

A cross sectional study of knowledge, attitude and practices of medical students regarding COVID-19 in Northern India

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Abstract

Background: Practicing preventive measures essential to control the spread of infection and possessing the required knowledge, attitude and practices (KAP) towards COVID-19 could possibly affect the behavior and perception of medical students towards the disease which must be observed and studied. Studies have been conducted to assess medical students' willingness to volunteer in the ongoing COVID-19 pandemic, but not many have focused on their level of pandemic preparedness and eligibility to volunteer. Our study explored the knowledge, attitude and practices of medical students, and also helps to develop effective action plans regarding the reopening of medical colleges in India.

Material and methods: This cross-sectional observational study was done in a tertiary care center in North India on Medical and Dental undergraduate students spanning across all professional years after they gave a written informed consent. A self-designed questionnaire was established based on published literature. The study questionnaire consisted of four sections - socio-demographics of students, knowledge, attitudes/beliefs and practice-based statements about COVID-19.

Results: 238 students participated in this study and for majority (79.4%) of students the major source of information for gaining knowledge towards COVID-19 was social media. All students were aware that COVID-19 spreads through droplet infection, 94.1% responded that people with chronic illnesses were at high-risk of infection and 91.2% and 88.2% reported that fever and dry cough were the main symptoms of COVID-19 respectively. The majority of students disagreed that they would avoid isolation (n=147), and the students also disagreed on aspect of keeping the report confidential if a near one is affected (n=140). Though there were no statistically significant differences (p<0.05) in the level of knowledge, attitude and practices found between students studying in different professional years.

Conclusion: To conclude, the results of our study showed that major source of information for gaining knowledge for COVID-19, was through social media. The students demonstrated a satisfactory level of knowledge, attitude and practices for the prevention of COVID-19.

Key words: knowledge, attitude, practice, medical students, pandemic

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Introduction

Coronaviruses (CoVs) are non-segmented single-stranded RNA viruses belonging to Coronaviridae family which are further classified into α -CoV, β -CoV, γ -CoV and δ -CoV based on their antigenicity [1-3]. α -CoV and β -CoV are responsible for causing infections ranging

from common cold to croup, bronchiolitis and pneumonia in animals as well as humans [1,4,5]. Corona Viruses are primarily enzootic infections but become zoonotic when they cross the species barriers to infect humans [1,6,7]. The outbreaks of Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS)

has led to virulent infections in humans [1,6,7]. An outbreak of pneumonia of unknown origin was reported in the Chinese City of Wuhan in a cluster of patients which was identified as Covid-19 caused by severe acute respiratory syndrome coronavirus 2 (SARSCoV-2) infections in December 2019 [8-10]. The virus was quick to spread and later was reported from many other regions of China and other countries across the world with human-to-human transmission [8,11]. World Health Organization (WHO) declared Covid-19 as a Public Health Emergency of International Concern and later declared it as a pandemic in early 2020 [8,12]. India also reported cases of Covid-19 with first case being identified in Late January 2020 which was associated with increased morbidity and mortality throughout the country. Although the case fatality in India was 3.17% which was better than the world's case fatality of 5.16% but owing to the highly populated nation, India was the worst-hit Asian country by the pandemic [13,14]. Though all age groups were affected, certain strata of the population were at high-risk of severe illness and high mortality. Patients with diabetes mellitus, hypertension, cancer, cardiac or chronic lung diseases were identified to be associated with higher morbidity and mortality [15,16]. The incubation period varied from 5 to 14 days and the patient could be contagious during initial few days in the pre-symptomatic period [15,17,18]. The most effective way to contain spread was through preventive measures which included isolation of cases, limiting travel, imposing lockdowns, regular hand washing, social distancing, wearing masks and avoid crowded places [15,19]. These preventive measures were essential to control the spread of the virus and required possession of an adequate level of knowledge, attitudes, and practices (KAP) towards covid-19 [15,20]. The entire daily routine came to a standstill which included a difficult time and situation for the education system worldwide. It not only curtailed the autonomy and independence of adults but also of students especially undergraduate students with limited experiences. This could affect their behavior and perception which needed to be studied and observed [8]. KAP Survey can help understand the perception and behavioural changes in health care workers and medical students providing the attitude of respondents towards Covid-19 [21-24]. This could further have a positive impact on friends and family of medical students as they are the most trusted source of information for them [21,25]. This further influence the surrounding community and could help in optimizing the involvement of medical students in the era of misinformation [21,26]. A KAP study done on students of different ages, batches, colleges and gender showed that all these students had adequate knowledge of modes of transmission, manifestation and prevention strategies but had limitations in their knowledge of manifestations in pregnancy. Although, students were equipped to help the frontline workers in management of Covid-19 [13]. Another study also demonstrated that behavior practices had changed but there was no significant change in attitude of the students [20]. A KAP Study demonstrated a positive correlation between the various variables [27]. Although, studies have been conducted to assess medical students' willingness to volunteer in the ongoing COVID-19 pandemic, not many focus on their level of pandemic preparedness and eligibility to volunteer. Our study explores the knowledge, attitudes and practices of medical students and helps in developing effective action plans regarding the reopening of medical colleges in India and to determine whether they are prepared to play role of a volunteer in the current crisis.

