

Original Research Article

Preparedness and perception of pandemics among medical students

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Received: 21 August 2023

Revised: 25 September 2023

Accepted: 27 September 2023

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ABSTRACT

Background: Infectious diseases continue to pose a serious threat to public health as pandemic or epidemic. Good knowledge about the emerging diseases and perception about the severity of disease is important to control these situations. The current study was undertaken to assess the preparedness of medical students in terms of level of knowledge, perception and willingness to volunteer during pandemics.

Methods: A cross-sectional study was conducted among 400 medical students using simple random sampling method. A self-structured and validated questionnaire was used to collect data which was then analyzed using frequencies, mean, t-test, Chi square test and ANOVA.

Results: The overall knowledge scores among majority (59.8%) students belonged to 'very good' category while 7.5% obtained 'unsatisfactory' scores. Mean scores for knowledge were significantly different in different stratified groups. One third participants were stressful during earlier pandemic. 68.5% strongly stated that being healthy and prior vaccination were important factor for preparedness and willingness to volunteer. Besides personal protective equipment (PPE), separate accommodation and transportation for volunteering duration and psychological support are other crucial factors.

Conclusions: Majority of the students in the study displayed adequate preparedness in terms of knowledge, awareness and willingness during the recent pandemics. However, the level of risk perception was evident. By imparting good knowledge and prior training about the pandemic, preventive strategies, tackling stress and identifying and addressing other relevant issues, medical college students can prove to be an asset for facing a pandemic like situation in our country.

Keywords: Knowledge, Medical students, Pandemic, Perception, Preparedness

INTRODUCTION

In last two decades we have seen mounting evidence of large-scale epidemics, which have gravely affected health, social and economic foundations of all nations. There were several viral disease epidemics in the recent past, such as, SARS-CoV in 2002 -2003, H1N1 Influenza in 2009, Middle East respiratory syndrome corona virus in 2012, and novel Corona virus disease in 2019.¹ In 2014-2016 there was West African Ebola virus outbreak, while in 2015-2016, Zika virus outbreak that spread to 87 countries starting from Brazil.² Problem of emerging and

re-emerging of infectious diseases is traced to natural mutation of viruses as they attempt to survive. Problem is compounded by globalization and trade mobility that makes everyone vulnerable to the spread of infectious disease agents anywhere in the world.

The COVID-19 pandemic exposed the inadequacy of public health institutions in India, affecting the medical and healthcare systems. In comparison to high income countries like the US and UK which are having 682 and 664 healthcare workers respectively per 10000 population (ILOSTAT, 2020), India has just 43, and this had

significantly overburdened our healthcare system. The healthcare services requirements continue to outgrow the availability. Both illnesses related and non-illness related absenteeism of the healthcare workers during the pandemic, compounded the shortfall of health care service delivery. There were also evidences supporting that non illness related absenteeism rates were high, where there was high virulence and more risk of infectivity.³

Various strategies were adopted in India and worldwide to overcome this problem, which included enrolling retired doctors or paramedical staff, diverting the existing staff to management of the pandemic and even cancelling all the elective procedures to increase the availability of doctors.⁴ In such a scarcity, medical students could have been a potential resource.^{1,5,6,7} Even earlier also they have played significant roles in Spanish Flu pandemic 1918 and polio epidemic in Denmark in 1952.^{6,7} In this current pandemic also, the medical students were graduated early to serve as clinicians in the US, Italy and UK.⁷

Involvement of medical students can be a strategy to overcome the constraints of human resource during management of a pandemic as they are familiar with medical situations. Being the future of healthcare systems, medical students could contribute in student response teams, screening of patients, telemedicine, indirect patient care areas or in rotational clinical duties under supervision. As their risk perception and willingness are prerequisites in their volunteering in pandemic situations, in order to effectively plan and prepare this resource, it is very important to assess the knowledge and preparedness of the medical students about these infectious diseases.

Objective

The present study was therefore undertaken to apprehend the pivotal role that can be played by medical students by assessing their knowledge and risk perception in recent pandemics and to understand their willingness to volunteer and preparation levels for the same in the Indian healthcare settings.

