student involvements and contributions are important in combating the disease; for this reason, the current study was designed to assess the knowledge-attitude-practice (KAP), preventive behavior, and risk perception among university students.

Methods: A cross-sectional survey-based study was conducted among medical and non-medical university students, from April 1 to June 30, 2020. The 68-item questionnaire was used to evaluate responses using statistical approaches (Student's t-test, regression-analysis, and correlation analysis) by considering a *P*-value <0.05 as statistically significant.

Results: A total of 503 university students (medical and nonmedical) were selected, where majority of participants were females (83%) and 64.5% were of age ranged from 16 to 21 years old. The participants (80%) reported good disease knowledge with a mean score of 12.06 ± 1.75 , which substantially higher among medical students ($P < 0.05$). Most of the respondents (72%) believed that COVID-19 will be effectively controlled through precautionary measures. In correlation subgroup analysis, a significant relationship ($P = 0.025$) between knowledge and positive attitude were indicated. Fear and knowledge of COVID-19 emerged as strong predictors ($P < 0.001$) of preventive behaviors towards disease.

Conclusion: This study demonstrated satisfactory knowledge, positive attitudes, and suitable practices among students toward COVID-19. University students can be involved in public education to aid the health authorities in achieving the targets of educational campaigns with maximum population coverage.

Coronavirus disease 2019 (COVID -19) is a respiratory disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease is manifested as fever, myalgia, cough, shortness of breath, and fatigue.¹ During previous pandemics, the world witnessed a tremendous loss of precious lives, just because of lack of scientific knowledge, with little information about the best coping strategies. Fear and myths contribute in complicating the disease. Currently, Pakistan is experiencing the COVID-19 pandemic and merely relying on preventive measures and supportive therapy. Educating individuals by providing them accurate and up-to-date information on preventive measures will aid in combating the virus effectively.²

Because Pakistan has never experienced any closely related epidemics such as severe acute respiratory syndrome (SARS) or Middle East respiratory syndrome (MERS), the health-care system in the country is not readily prepared to accommodate the extended load of COVID-19 patients. In addition, neighboring countries, including China and India, are the major hotspots of disease spread, which make Pakistan more vulnerable to the pandemic. Health authorities in Pakistan have imposed several partial and complete lockdowns to cope with the ongoing situation.³ Moreover, authorities have initiated massive educational

campaigns for the public through mass media. Educating the public is an effective measure during health emergencies for fighting against such outbreaks, because pandemics affect human behaviors.⁴ However, a rapid and continuous surge of cases in Pakistan indicates that either effective maneuvers have not been taken or people may not be adequately complying with precautions shared with them by the organizations.

Students represent a large portion of the country's population, making them more vulnerable to disease. Positive behavior of the students toward the disease is of paramount importance as they can be used for educating the public. Considering their active participation in social media platforms, they can help in combating the current pandemic.⁵ However, data on student's behavior toward the pandemic, particularly females studying in private institutes, are currently scarce. Because female students are experiencing more movement restrictions compared with male students, evaluation of their response toward the pandemic will yield pivotal implications for the prospective policies. In this context, we aimed to assess the knowledge, attitude, behavior, and risk perception among students studying in private and government institutes in Pakistan.

Methods

Ethical Approval

The current study was approved by The University of Faisalabad (TUF) ethical review committee (TUF/Dean/2020/24). All the participants provided online consent for this study.

Study Site and Population

A cross-sectional Web-based survey was conducted from April 1, 2020, to June 30, 2020, among students from the public (agriculture university Faisalabad) and private (TUF, a women-only university) universities of Punjab, Pakistan.

Sample Size

Raosoft formula indicated an expected sample size of 435 with a margin of error of 5% and a confidence level of 95%.

Study Instrument and Validation

The questionnaire was developed through an in-depth literature search.^{1-4,6} The reliability analysis was done on 30 participants. Cronbach's alpha coefficient of 0.81 demonstrated the internal consistency and reliability of the study instrument.

The demographics included university name, age, gender, nationality, level of education, and study year. The knowledge section contains 15 questions in 2 sections. Section I included basic knowledge questions, such as incubation period, transmission, and symptoms of disease. Section II included preventive methods used by the study participants. The questions in both sections were answered as yes, no, or do not know. Each correct answer scored 1, otherwise 0. The attitude section was comprised of 14 questions, such as media coverage and impact of lockdown on a Likert scale (a score of 2, 1, and 0 represented positive, neutral, and negative attitude, respectively). The level of fear was assessed with 5 items (responses: feared and not feared with 1 and 0 scores, respectively). The practice section was composed of 18 questions, such as washing hands, covering mouth, and others, using a 3-item Likert scale, where the proactive, neutral, and passive response was scored 2, 1, and 0, respectively. Eight questions were used to assess preventive

behaviors, such as less public interaction and use of public transportation (appropriate and inappropriate behavior with 1 and 0 scores, respectively). Only 2 questions were used to assess the risk perception highlighting fear of infecting with coronavirus (responses: yes, no, and do not know) where a yes response was scored 1 while other responses were scored zero. The questionnaire is shared as Supplementary File 1.

