

The Effect of an Educational Intervention on COVID-19 Awareness, Preventive Behaviors, and Risk Perceptions among Secondary School Students

Sadia Ibrar Khan, Mohi Ud Din, Syed Fawad Mashhadi, Shamaila Mohsin, Samreen Misbah, Muhammad Mushtaq Ahmed Khan

ABSTRACT

Objectives: To determine the impact of an educational intervention on secondary school students' Covid-19 awareness and risk perception, as well as their preventive practices.

Study design and settings: A quasi-experimental study conducted in private secondary schools.

Methodology: The study duration was two months. Students who gave consent and didn't have COVID-19 infection in past were included by non-probability purposive sampling. Raosoft sample size calculator was used to calculate the sample size and it came out to be 385 but a total of 380 students could be enrolled. Among these, 37 responses were invalid making the total sample size to be 343. Ethical approval was taken from the institutional ethical review committee with approval letter number i.e. ERC/ID/126. SPSS version 25 was used for the analysis of data. Frequencies and percentages were calculated. Paired samples T-test was applied to see the difference in participants' scores before and after the intervention. A p-value = 0.05 was taken as significant.

Results: The knowledge of students were improved from moderate to high level and the total percentile score from 74.86% to 89.76% after intervention. Their practicing preventive behaviors were at a low level with scores of 69.37%. Their risk perceptions remained at moderate levels and did not see any improvement.

Conclusion: Participants practicing preventive behaviors were at a low level. Their knowledge scores improved from moderate to high level after intervention but their risk perceptions remained at moderate levels and no change was seen.

Keywords: Awareness, Covid-19, Practices, Prevention.

How to cite this Article:

Khan SI, Din MU, Mashhadi SF, Mohsin S, Misbah S, Khan MMA. The Effect of an Educational Intervention on COVID-19 Awareness, Preventive Behaviors, and Risk Perceptions among Secondary School Students. *J Bahria Uni Med Dental Coll.* 2022; 12(2):83-87 DOI: <https://doi.org/10.51985/JBUMDC202205>

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non commercial use, distribution and reproduction in any medium, provided the original work is properly cited.

Sadia Ibrar Khan

House officer
CMH Rawalpindi
Email: sadiaamcolian@gmail.com

Mohi Ud Din

Assistant Professor, Department of Community Medicine
Aziz Fatimah Medical and Dental College, Faisalabad
Email: dr.md89@outlook.com

Syed Fawad Mashhadi

Associate Professor, Department of Community Medicine
Army Medical College, Rawalpindi
Email: fawadmashhadi@gmail.com

Shamaila Mohsin

Associate Professor, Department of Community Medicine
Army Medical College, Rawalpindi
Email: sm104177@hotmail.com

Samreen Misbah

Assistant Professor, Department of Community Medicine
Army Medical College, Rawalpindi
Email: samreen.misbah@hotmail.com

Muhammad Mushtaq Ahmed Khan

Medical Officer, Department of Anesthesia
DHQ Hospital Mianwali
Email: www.niazirules@yahoo.com

Received: 06-Jan-2022

Accepted: 02-Mar-2022

INTRODUCTION:

Residents of Wuhan, China, reported several novel viruses that caused respiratory diseases in people in December 2019. Coronavirus disease 2019 is the title given to the new virus sickness.¹ On 7 January 2020, this virus was identified. It was comparable to the virus that causes the severe acute respiratory syndrome, or SARS. Despite this, the COVID-19 pandemic has evolved into a significant public health hazard, posing a significant challenge to the scientific and medical communities.² To prevent the present epidemic, wide-ranging measures are needed to decrease COVID-19 transmission from human to human. Particular attention and effort should be given to preventing or decreasing transmission among very sensitive groups including healthcare workers, youngsters, and elderly people. A society that is made aware about the spread of diseases and how they can be transmitted, as well as the clinical manifestations and the use of safety techniques, seems to be more likely to experience positive perceptions, reducing the virus's dispersion. These arguments rely on two of the popular models in psychology: the health belief model, which supposes that the perception of risk as well as the advantages and barriers linked to diagnostic and intervention tendencies,

ascertain the lifestyle factors embraced, and the other one is planned behavior theory, which emphasizes the value of perceptions toward the behavior in forming an ability to commit that activity.³ The early mortality of COVID-19 was seen in elderly patients with a weakened immune system, allowing viral infection to spread rapidly.⁴ Hand-washing decontaminating chemicals should be readily available at public facilities and establishments. Also, cleaning hands regularly, using a tissue to cover your mouth and nose and discarding used tissues in the detritus; sniffle or coughs into your elbow, not your hands if you don't have a tissue; wearing a mask or face protection in crowded locations; disinfecting surface areas; good ventilation systems; and containment for people who have strong suspicions that they are susceptible are all recommended methods.⁵