METHODS

A questionnaire based one-time cross-sectional study was conducted among medical students in a tertiary care teaching hospital in North India, the Government Medical College and Hospital, also known as Rajkiya Ayurvigyan Mahavidyalaya, located in Sector 32, Chandigarh. The period of study was from April 2022 to June 2022.

Inclusion criteria

All preclinical, paraclinical and clinical undergraduate medical students (MBBS) in the tertiary care teaching hospital were included in the study.

Exclusion criteria

Students training in the field of dentistry, nursing, physiotherapy, homeopathy, ayurveda and allied health sciences

Sampling technique

The participants were selected on the basis of availability and willingness to take part through simple random sampling method.

$$N = 4p(1-p)/r^2$$

Where, p = prevalence of willingness,

r= absolute precision

Considering the prevalence of willingness as 58.3%, at 95% confidence interval and 5% absolute precision, the sample size came to be 374. Assuming 5% as non-response rate, the final sample size came to be 392 (approximately 400).

Questionnaire

The questionnaire used for the current study was a self-structured questionnaire validated by Delphi technique designed to answer the objectives of the study. The questionnaire was pre-tested on 12 students and modified accordingly. The survey consisted of a series of closed-ended questions collecting information on demographic details, knowledge of communicable diseases, questions each on perception and preparedness of medical students. These closed-ended questions had a list of possible options from which the respondents were to choose. These options were pre-coded for analysis. The reliability and validity of the questionnaire was found to be satisfactory.

Knowledge based questions were on understanding and skills on pandemics that students have gained through learning or experience, including various challenges one may face during volunteering and ways to alleviate these challenges. Question on perception of pandemic were on the manner in which the attitude of medical students resonates with the existing information about the prevalent pandemic. Willingness of medical students were assessed through questions on voluntarily undertaking the health care service during the pandemic and the deterrent factors for the same. Pandemic preparedness questions focused on multidisciplinary collaborations including social interactions.

The participants were enrolled on the basis of availability and willingness to take part in the study. After taking written consent, the questionnaire was given to them. To maintain the anonymity personally identifiable data was not collected.

Statistical analysis

Data were entered and analyzed using a statistical package for social science (SPSS) software version 20.0. The data was described using frequencies, percentage, mean and standard deviations. T-test, Chi square test and ANOVA was used to find the association between the outcome/dependent and determinants/ independent variables.

Knowledge based questions were coded dichotomously into 1 and 2 corresponding to correct and incorrect responses to calculate the overall knowledge score. Likert scale was coded 1 to 5 according to ascending order of responses and converted to interval scale for quantitative data. The mean and standard deviation was calculated for answering Likert scale responses. The means scores were re-coded into Likert responses back as per following: 1.0-1.8=1; 1.81-2.6=2; 2.61-3.4=3; 3.41-4.2=4; 4.21-5=5. All values were considered significant at $p < 0.05$ (two sided).

RESULTS

The age of the study participants varied between 17 to 24 years, the mean age being 20.07 ± 1.20 years. 62.8% respondents belonged to 17-20 years age group while almost half 37.3% belonged to 21-24 years of age. The gender distribution of students was almost equal with slightly higher female: 52.5% and male: 47.5%. The largest proportion of respondents (95.5%) belonged to urban area. There was almost equal distribution of students among pre-clinical, para-clinical and clinical phase of MBBS study. 54 (38.8%) pre-clinical, 57 (43.5%) para clinical and 56 (43.1%) clinical students agreed that they were worried of being infected by the virus. All of them accepted the stress of the disease. However, the clinical batch strongly disagreed about concentrating difficulty because of the pandemic

situation. Age wise and gender wise comparison of study participants to factors influencing their willingness to volunteer in pandemics was found to be statistically non-significant.

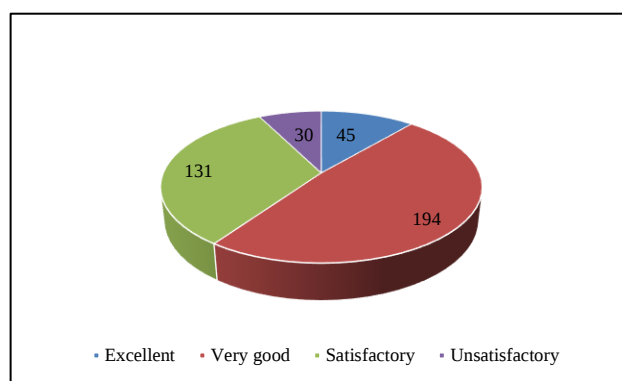


Figure 1: Distribution of overall knowledge scores among study participants (N=400).