Objectives of the study: To assess the current knowledge of medical students regarding COVID-19 and explore their

sources of information for the same. To understand their attitude towards reopening of medical colleges and their willingness to volunteer in the pandemic. To gain insight into the practices and precautionary measures followed by medical students to avoid personal infection. To assess the overall level of pandemic preparedness among medical students.

Material and methods

This cross-sectional observational study was done in a tertiary care center in North India on Medical and Dental undergraduate students spanning across all professional years. Only those participants were enrolled in the study who filled up the questionnaire circulated on social media and gave written informed consent. Participation of students in the study was voluntary and all questions were mandatory with each student allowed only one attempt. All undergraduate medical students (Bachelor of Medicine and Bachelor of Surgery (M.B.B.S) and Bachelors of Dental Surgery (B.D.S)) from first to final year at tertiary care center were enrolled in the study only if they were willing to give informed consent and any student of less than 18 years of age was excluded from the study.

A self-designed questionnaire was prepared based on the input from published literature. The study questionnaire consisted of two sections. Section one was designed to explore the socio-demographic profile of students and comprised of few demographic variables which included their age, gender, course, name of college etc. Section two comprised of 3 subsections, the first subsection was designed to know the major sources of information used by students to gain knowledge about COVID-19 – this subsection had 18 questions to evaluate students' in-depth knowledge and included multiple choice questions on the route of transmission, incubation period, symptoms, high-risk groups, complications, investigations, diagnosis, and current treatment regarding COVID-19 and knowledge assessing statements to be answered as True/False/Not sure. Subsection two comprised of twelve statements aimed to evaluate students' attitudes/beliefs about COVID-19. The questions on attitude were designed based on a 5-point Likert scale (1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, and 5 = strongly disagree). The final subsection comprised of thirteen practice-based statements and was to be responded with never/sometimes or rarely/often according to the frequency with which these practices were followed by the individual. The Attitude and Practice sections were prepared based on the circumstances likely to be faced by undergraduate students. The anonymized questionnaire had been developed using Google Forms. A literature search was done with keywords like "medical students", "COVID-19", "Pandemic", "KAP", "Preparedness", "medical colleges", "volunteer", and "medical task force".

All undergraduate medical and dental students across all professionals were approached through email and social networking apps like WhatsApp and an online questionnaire was distributed. A brief introduction of the study highlighting the aims and objectives, expected duration of subject participation, benefits/risks associated with participation and informed consent were included at the beginning of the survey. Class Representatives for each academic year were involved in the process of distributing the questionnaire link to students directly to ensure prompt responses from all the batches.

A pilot study to assess the validity and reliability of the questionnaire was done among a small number of students (n = 34), and the average time taken to complete it is around 10 minutes. The feedback questionnaire was analyzed for the

coefficient of reliability by Cronbach's Alpha and gave an internal consistency of 0.831. The students' who were the part of pilot study were excluded from the study.

Statistical analysis

Feedback was expressed as a percentage of all the responses. The data was tabulated as mean±standard deviation (mean±SD), the results being analyzed using non-parametric (Chi-Square Test) and parametric (Unpaired Student 't' test and ANOVA for comparison of results of all three batches) tests. A P<0.05 was considered statistically significant. The data was analyzed using the SPSS Version 25.

Ethical consideration

The study was approved by Institutional Review Board (IRB) and conducted in accordance with ICH-GCP guidelines.