Statistical Analysis

The data were analyzed by using statistical package SPSS version 19. Descriptive statistics were reported as a percentage, frequency, mean, and standard deviation (SD). The Pearson product-moment correlation analysis was used to find the relationship between study variables. The hierarchical multiple regression analysis was performed for predicting preventive behavior. The unstandardized regression coefficients (β) and 95% confidence intervals (CIs) were used to quantify the associations between variables. All P -values of <0.05 were considered statistically significant.

Results

A total of 503 participants with female preponderance (83%) were included in the study. The age of the participants was ranged between 16 and 27 y. The majority of the participants (64.5%) were in the age range of 16 to 21 y, and the age of 35.5% of participants was between 22 and 27 y. There were medical (79.7%) and non-medical (20.3%) students in the cohort. Approximately 92% of respondents knew the type of disease, 97% knew the transmission route, and 78% correctly responded to the incubation period. Fewer participants (21%) had correctly answered the question about the susceptibility of COVID-19. The majority of participants (88%) had a positive attitude toward the role of media in public education; 90% agreed that lockdown will help to combat COVID-19; and 62% consented that implementing precautionary measures will help to contain the virus. The maximum number of students (78%) were afraid of contact with people who had symptoms. Avoiding handshake (85%), washing hands (98%), using hand sanitizers (69%), wearing face masks (95%), limiting public transport (97%), and avoiding visiting shopping malls (94%) were major precautionary measures reported by the students (Supplementary File 1).

Pearson correlation was used to find relationships between study variables. The knowledge section had significant positive relationships with preventive behavior ($r = 0.42$; $P < 0.001$), attitude ($r = 0.33$; $P < 0.001$), and practices ($r = 0.25$; $P < 0.01$), which indicated that the persons having knowledge about COVID-19 would have positive attitude toward COVID-19. Such persons would also adopt some practices and preventive measures to avoid getting infected with COVID-19. Attitude toward COVID-19 was highly correlated with preventive behavior ($r = 0.44$; $P < 0.001$), practices ($r = 0.42$; $P < 0.001$), fear of COVID-19 ($r = 0.28$; $P < 0.01$), and risk perception ($r = 0.22$; $P < 0.01$). Participants' practices were highly correlated with preventive behavior ($r = 0.60$; $P < 0.0001$), while fear about COVID-19 was highly correlated with preventive measures ($r = 0.44$; $P < 0.001$) and practices ($r = 0.38$; $P < 0.001$), which suggested that an individual's high level of fear about COVID-19 motivated them to practice some preventive measures against COVID-19.

A higher attitude score was observed among females compared with males (19.17 ± 3.22 vs 18.27 ± 3.58 ; $P = 0.025$). Similar,

Table 1. Score comparison among medical/non-medical and male/female students ($N = 503$)

Study variables	Medical Students ($n = 401$)		Non-medical students ($n = 102$)		T	P	95% CI		Cohen's d
	Mean	SD	Mean	SD			LL	UL	
Knowledge	12.06	1.75	11.62	2.07	2.16	0.031*	0.039	0.835	0.23
Attitude	19.21	3.14	18.25	3.71	2.66	0.025*	0.252	1.67	0.28
Fear	4.02	1.44	3.68	1.66	2.06	0.039*	0.016	0.665	0.22
Practices	29.87	4.28	27.55	6.19	4.04	0.001***	1.28	3.34	0.45
Preventive behavior	7.65	.96	7.23	1.64	3.33	0.008**	0.172	0.668	0.31

Study variables	Female ($n = 418$)		Male ($n = 85$)		t	P	95% CI		Cohen's d
	Mean	SD	Mean	SD			LL	UL	
Attitude	19.17	3.22	18.27	3.58	2.25	0.025*	0.11	1.67	0.26
Practices	29.8	4.45	27.32	6.05	4.28	0.001***	1.34	3.6	0.57
Preventive behavior	7.84	1.04	7.20	1.5	3.12	0.001***	0.16	0.70	0.50

* $P < 0.05$.** $P < 0.01$.*** $P < 0.001$.