Table 1: Age, gender and academic year wise comparison of mean knowledge scores among study participants.

Category	N	Mean	SD	t-test value	P value
Age					
17-20 years	251	7.0	1.9	1.12	0.28
21-24 years	149	7.3	2.0		
Gender					
Male	190	2.2	0.8	0.145	0.885
Female	210	2.2	0.8		
Academic year of study					
Pre-clinical	139	6.8	1.6	7.7	0.001
Paraclinical	131	6.9	2.0		
Clinical	130	7.7	2.1		

Table 2: Perception distribution of mental take on pandemic.

Factors	Strongly disagree N (%)	Disagree N (%)	Neither agree nor disagree N (%)	Agree N (%)	Strongly agree N (%)
I was worried of getting corona virus disease					
Pre-clinical	13 (9.4)	24 (17.3)	32 (23.0)	54 (38.8)	16 (11.5)
Para clinical	12 (9.2)	10 (7.6)	27 (20.6)	57 (43.5)	25 (19.1)
Clinical	14 (10.8)	15 (11.5)	33 (25.4)	56 (43.1)	12 (9.2)
I was worried of my friends getting corona virus disease					
Pre-clinical	15 (10.8)	19 (13.7)	33 (23.7)	57 (41.0)	15 (10.8)
Para clinical	16 (12.2)	16 (12.2)	13 (9.9)	68 (51.9)	18 (13.7)
Clinical	18 (13.8)	16 (12.3)	28 (21.5)	54 (41.5)	14 (10.8)
I had hard time sleeping because of corona virus disease					
Pre-clinical	52 (37.4)	49 (35.3)	25 (18.0)	10 (7.2)	03 (2.2)
Para clinical	44 (33.6)	44 (33.6)	28 (21.4)	04 (10.7)	01 (0.8)
Clinical	60 (46.2)	45 (34.6)	18 (13.8)	05 (3.8)	02 (1.5)
I had difficulty in concentrating because of corona virus disease					
Pre-clinical	28 (20.1)	41 (29.5)	18 (12.9)	42 (30.2)	10 (7.2)
Para clinical	30 (22.9)	27 (20.6)	28 (21.4)	37 (28.2)	09 (6.9)

Continued.

Factors	Strongly disagree N (%)	Disagree N (%)	Neither agree nor disagree N (%)	Agree N (%)	Strongly agree N (%)
Clinical	42 (32.3)	38 (29.2)	21 (16.2)	28 (21.5)	01 (0.8)
I felt the stress of corona virus disease					
Pre-clinical	22 (15.8)	33 (23.7)	18 (12.9)	50 (36.0)	16 (11.5)
Para clinical	28 (21.4)	16 (12.2)	28 (21.4)	43 (32.8)	16 (12.2)
Clinical	37 (28.5)	28 (21.5)	21 (16.2)	39 (30.9)	05 (3.8)

Table 3: Course wise distribution of students according to the factors influencing their preparedness and willingness to volunteer.