Results

238 students participated in this study on knowledge, attitude and practice among medical undergraduate students regarding Covid-19. Out of the 238 students, 55.9% (n=133) were females and 41.2% (n=98) were males. A majority of students – 97.1% (n=231) were pursuing MBBS course while 7 students pursuing BDS course participated in the study. Students of both MBBS and BDS spread from over first year to final year participated in the study as shown in Table 1 with maximum students of fourth/final year participating in the study.

Table 1 Year-wise distribution of students

Year	Percentage (n)
First year	14.7 (35)
Second year	29.4 (70)
Third year	23.5 (56)
Fourth/Final year	32.4 (77)

Response of KAP questionnaire by the students

Knowledge related to Covid-19 is shown in Table 2. In response to the major source of information for gaining knowledge towards the Covid-19, 79.4% (n=189) reported that social media was the major source of information. All the students answered that Covid-19 spread through droplet infection, 94.1% (n=224) responded that people with chronic illness were at high-risk for morbidity and mortality associated with infection. Most of the students stated that the incubation period varies from 2-14 days to 10-14 days with 91.2% (n=217) and 88.2 (n=210) reported fever and dry cough as the main symptom of Covid-19, respectively. There were no statistically significant differences (p<0.05) between the knowledge of students studying in different professional years.

Table 3 represents the questions assessing the knowledge component with the option of answers being either true, false, or not sure. 210 participants were aware that there is no current effective cure for Covid-19 with 189 participants responding that Covid-19 is transmitted even if fever is not present (n=189). All the participants responded that isolation and treatment of infected people were effective means to reduce spread of infection and asymptomatic patients can spread the disease. Though there were no statistically significant differences (p<0.05) in the level of knowledge between students studying in different professional years.

The response of students to the attitude aspect of the questionnaire are shown in Table 4. The questions had answers on a 5-point Likert scale rating from strongly disagree to strongly agree. The majority of students disagreed with the view that they would avoid isolation (n=147), the students also disagreed on the aspect of keeping the report confidential if a near one is affected (n=140). In response to other questions, most of the students (n=119) were ready to take all necessary precautions to prevent the spread of infection. There were no statistically significant differences (p<0.05) in the attitudes of students studying in different professional years.

The response of students to the practice aspect of the questionnaire is shown in Table 5. Most students practiced social distancing in public places (n=187), wore masks when outdoors (n=217), regularly washed hands (n=224) and took all the necessary precautions. There were no statistically significant differences (p<0.05) in the practices of students studying in different professional years.

Discussion

238 students participated in this study on knowledge, attitude and practices in medical undergraduate students regarding Covid-19 with 55.9% being females and a majority of the students 97.1% pursuing MBBS course. In response to the major source of information for gaining knowledge towards Covid-19, 79.4% reported that social media was the major source of information. All the students answered that Covid-19 spread through droplet infection, and 94.1% responded that people with chronic illness were at high risk of mortality and morbidity. Most of the students stated that the incubation period varied from 2-14 days to 10-14 days with 91.2% and 88.2 % reported that fever and dry cough were the main symptoms of Covid-19, respectively. 210 participants were aware that there is no current effective cure for Covid-19 with 189 participants responding that Covid-19 is transmitted even if fever is not present. All the participants responded that isolation and treatment of infected people were effective means to reduce the spread of infection and were aware that asymptomatic patients can spread the disease. The questions had answers on a scale rating from strongly disagree to strongly agree. A majority of students disagreed with the view that they would avoid isolation (n=147), whereas students also disagreed on the aspect of keeping the report confidential if a near one is affected (n=140). In response to other questions, most of the students (n=119) were ready to take all necessary precautions to prevent the spread of infection. Most students practiced social distancing in public places (n=187), wore masks when outdoors (n=217), regularly washed hands (n=224) and took all precautions. There were no statistically significant differences(p<0.05) in the knowledge, attitude and practices of students studying in different professional years.

A study done in Indonesia on implementing health protocols and preventive measures influencing the KAP of Medical students as healthcare workers during the pandemic took 525 participants who responded to a questionnaire with 18 items. Most of the students demonstrated good knowledge, attitude, and practices towards COVID-19 which was not influenced by location, although, age, institution type, and institution status played a significant role. The results obtained from our study are similar as it demonstrates that most of the students possess the requisite knowledge, attitude and practices. Though the number of items in our questionnaire were more than what is used in this study, participants in our study also demonstrated an overall preparedness of the students for the Pandemic [21].