The COVID-19 outbreak has spread throughout the globe and has been called the deadliest since 1918-1919 Spanish influenza. By the end of January 2021, COVID-19 was responsible for roughly one hundred million confirmed infections and two million deaths in the world.⁶ Governments across the world have decided to close educational institutions in response to the fast spread of COVID-19. According to WHO and public health authorities, closing educational institutions may help flatten the curve of COVID-19 spread.⁷ Pakistan's government has decided to close all educational institutions as a precautionary measure to halt the pandemic's fast spread.⁸ Although certain nations and regions, including Pakistan, have implemented a wide array of vaccines, the development, and promotion of preventive literature and behavior, in addition to the development of treatment and vaccines, is critical during the 'new normal' period of COVID-19 given its long-term complexity.⁹

In the intellectual, physiological, emotive, interpersonal, and cultural realms, young adulthood as a phase of life, which includes higher education students, correlates to a learning stage and character building. Nevertheless, research shows that students have a high incidence of risky attitudes towards health and have a strong influence on their health.

Furthermore, students usually own special information on basis of their educational experience and, as a result, possess the capacity to impact the health of a community.

Indeed, following the COVID-19 epidemic, a growing number of studies have helped to comprehend our general public preventive behavior in several countries. However, few focused on higher education systems with the bulk concentrating on the effect of knowledge and attitudes on the prediction of the preventive behavior of COVID-19 students. To overcome the limitations of prior research, this study analyses the explicit impacts on COVID-19 prevention actions of secondary school students, attitudes, perceived behavioral control, and perceived risk. While several recent studies of COVID-19 preventative conduct have used educational interventions, it is also important to study the preventive behavior of COVID-19 among students of

secondary schools. Given the aforementioned, the main purpose of current investigations is to evaluate the mediating impact of three elements, i.e. attitudes, preventive practices, and perceived conduct control for students to raise their perception of risk through various forms of health promotion, focusing mainly on individuals having low risk perception.

METHODOLOGY:

It was a quasi-experimental study conducted in private secondary schools based on educational intervention. The target population of this study was high school students (9th and 10th class). Ethical approval was taken from the institutional ethical review committee with approval letter number i.e. ERC/ID/126. Prior permission from Principals of the concerned colleges was taken. Written informed consent was taken from the participants prior to data collection. Non-probability purposive sampling was done.

The study duration was two months and inclusion criteria were those students who gave consent; filled out the questionnaire and who didn't have Covid-19 infection in the past while those students who had Covid-19 infection in past six months or did not give consent were excluded. Raosoft sample size calculator was used to calculate the sample size. The required sample size calculated was 385 but a total of 380 students could be enrolled in the study, out of which 37 responses were found to be invalid making the total sample size to be 343.¹⁰ This study was conducted using a self-administered pre-tested modified version of the questionnaire used by Taghrir et al in their study from June 2020.¹¹ The questionnaire had six sections: Demographics, Pre-Intervention Knowledge, Pre-Intervention Risk Perceptions, Self-Reported Preventive Behaviors, Post-Intervention Knowledge, and Post-Intervention Risk Perceptions. The educational intervention was conducted on two perspectives: Basic Knowledge and Risk Perceptions while self-reported Preventive Practices assessment was done once at the time of data collection. The educational intervention was done by a power point lecture and videos on COVID-19, and finally, re-assessment of Knowledge and Risk Perceptions through a self-administered pre-tested questionnaire was done.

Demographic information included age (in years), gender, and the current class where the student is studying. The level of COVID-19 related knowledge was assessed before and after the intervention using 13 items. For knowledge, the correct answer was assigned 1 point and an incorrect answer or 'I don't know' was assigned 0 points. The total score was calculated and converted into a percentile. A score = 75% was considered as high, 50%-75% as moderate, and =50% as low level of knowledge. Knowledge score was calculated both before and after the educational intervention to establish the effect of the intervention on the study group. To assess preventive behaviors, eight items were used based on the same study. Choices were 'yes' or 'no' and the respondent was assigned one point for each appropriate behavior and

0 points for inappropriate behaviors. The total score ranged from 0 to 8 and was converted to a percentile. Seventy-five percent or higher scores were designated as high performance in preventive behaviors and <75% as low performance. Two items were used to assess the risk perception of COVID-19 among participants. Responses were provided using a 4-point Likert-type scale (1 = not at all, 4 = absolutely yes). The total cumulative score ranged from 2 to 8. Scores between 2 to 3 were designated as low, 4 to 5 as moderate, and 6 to 8 as high-risk perception.