Factors	Strongly disagree N (%)	Somewhat disagree N (%)	Neutral N (%)	Somewhat agree N (%)	Strongly agree N (%)
Healthy and able to					
Pre-clinical	1 (10.7)	8 (5.8)	40 (28.8)	52 (37.4)	38 (27.3)
Para clinical	5 (3.8)	5 (3.8)	31 (23.7)	36 (27.5)	54 (41.2)
Clinical	2 (1.2)	5 (3.8)	29 (22.3)	58 (44.6)	36 (27.7)
Sufficient knowledge and skill					
Pre-clinical	3 (2.2)	9 (6.5)	32 (23.0)	56 (40.3)	39 (28.1)
Para clinical	2 (1.5)	6 (4.6)	22 (16.8)	51 (38.9)	50 (38.2)
Clinical	2 (1.5)	12 (9.2)	22 (16.9)	57 (43.8)	37 (28.5)
Personal protective equipment (PPE)					
Pre-clinical	4 (2.9)	7 (5.0)	17 (12.2)	53 (41.1)	58 (41.7)
Para clinical	2 (1.5)	3 (2.3)	28 (21.4)	36 (27.9)	62 (47.3)
Clinical	3 (2.3)	3 (2.3)	16 (12.3)	40 (31.0)	68 (52.3)
Vaccine for family and myself at the earliest Availability					
Pre-clinical	2 (1.4)	7 (5.0)	28 (20.1)	37 (26.6)	65 (46.8)
Para clinical	2 (1.5)	9 (6.9)	28 (21.4)	44 (33.6)	48 (36.6)
Clinical	3 (2.3)	3 (2.3)	17 (13.1)	43 (33.1)	64 (49.2)
Coverage of treatment cost if I get infected					
Pre-clinical	6 (4.3)	14 (10.1)	27 (19.4)	41 (29.5)	50 (36.0)
Para clinical	1 (0.8)	9 (6.9)	20 (15.3)	44 (33.6)	57 (43.5)
Clinical	1 (0.8)	3 (2.3)	18 (13.8)	35 (26.9)	73 (56.2)
Separate accommodation during the duration of Volunteer					
Pre-clinical	2 (1.4)	13 (9.4)	36 (25.9)	44 (31.7)	44 (31.7)
Para clinical	1 (0.8)	7 (5.3)	31 (23.7)	41 (31.3)	51 (38.9)
Clinical	0 (0.0)	1 (0.8)	20 (15.4)	40 (30.8)	69 (53.1)
Transportation to and back from the hospital					
Pre-clinical	7 (5.0)	14 (10.1)	38 (27.3)	41 (29.5)	39 (28.1)
Para clinical	6 (4.6)	10 (7.6)	29 (22.1)	44 (33.6)	42 (32.1)
Clinical	3 (2.3)	8 (6.2)	24 (18.5)	40 (30.8)	55 (42.3)
Psychological support during the pandemic					
Pre-clinical	2 (1.4)	6 (4.3)	31 (22.3)	51 (36.7)	49 (35.3)
Para clinical	2 (1.5)	6 (4.6)	31 (23.7)	42 (32.1)	50 (38.2)
Clinical	3 (2.3)	1 (0.8)	24 (18.5)	50 (38.5)	52 (40.0)

Table 4: Age wise and gender wise comparison of study participants for factors influencing their willingness to volunteer in pandemics.

Category	N	Mean	SD	t-test value	P value
Age					
17-20 years	251	4.2	0.7	0.20	0.38
21-24 years	149	4.2	0.8		
Gender					
Male	190	4.1	0.8	-1.76	0.08
Female	210	4.2	0.7		

Table 5: Association between willingness to volunteer based on risk perception.

Category	Risk Perception and Willingness to Volunteer					P value
	Extremely likely N (%)	Somewhat likely N (%)	Neutral N (%)	Somewhat unlikely N (%)	Extremely unlikely N (%)	
Age (years)						
17-20	117 (46.6)	108 (43.0)	20 (8.0)	5 (2.0)	1 (0.4)	0.545 (NS)
21-24	67 (45.0)	71 (47.7)	6 (4.0)	4 (2.7)	1 (0,7)	
Gender						
Male	78 (41.1)	98 (51.6)	05 (2.6)	07 (3.7)	02 (1,1)	0.001 (S)
Female	106 (50.5)	81 (38.6)	21 (10.0)	02 (1.0)	0 (0.0)	
Year of study						
Preclinical	45 (32.4)	75 (54.0)	13 (9.4)	05 (3.6)	01 (0.7)	0.001(S)
Para clinical	73 (55.7)	43 (32.8)	11 (8.4)	03 (2.3)	01 (0.8)	
Clinical	66 (50.8)	61 (46.9)	02 (1.5)	01 (0.8)	0 (0.0)	

Based on risk perception a statistically significant relationship existed with the year of study of the participants ($p=0.001$).