Abbreviations: SD, standard deviation; CI, confidence interval; LL, lower level; UL, upper level.

practice score was higher among females than males (29.8 ± 4.5 vs 27.32 ± 6.05 ; $P = 0.001$) (Table 1).

Hierarchical regression analysis was run to find the predictor for the preventive behavior toward COVID-19. After controlling for the gender of the participants, their knowledge and fear about COVID-19 was put in the model. The F value ($F = 84.23$), $P < .0001$ indicated the statistical significance of the model. Both variables emerged as strong predictors of preventive behavior and accounted for 32% variance for preventive behavior. The value of unstandardized regression coefficient beta (β) indicated that, for every 1-unit change in the predictor (knowledge, fear), and predict (preventive behavior) would increase by the value of beta (β). Fear and knowledge of COVID-19 emerged as strong predictors ($P < 0.001$) of preventive behaviors toward disease, accounting for 19% and 14% variance (Table 2).

Discussion

COVID-19 is the most devastating and challenging health crisis since the influenza pandemic in 1918. Students are more vulnerable to contracting the infection due to congested classrooms and mass gatherings. The challenges to maintain social distancing may spread the virus among their families. On the other hand, students can act as public health educators for a diverse population. In this context, students must have positive and supportive behavior, which entirely relies on their understanding and response toward the disease.³

Disease knowledge is an essential tool to establish a preventive attitude, positive environment, and behaviors. This ultimately affects an individual's perception, attitudes toward disease, and influences strategies.⁷ Approximately 80% of the population in the current study has satisfactory disease-related information. The high knowledge in our study might be attributed to the medical background of the students, where fourth- and fifth-year students have comparatively higher knowledge. These findings corroborate with the results of studies conducted in India and Jordan.^{8,9} Moreover, our analysis also demonstrated a more positive attitude and preventive behavior among medical students. Subgroup analysis also demonstrated a proportionate relationship of knowledge with a positive attitude and preventive practices.

Table 2. Regression analysis on predictors of preventive behavior

Variables	Model		Preventive behavior	
	Model 1 B	Model 2 B	95% CI	
Predictors			LL	UL
Constant	6.23	3.60	3.04	6.49
Fear about COVID 19	0.34	0.30	0.25	0.36
Knowledge about COVID 19		0.23	0.19	0.28
R	0.44	0.57		
R ²	0.19	0.33		
F	120.07**	122.04**		
ΔR^2		0.14		

** $P < 0.01$.* $P < 0.05$.

Abbreviations: B, regression coefficient; CI, confidence interval; LL, lower level; UL, upper level.

These results are consistent with a study conducted in a neighboring country (India).⁸

Two-thirds of the study population had a positive attitude toward the importance of precautionary measures in the containment of the disease. However, the proportion of this attitude was 76.5% among medical students, which was higher compared with that of Ugandan medical students (74%).¹⁰ Because contact of students with media and health-related journals is linked with a positive attitude, such activities should be promoted in the educational institutes. Moreover, the majority of the participants in our analysis demonstrated a positive attitude toward the role of media in public education.

The preventive measures and behaviors against COVID-19 were found to be widely practiced among study participants. However, practice score was substantially higher among females. These results are in accordance with the other studies.^{4,11} The positive practices among female students can be explained by more movement restrictions and religious norms in Pakistan. Furthermore, careless attitudes, practices, and behaviors among males have also been recently discussed in the literature.⁴ The preventive behaviors and risk perception have an indirect relation

with each other. However, in our study, practices are highly correlated with preventive behavior and moderately with fear and risk perception. The findings are not consistent with the study conducted in Iran, where risk perception and preventive behaviors showed a significant negative correlation.¹²

The findings of this study indicate that satisfactory disease knowledge can be translated into improved attitudes and practices toward COVID-19, and diminished disease fears among the public. These results are consistent with a previous investigation.¹¹ Public health education has been found to be an effective tool in managing health emergencies. It is directly linked with the positive attitudes, practices, and preventive behaviors, which are of utmost importance to achieve the desired outcomes. All these elements are fundamental to guarantee effective prevention and emergency management.⁴ However, an outreach of health authorities to the public and targeting specific high-risk groups is quite challenging amid the overwhelmed health-care system. In these circumstances, students can play a pivotal role in public education. The involvement of the student in public health education will not only build a positive sense of responsibility among them but will also facilitate the health authorities to cover large population in provision of required information.