Data was coded and confidentiality was maintained. SPSS version 25 was used for the analysis of this data. Frequencies and percentages were calculated. Paired samples T-test was applied to see the difference in participants' scores before and after the intervention. A p-value = 0.05 was taken as significant.

RESULTS

Total participants in the study were 343. Most of them were 16 years old (33.5%) followed by 21.9% of participants of 17 years old. The majority of them were males (62.1%) while most of the study participants were from the 10th class (57.4%).

Table 1 shows the level of knowledge of students about

Covid-19 before and after the intervention. Paired samples T-test was applied and significant associations were shown as p-values. The total percentile score before intervention came out to be 74.86% which is indicative that students have a moderate level of knowledge but after the intervention, the total scores percentile was 89.76% which indicates that students' knowledge after educational intervention came out to be of high level. The lowest scores before intervention were about 4 items i.e. about the type of covid-19 infection; about its origin; about the usage of the N-95 mask and its diagnosis by PCR test.

About 8 questions were asked from students to assess their preventive behavior practices. Their percentile score came out to be 69.37% which is below 75% and indicative of low performance as shown in table 2. Risk perception of the two items before intervention were 2.36 + 0.9 and 2.5 + 0.9 respectively amounting to 4.86 + 1.8 (possible range 2 – 8) showing moderate risk perception. Risk perception of these two items after intervention remained at a moderate level with minor changes i.e. 2.33 + 0.85 and 2.51 + 0.9 amounting to 4.84 + 1.75. A significant relationship was found between risk perception scores of before intervention and after the intervention. Risk perception of students before and after intervention is shown in table 3.

Table 1: Covid-19 related knowledge before and after intervention (n = 343)

	Before		After		p-value
	n	%	n	%	
COVID-19 is a respiratory infection caused by a new species of the coronavirus family	198	56.3	271	79	.000
The first case of COVID-19 was diagnosed in Wuhan, China	324	94.5	329	95.9	.208
The origin of COVID-19 is not clear but it seems that it has been transmitted to humans by seafoods, snakes, or bats.	205	59.8	312	91	.000
Its common symptoms are fever, cough, and shortness of breath but nausea and diarrhea were reported rarely	308	89.8	332	96.8	.001
It is transmitted through respiratory droplets such as cough and sneeze.	320	91.3	329	95.9	.007
It is transmitted through close contacts with an infected case (especially in the family, crowded places, and health centers)	299	87.2	320	93.3	.002
The disease can be prevented through handwashing and personal hygiene.	322	93.9	338	98.5	.003
A medical mask is useful to prevent the spread of respiratory droplets during coughing.	316	92.1	335	97.7	.001
The disease can be prevented through no close contact such as handshakes or kissing, not attending meetings, and frequent hand disinfection.	312	89	327	95.3	.018
All people in the society should wear an N-95 mask	68	19.8	213	62.1	.000
COVID-19 can be diagnosed by PCR test.	157	43.8	306	89.2	.000
COVID-19 vaccine is available in the markets	240	70	291	84.8	.291
COVID-19 can be fatal	294	85.7	300	87.5	.056
Total score	74.86		89.76		

Table 2: Practicing preventive behaviors (n = 343)

Practicing preventive behaviors	Yes (%)
I canceled or postponed meetings with friends, eating out and sport events.	212 (61.8)
I reduced the use of public transportation.	246 (71.7)
I went shopping less frequently.	248 (72.3)
I reduced the use of closed spaces, such as a library, theatres, and cinema.	293 (85.4)
I avoided coughing around people as much as possible.	240 (70)
I avoided places where a large number of people are gathered.	185 (53.9)
I increased the frequency of cleaning and disinfecting items that can be easily touched with hands (i.e. door handles and surfaces).	249 (72.6)
I washed my hands more often than usual.	231 (67.3)
Total score	69.37

Table 3: Risk perception of students

Items	I may become infected with COVID-19 more easily than others (%)				p-value	I am afraid to be infected with COVID-19 (%)				p-value
	Not at all	No	Yes	Absolutely Yes		Not at all	No	Yes	Absolutely Yes	
Before	18.4	37.9	32.7	11.1	0.00	21.3	22.7	40.2	15.7	0.00
After intervention	16.3	43.1	31.5	9.0		17.5	26.5	43.4	12.5	

DISCUSSION:

COVID-19 began in China in late 2019 and quickly expanded globally, causing a domino impact. The disease is causing worry and fear among individuals for a variety of reasons, including the fact that it is new, which implies no one is protected and no vaccine has yet been developed at start of the pandemic.