Table 2

Percentage response to knowledge aspect for Covid-19 infection where all choices were applicable.

Questions	Response in percentage (n)
1. What are the major sources of information you have used to gain knowledge towards Covid-19 pandemic? (Tick all that apply) a. Newspaper/Television/Radio b. Social Media c. Medical Professionals d. Official Websites (Like W.H.O) e. NGOs f. Religious Leaders g. Friends and Family	70.6 (168) 79.4 (189) 61.8 (147) 52.9 (126) 14.7 (35) 5.9 (14) 44.1 (105)
2. The route of transmission for Covid-19 infection is (Tick all that apply) a. Airborne b. Droplet infection c. Fomite borne Transmission d. Fecal-Oral Route e. Blood Transmission f. Mother to Fetus g. From Animals	58.8 (140) 100 (238) 23.5 (56) 14.7 (35) 20.6 (49) 23.5 (56) 8.8 (21)
3. High risk population for Covid-19 infection include (Tick all that apply) a. Children b. Pregnant Women c. People with chronic illness d. Elderly e. Not sure	58.8 (140) 61.8 (147) 94.1 (224) 91.2 (217) 5.9 (14)
4. The incubation period for Covid-19 is (in days) a. 1-5 b. 5-10 c. 2-14 d. 10-14 e. Not Sure	2.9 (7) 0 50 (119) 44.1 (105) 2.9 (7)
5. The main clinical symptoms of Covid-19 include (Tick all that apply) a. Dry Cough b. Fever c. Runny Nose d. Myalgia e. Dyspnea f. Sore Throat g. Head Ache h. Sneezing i. Confusion j. Diarrhea	88.2 (210) 91.2 (217) 44.1 (105) 26.5 (63) 44.1 (105) 73.5 (175) 44.1 (105) 35.3 (84) 2.9 (7) 14.7 (35)
6. The most ideal sample taken for investigation is a. Blood b. Nasopharyngeal Swab c. Serum/ Urine/ Not Sure	8.8 (21) 91.2 (217) 0
7. Which test is preferred in Covid-19 testing? a. Serological Test b. Immunological Test c. RT-PCR d. Titration e. Not Sure	8.8 (21) 8.8 (21) 79.4 (189) 0 3 (7)
8. Confirmative diagnostic test in Covid-19? a. Only through patient's symptoms b. Detection of causative virus based on lab diagnosis c. Through general examination d. Through systemic examination e. Not Sure	8.8 (21) 88.2 (210) 0 3 (7) 0
9. The complications of Covid-19 include: a. Pneumonia b. Septic Shock c. ARDS d. All of the Above e. Not Sure	20.6 (49) 0 14.7 (35) 50 (119) 14.7 (35)
10. How do you judge your level of knowledge about Covid-19? a. Sufficient b. Inadequate c. Not Sure	61.8 (147) 29.4 (70) 8.8 (21)

Another study done in Rajasthan, India showed the scores attained by different batches, gender, age-group and college to be comparable with satisfactory knowledge in students regarding the symptoms, mode of spread, incubation period and precautions for prevention of disease but there was limited

capacity of students in the attitude and practice section for Covid-19. The results of our study are similar as the knowledge component of students in our study was satisfactory, though, in terms of attitude and practices, our study has shown a more positive outcome [13].

Table 3

Response to knowledge aspect for Covid-19 infection with once choice option

Question	True	False	Not Sure
There currently is no effective cure for COVID-19 but early symptomatic and supportive treatment can help most patients recover from the infection	210	14	14
People with COVID-19 will not transmit the virus to others when fever is not present.	14	189	35
COVID-19 is caused by a virus, so antibiotics do not work. Antibiotics should not be used as a means of prevention or treatment of COVID-19. They should only be used as directed by a physician to treat a bacterial infection	140	49	49
Not all people with COVID-19 develop severe cases, only older people with serious chronic illnesses like lung/heart diseases and diabetes have increased risk of developing more serious complications of COVID-19.]	182	28	28
Isolation and treatment of people who are infected with the COVID virus are effective measures to reduce spread of virus	238	0	0
Asymptomatic carriers in subclinical stage can spread the disease.	210	7	21
Mild cases of COVID-19 that improve in few days on its own need not be isolated.	42	175	21
Do you have access to any helpline number to contact in case you suspect you or someone you know had COVID-19 OR to obtain information?	182	21	7