DISCUSSION

The overall knowledge scores among study participants revealed that most of the students 59.8% belonged to 'very good' category. Around 11.3% students obtained the 'excellent' score, 32.8% were with satisfactory scores while 7.5% participants were coded as 'unsatisfactory.' A similar study done among medical students in Southern India found that 65.5% ($n=199$) of the participants displayed good knowledge level.⁸ For most of the knowledge-based questions the percentage of correct responses was higher in the age group of 17-20 years as compared to the percentage of correct response in the age group of 21-24 years. However, the analysis of variance between knowledge scores among study participants revealed that the age wise ($p=0.28$) and gender wise ($p=0.885$) difference in mean score for knowledge was statistically non-significant. Whereas, academic year wise it is significant ($p=0.001$) being less than 0.05.

The participants from the clinical group had significantly higher knowledge scores for infectious diseases than preclinical and clinical. The higher score in clinical group can be linked to their higher education levels. Similar results were reported in a study done in medical students in Pakistan which assessed the predictors for good knowledge among medical students depended on the number of years spent at medical school.⁹ This is comparable to the results of other studies conducted in Saudi Arabia, Egypt and Uganda.^{10,11,12}

The perception of study participants about pandemics was assessed based on the past events that occurred in COVID-19 pandemic. Around 21.4% paraclinical, 19.2% clinical and 11.7% of pre-clinical students responded that they already suffered the infection during the earlier waves of COVID-19. A study conducted in Jordan found that 50% of those who were tested positive for COVID-

19 infection were from clinical batch and the participants spending more than 5 daily hours in the hospital had higher percentages of COVID-19 infection.^{10,13} Majority of students from all batches agreed that they were worried of being infected by the virus. It was found that almost one third of the participants revealed stressful states due to COVID-19 while more than one third admitted their worries of being infected. Although they did not feel sleep disturbance, yet they had concentrating difficulties because of pandemic and accepted the stress of corona virus. A study done at a tertiary care center at Pune found that various coping methods were used by the participants undergoing psychological turmoil during COVID-19.¹⁴ This reassures the fact that pandemic situations are stressful.

Most of the students (68.5%) generally or strongly stated that being healthy and prior vaccination were important factor influencing their preparedness and willingness to volunteer during pandemics. Besides personal protective equipment (PPE), separate accommodation and transportation for volunteering duration and psychological support are other crucial factors. Another study reported that insufficient knowledge and health of individuals can be important deterrent factors.¹⁵ However, in the study conducted in AIIMS, Delhi found that the knowledge (i.e. medical students) regarding COVID-19 did not significantly affect the willingness to volunteer of the respondents.⁴ Meanwhile study by Khalid in Karachi, Pakistan, described a significant association with willingness to volunteer during the pandemic among medical students if they were healthy ($p=0.023$), and if they were offered compensation ($p=0.039$).¹ The hesitancy to participate in settings with inadequate PPE or those involving spread of infection to family and friends is also reported in previous studies.^{16,17}

Risk perception among different groups was gauged by their likelihood of getting infected while working or volunteering during the pandemics. A statistically significant relationship existed with the gender (0.001) and year of study (0.001) of the participants. Pandemics

are the panic situations and there is need to raise awareness among general population as well as in specialized groups (health care workers) to make them understand the mode of transmission, virulence and infectivity of the organism, and a transparency in the information. The study has identified the basic mind set of the medical students and their key concerns in pandemic situations. However moral and ethical issues pertaining to such situations may require subtle exploration.

The present study was a single centre study. Results of the study cannot truly represent the knowledge, perception and willingness of medical students worldwide and therefore there is need of similar studies from other medical colleges.

CONCLUSION

Global pandemics significantly overburden the healthcare facilities worldwide. The study found that majority of students had adequate knowledge regarding transmission of infection but the participants had fear of catching infection or transmission of infection. Participants believed that if they were healthy and given adequate personal protective equipment (PPE), separate accommodation and transportation for volunteering duration and psychological support, they would be motivated for volunteering in pandemic like situations in future. The study curriculum needs to be enhanced to train them for such situations at an early stage of medical career.