Most of the items related to knowledge were having high scores except for 4 items i.e. about the type of covid-19 infection and its origin; about the usage of N-95 mask and its diagnosis by PCR test. When asked by participants that “What is covid-19? and is it a respiratory infection?”, more than 3/4th of students answered it correctly after intervention whereas only more than half of participants answered it correctly before intervention. The results are similar to a study conducted by Dafni Souli et al where about 3/4th of students answered it correctly.¹² When asked about the clinical presentation of Covid-19, more than 90% of students answered it correctly. A study conducted by Yaling Peng et al showed similar results.¹³ A study conducted by Lincoln Leehang Lau et al showed that more than 90% of the participants were of the view that mainly disease is transmitted through coughing and sneezing¹⁴ which are similar to the results of our study. Knowledge about hand hygiene and mask use in disease prevention were correct in the majority of participants as shown by the students in a study conducted by Gülsün Ayran et al which are similar to the result of our study.¹⁵

A study done by Murat Yildirim et al showed that preventive

behaviors were highly practiced by participants and among these practices, increased frequency of handwashing and avoidance of public transport were most common.¹⁶ These results are similar to our study except that most common practicing preventive behaviors were reduced the use of closed spaces; increased frequency of disinfecting items and going shopping less frequently. A study done by Enayat M. Soltan showed that 92% of participants were practicing preventive behaviors.¹⁷ These results are in contrast to our study where 69% of participants practiced it. A study done by Henok Dagne et al showed that about half of participants were practicing preventive behaviors which are in contrast to the results of our study.¹⁸

A study done by Yani Ding et al showed that students had a high risk perception of Covid-19.¹⁹ A study done by Sherzad Shabu et al showed that participants were having the highest perceived threat level related to Covid-19.²⁰ These results are in contrast to our study where despite educational intervention, risk perception of students remained at a moderate level. But a study conducted by Tara Ma et al showed that students were having low-risk perception²¹ which is similar to the results of our study.

The sample size of the study is good which shows a good representation of students. Also, the benefits of educational intervention are clearly visible in improving students’ awareness about this disease. But, because a self-administered questionnaire was employed, reporting bias could not be ruled out. This study is limited to the students of 9th and 10th class only, so generalization cannot be done on all school students.

CONCLUSION:

Participants practicing preventive behaviors were at a low level. Their knowledge scores improved from moderate to high level after intervention but their risk perception remained at a moderate level and no change was seen due to the effect of educational intervention. Because of COVID-19's high disease transmission and opacity, it's critical to raise the perception of risk among students through various forms of health promotion, with special emphasis dedicated to some individuals who have a low and moderate risk perception.

Authors Contribution:

Sadia Ibrar Khan: Conception and design, Collection and assembly of data, Final approval

Mohi Ud Din: Conception and design, Analysis and interpretation of the data, Statistical expertise, Final approval

Syed Fawad Mashhadi: Drafting of the article, Statistical expertise, Critical revision

Shamaila Mohsin: Analysis and interpretation of the data, Critical revision

Samreen Misbah: Analysis and interpretation of the data, Statistical expertise

Muhammad Mushtaq Ahmed Khan: Introduction, Drafting of the article, Critical revision

REFERENCES:

- Lau H, Khosrawipour V, Kocbach P, Mikolajczyk A, Schubert J, Bania J, et al. The positive impact of lockdown in Wuhan on containing the COVID-19 outbreak in China. *J. Travel Med.* 2020. doi: 10.1093/jtm/taaa037
- Guleria R. The Need to Change and the Necessity to Evolve During the COVID-19 Pandemic. *Neurol. India.* 2020;68(4):726. DOI: 10.4103/0028-3886.293450
- Mubeen SM, Kamal S, Kamal S, Balkhi F. Knowledge and awareness regarding spread and prevention of COVID-19 among the young adults of Karachi. *J Pak Med Assoc.* 2020;70(5):S169-74. <https://doi.org/10.5455/JPMA.40>
- Consuegra D, Seidner-Isaacs Y, Larios-Sanjuan D, Ibarra J, Benavides-Rodríguez P, Vilorio S, et al. Unexpected high frequency of early mortality in COVID-19: a single-centre experience during the first wave of the pandemic. *Intern. Med. J.* 2021;51(1):102-5. <https://doi.org/10.1111/imj.15134>
- Al-Wutayd O, Mansour AE, Aldosary AH, Hamdan HZ, Al-Batanony MA. Handwashing knowledge, attitudes, and practices during the COVID-19 pandemic in Saudi Arabia: A non-representative cross-sectional study. *Sci. Rep.* 2021;11(1):1-12. <https://doi.org/10.1038/s41598-021-96393-6>
- Fanelli D, Piazza F. Analysis and forecast of COVID-19 spreading in China, Italy and France. *Chaos Solit. Fractals.* 2020;134:109761. <https://doi.org/10.1016/j.chaos.2020.109761>
- Esposito S, Principi N. School closure during the coronavirus disease 2019 (COVID-19) pandemic: an effective intervention at the global level? *JAMA Pediatr.* 2020;174(10):921-2. doi:10.1001/jamapediatrics.2020.1892
- Geven, Koen; Hasan, Amer. 2020. Learning Losses in Pakistan Due to COVID-19 School Closures : A Technical Note on Simulation Results. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/34659> License: CC BY 3.0 IGO.
- Lurie N, Saville M, Hatchett R, Halton J. Developing Covid-19 vaccines at pandemic speed. *N Engl J Med.* 2020;382(21):1969-73. DOI: 10.1056/NEJMp2005630
- Raosoft. Sample size calculator. 2022; Available from: <http://www.raosoft.com/samplesize.html>.
- 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):249-54. doi: 10.34172/aim.2020.06
- Souli D, Dilucca M. Knowledge, attitude and practice of secondary school students toward COVID-19 epidemic in Italy: a cross sectional study. *bioRxiv.* 2020:2020.05.08.084236. doi: <https://doi.org/10.1101/2020.05.08.084236>
- Peng Y, Pei C, Zheng Y, Wang J, Zhang K, Zheng Z, 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(1):1292. <https://doi.org/10.1186/s12889-020-09392-z>
- Lau LL, Hung N, Go DJ, Ferma J, Choi M, Dodd W, et al. Knowledge, attitudes and practices of COVID-19 among income-poor households in the Philippines: A cross-sectional study. *J Glob Health.* 2020;10(1):011007-. doi: 10.7189/jogh.10.011007
- Ayran G, Köse S, Sarýaliođlu A, Çelebiođlu A. Hand hygiene and mask-wearing behaviors and the related factors during the COVID 19 pandemic: A cross-sectional study with secondary school students in Turkey. *J. Pediatr. Nurs.* 2021. <https://doi.org/10.1016/j.pedn.2021.10.001>
- Yıldırım M, Geçer E, Akgül Ö. The impacts of vulnerability, perceived risk, and fear on preventive behaviours against COVID-19. *Psychol Health Med.* 2021;26(1):35-43. <https://doi.org/10.1080/13548506.2020.1776891>
- Soltan EM, El-Zoghby SM, Salama HM. Knowledge, Risk Perception, and Preventive Behaviors Related to COVID-19 Pandemic Among Undergraduate Medical Students in Egypt. *SN Compr Clin Med.* 2020;2(12):2568-75. <https://doi.org/10.1007/s42399-020-00640-2>
- Dagne H, Alemu KA, Dagne B, Tadesse D, Alemayehu AM, Andualem Z, et al. Prevention practice and associated factors of Coronavirus disease 2019 (COVID-19) outbreak among educated Ethiopians: an online based cross-sectional survey. *Res Sq.* 2020. DOI: <https://doi.org/10.21203/rs.3.rs-34504/v1>
- Ding Y, Du X, Li Q, Zhang M, Zhang Q, Tan X, et al. Risk perception of coronavirus disease 2019 (COVID-19) and its related factors among college students in China during quarantine. *PLoS One.* 2020;15(8):e0237626. <https://doi.org/10.1371/journal.pone.0237626>
- Shabu SA, M-Amin K, Mahmood KI, Shabila NP. Risk Perception and Behavioral Response to COVID-19: A Survey of University Students and Staff in the Iraqi Kurdistan Region. *Soc Work Public Health.* 2021 May 19;36(4):474-85. <https://doi.org/10.1080/19371918.2021.1915909>
- Ma T, Heywood A, MacIntyre CR. Travel health risk perceptions of Chinese international students in Australia—Implications for COVID-19. *Infect Dis Health.* 2020;25(3):197-204. <https://doi.org/10.1016/j.idh.2020.03.002>