Table 4

Response to Attitude aspect for Covid-19 infection with once choice option

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
If I got infected, I would do anything to avoid isolation.	147	49	21	7	14
If I got infected , I will be extremely stressed of the way the health-workers people in hospital, hospitalization process will deal with me	77	63	47	28	21
If somebody in my family were to get COVID-19, I would want it to remain private or a secret.	140	42	28	7	21
When called upon, I will willingly attend physical offline classes, practical's and clinical postings in the hospital if my college reopens.	56	28	70	21	63
When called upon, I will willingly participate in the frontline of COVID-19 pandemic response.	21	21	63	56	77
I will go into institutional quarantine if I come in contact with a patient of COVID-19.	35	28	28	63	84
I think I am capable to endure such a public health emergency with proper training.	14	28	56	63	77
I will readily take all necessary precautions (like wearing PPE) and maintain sanitation to prevent personal infection or spread of the infection.	14	14	35	56	119
I will not go for any postings in a hospital where COVID-19 patients are treated.	35	42	63	56	42
I will not go for any postings in a hospital without a clear COVID-19 infection control isolation policy.	14	14	63	63	98
I fear self-infecting or infecting family members and high risk groups during COVID-19 duty.	21	14	49	70	84
If a person known to me(neighbor/relative) gets infected with COVID-19, I will help him/her in my best ability.	14	14	35	49	126

Table 5

Response to Practice aspect for Covid-19 infection with once choice option

Question	Never	Sometimes	Often
I maintain a social distance of 1 meter at public places.	0	49	189
I wear a mask whenever I go outside.	7	14	217
I wash and/or reuse my mask.	42	56	140
I refrain from touching my face and shaking hands.	14	56	168
I regularly wash my hands with soap and water.	7	7	224
I use hand sanitizers and disinfectants more frequently.	7	21	210
I avoid unnecessary travel and public gatherings.	0	49	189
In case I am not wearing a mask, I cover my mouth or nose during a cough or sneeze with elbow/a tissue.	0	28	210
I listen and follow the direction of state and local authorities.	7	21	210
I closely monitor my personal physical health and that of other people around me.	0	21	217
I persuade people around me to follow the precautionary guidelines.	7	14	217
In order to prevent contracting COVID-19, I take vitamin supplements/herbal products/traditional medicines.	35	84	119
I always carry a hand sanitizer while going out of the house.	0	28	210

Another study was done in Jordan and one done in Vietnam on a sample of medical students to assess their knowledge, attitude and practices towards Covid-19 in six medical colleges demonstrated that the main source of knowledge for students was social media and online search engines, with less preference for medical search portals. The students had satisfactory knowledge of the route of transmission but limited response was obtained for droplet infection as the main source of transmission. The students also showed a satisfactory level of attitude and practice for the pandemic. The results of our study are quite similar as students in our study demonstrated a satisfactory level of KAP as well and their main source of information was through social media [1,15].

One more study done in India for assessing the KAP of Medical Students showed no significant relationship in terms of knowledge, attitude and practices between different age groups and religions, though this study did show a significant impact of gender on the practice score with the majority of participants possessing satisfactory knowledge, attitude and practice regarding the pandemic. The results of this study are similar to our study which showed satisfactory knowledge, attitude and practice though there was no difference in terms of gender in the participants [20]. Another study showed that undergraduate students in response to the Covid-19 outbreak had acquired the necessary knowledge, positive attitude and proactive practices but their scores significantly varied by gender, major and school type. This is different from our study as there was no difference in terms of gender, year or religion in our study [8].

Another study done in India demonstrated that 25% of students had low- to moderate-level knowledge, had a negative attitude and undesirable practices in preventing the pandemic (Covid-19) thereby suggesting approaches to enhance KAP amongst medical students. The results of our study are different from this study as our study demonstrated a satisfactory level of knowledge, attitude and practices among medical students regarding the pandemic [27].

There are a few limitations of our study, firstly is the sample size as the participation was voluntary and through online sessions, so the response after students joining back and after appropriate training might depict better scores and better participation in the KAP study. Secondly, the study only provides a snapshot of the KAP level of students, training the students regarding the pandemic could yield different results.

To conclude, the results of our study showed that the major source of information for gaining knowledge towards Covid-19 was through social media and students demonstrated a satisfactory level of knowledge, attitude and practices for the prevention of Covid-19. Though awareness campaigns and proper training can equip these students to handle the situation appropriately.

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