Limitations

This study is accompanied by few limitations that should be considered while interpreting the results. Because our study is an over-representation of female students, the generalizability of the findings is limited to this specific population. However, our findings can be implicated to female students in the country, who account for approximately 40% of total enrollments in educational institutes. Moreover, these findings might be broadly generalized in private institutes, which account for 43% of recognized universities and colleges in the country. In addition, these results can be implicated to Women's Universities, which are located in almost all metropolises in Pakistan. Moreover, it must be noted that most of the study population belongs to stable socioeconomic conditions having uninterrupted Internet facilities; other endangered population including elders and rural residents may have more negative attitudes and inappropriate practices toward COVID-19. We urge special research attention on these susceptible populations. Nevertheless, the current study is strengthened to suggest the national and international health authorities to initiate awareness programs in educational institutions so that students could be used as educators to raise disease awareness and compliance among the general community.

Conclusions

This study demonstrated satisfactory knowledge, positive attitudes, and suitable practices among students toward COVID-19 during the pandemic. Our results underscored that good knowledge can result in good attitudes and practices, which are of paramount importance to curb the growing encumbrance of the disease. However, the involvement of medical students in public education will not only increase their positive response toward the disease but will also aid health authorities in achieving the targets of educational campaigns, guiding the public properly and

neutralizing the misleading narratives toward COVID-19. Moreover, the involvement of students in public health education will facilitate the timely mass coverage during disastrous events such as pandemics.

Supplementary material. To view supplementary material for this article, please visit <https://doi.org/10.1017/dmp.2022.1>

Author Contributions. M.F., A.H., and T.H.M. conceived and designed the study. M.F., S.K., M.H.B., A.Q.K., and M.I.K. conducted the literature review. M.F., A.H., M.H.B., Y.H.K., A.Z., A.I., and M.U.B. designed the questionnaire. M.F., A.H., and T.H.M., analyzed and interpreted data. M.F., M.H.B., and Y.H.K. drafted the manuscript. A.H., and T.H.M. critically revised the manuscript. All authors approved the manuscript for submission.

Funding statement. This work was funded by Deanship of Scientific Research at Jouf University under grant number (DSR-2021-01-0341).

Conflict(s) of interest. There is no conflict of interest reported by the authors.

References

1. Misbah S, Ahmad A, Butt MH, *et al.* A systematic analysis of studies on corona virus disease 19 (COVID-19) from viral emergence to treatment. *J Coll Physician Surg Pak.* 2020;30(6):9-18.
2. Butt MH, Ahmad A, Misbah S, *et al.* Ensuring the quality and appropriate use of hand sanitizers during the covid-19 pandemic; suggestions and recommendations with role of the pharmacist. *Disaster Med Public Health Prep.* 2021:1-2.
3. Salman M, Asif N, Mustafa ZU, *et al.* Psychological impairment and coping strategies during the COVID-19 pandemic among students in Pakistan: a cross-sectional analysis. *Disaster Med Public Health Prep.* 2020:1-7.
4. Peng Y, Pei C, Zheng Y, *et al.* A cross-sectional survey of knowledge, attitude and practice associated with COVID-19 among undergraduate students in China. *BMC Public Health.* 2020;20:1292.
5. Saleem RT, Butt MH, Ahmad A, *et al.* Practices and attitude of self-medication during COVID-19 pandemic in university students with interventional role of pharmacist: a regional analysis. *Lat Am J Pharmacy.* 2021;40:1946-1953.
6. Muhammad K, Saqlain M, Muhammad G, *et al.* Knowledge, Attitude, and Practices (KAPs) of community pharmacists regarding COVID-19: a cross-sectional survey in 2 provinces of Pakistan. *Disaster Med Public Health Prep.* 2021:1-9.
7. McEachan R, Taylor N, Harrison R, *et al.* Meta-analysis of the reasoned action approach (RAA) to understanding health behaviors. *Ann Behav Med.* 2016;50(4):592-612.
8. Maheshwari S, Gupta PK, Sinha R, *et al.* Knowledge, attitude, and practice towards coronavirus disease 2019 (COVID-19) among medical students: a cross-sectional study. *J Acute Dis.* 2020;9:100.
9. Khasawneh AI, Humeidan AA, Alsulaiman JW, *et al.* Medical students and COVID-19: knowledge, attitudes, and precautionary measures. A descriptive study from Jordan. *Front Public Health.* 2020;8:253.
10. Olum R, Kajjimu J, Kanyike AM, *et al.* Perspective of medical students on the COVID-19 pandemic: survey of nine medical schools in Uganda. *JMIR Public Health Surveill.* 2020;6(2):e19847.
11. Zhong B-L, Luo W, Li H-M, *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.
12. Taghrir MH, Borazjani R, Shiraly R. COVID-19 and Iranian medical students; a survey on their related-knowledge, preventive behaviors and risk perception. *Arch Iran Med.* 2020;23(4):249-254.