ACKNOWLEDGEMENTS

Technical support and guidance provided by Dr. I. K. Sawhney, former principal scientist, ICAR- National Dairy research Institute, Karnal is acknowledged.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Khalid M, Khalid H, Bhimani S, Bhimani S, Khan S, Choudry E, et al. Risk perception and willingness to work among doctors and medical students of Karachi, Pakistan during the COVID-19 pandemic: a web-based cross-sectional survey. *Risk Manage Healthcare Polic*. 2021;3265-73.
2. Pielnaa P, Al-Saadawe M, Saro A, Dama MF, Zhou M, Huang Y, et al. Zika virus-spread, epidemiology, genome, transmission cycle, clinical manifestation, associated challenges, vaccine and antiviral drug development. *Virology*. 2020;543:34-42.
3. Gershon RR, Magda LA, Qureshi KA, Riley HE, Scanlon E, Carney MT, et al. Factors associated with the ability and willingness of essential workers to report to duty during a pandemic. *J Occup Environ Med*. 2010;995-1003.
4. Sra M, Gupta A, Jaiswal A, Yadav K, Goswami A, Goswami K. Willingness to volunteer of medical students during the COVID-19 pandemic: Assessment at a tertiary care hospital in India. *MedRxiv*. 2021:2021-01.
5. Starr I. Influenza in 1918: recollections of the epidemic in Philadelphia. *Ann Intern Med*. 1976;85(4):516-8.
6. West JB. The physiological challenges of the 1952 Copenhagen poliomyelitis epidemic and a renaissance in clinical respiratory physiology. *J App Physiol*. 2005;99(2):424-32.
7. Goldberg E. Early graduation could send medical students to virus front lines. *The New York Times*. 2020. Available from: <https://www.nytimes.com/2020/03/26/health/corona-virus-medical-students-graduation.html#:~:text=Several%20medical%20schools%20in%20Massachusetts,need%20for%20medical%20workers%20surges>. Accessed on 12 May 2023.
8. Pradeep M, Surendran S, Rema B, Binesh N, Reji PP. COVID-19 readiness and career aspirations of south indian medical students: a cross-sectional survey study. *Adv Med Educ Pract*. 2021;12:1267.
9. Khan H, Khawaja MR, Waheed A, Rauf MA, Fatmi Z. Knowledge and attitudes about health research amongst a group of Pakistani medical students. *BMC Med Educ*. 2006;6(1):1-7.
10. Al-Hanawi MK, Angawi K, Alshareef N, Qattan AMN, Helmy HZ, Abudawood Y, et al. Knowledge, attitude and practice towards COVID-19 among the public in the Kingdom of Saudi Arabia: a cross-sectional study. *Front Public Health*. 2020;8:217.
11. Wahed WAY, Hefzy EM, Ahmed MI, Hamed NS. Assessment of knowledge, attitudes, and perception of health care workers regarding COVID-19, a cross-sectional study from Egypt. *J Community Health*. 2020;45:1242-51.
12. Olum R, Chekwech G, Wekha G, Nassozi DR, Bongomin F. Coronavirus disease-2019: knowledge, attitude, and practices of health care workers at Makerere University Teaching Hospitals, Uganda. *Front Public Health*. 2020;8:181.
13. Hani AB, Alaridah N, Abeeleh MA, Shatarat A, Rayyan R, Kamal A, et al. Medical students and risk of COVID-19 infection: a descriptive cross-sectional study from the University of Jordan. *Ann Med Surg*. 2021;70:102775.
14. Patil ST, Datar MC, Shetty JV, Naphade NM. "Psychological consequences and coping strategies of patients undergoing treatment for COVID-19 at a tertiary care hospital": a qualitative study. *Asian J Soc Health Behavior*. 2021;4(2):62.
15. Qureshi K, Gershon RRM, Sherman MF, Straub T, Gebbie E, McCollum M, et al. Health care workers' ability and willingness to report to duty during catastrophic disasters. *J Urban Health*. 2005;82(3):378-88.

16. Smith E. Willingness to work during a terrorist attack: a case-study of first responders during the 9/11 World Trade Centre terrorist attacks. *Australas J Paramed*. 2008;6:1-1.

Cite this article as: Sawhney D, Goel NK, Prashar S, Rana K. Preparedness and perception of pandemics among medical students. *Int J Community Med Public Health* 2023;10:4291-7.