Original Article

Awareness and Myths Related to COVID-19 among Medical Students at a Tertiary Health Care Facility in Northern India.

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Abstract

Background & Objective: Assessing the undergraduate medical students' knowledge regarding COVID-19 to determine any gaps in their learning and any misinformation is essential. This study aimed to access the awareness regarding COVID-19 and related myths among undergraduate medical students.
Materials & Methods: A cross-sectional survey was conducted on undergraduate medical students in a tertiary healthcare teaching institute in a district of central Uttar Pradesh. Unpaired t-test and one-way ANOVA were applied to determine any differences among the mean scores of awareness and myths among gender and batch years. We used boxplots to represent the overall and section-wise correct percentages.
Results Out of the total 800 students, 494 (61.7%) participated in the study. Most of the participants were first-year MBBS students, 158 (32.0%), and were males (280, 56.7%). The average performance regarding the awareness and myth related to COVID-19 was satisfactory, with a 72.5% overall correct mean score. According to modified Bloom's cut-off, 406 (82.2%) students performed moderately, followed by 81 (16.4%) students who performed good, and seven (1.4%) performed poorly. Although the majority 489 (99.0%) knew the correct taxonomy of the virus causing COVID-19, 60.0% and 43.0% had difficulty defining the SARS-CoV-2 virus and close contacts, respectively. There was a drastic variation in response to the physical distancing criteria, with only 71 (14.4 %) answered correctly.
Conclusion: As the guidelines regarding COVID-19 are dynamic, there is a need for regular training of undergraduate medical students, focusing on infection control and prevention to keep them updated with the latest and upcoming guidelines.

Introduction

COVID-19 pandemic has taken a heavy toll on the healthcare fraternity worldwide, and despite setting up added facilities to augment the number of beds and ventilators, the limited number of healthcare workers is a limiting factor (1). To support the healthcare workers in this fight against the disease and eliminate this limiting factor, medical students can be recruited in the future when in dire need. Just as the medical students played a pivotal role by supporting the increased healthcare demands during the 1918 influenza epidemic, today's students can be trained to face the current pandemic (2).While clinical training is required to render them eligible for frontline work, basic knowledge and awareness regarding COVID-19 should be inculcated into them along with proper hygiene practices. This is important as there is a mushrooming of unreliable media sources that are responsible for spreading false and misleading information fast and in a convincing manner. As the medical students increasingly take part in volunteering in their communities' awareness programs and many of them tend to spread awareness through social media, it is essential that the information being imparted by them is correct and updated. This calls for assessing their knowledge regarding COVID-19 to determine any gaps in their learning as well as any rampant misinformation that can be addressed through proper and regular training by their respective institutions. Keeping these issues in mind, we designed this study to assess the awareness and myths regarding COVID-19 among

MBBS students enrolled in the tertiary care and teaching institute, which will help identify the gaps and address them accordingly.

Materials and Methods

Study design. A web-based cross-sectional survey was conducted at a tertiary healthcare hospital and teaching institute in a district of central Uttar Pradesh between the 1st of June to the 31st of July. The target study population was all the undergraduate medical students from the first year to the fourth (final) year and those undergoing internship (fifth year). At the time of the survey, due to restrictions imposed by the government with regards to the pandemic, all the on-campus classes were suspended, forbidding in-person surveys. Hence, we designed a web-based survey that, despite its known limitations, provides fast distribution and decreases the risk of unwanted exposure to infection.

The university had been enrolling 150 students each year, and following an increase of 50 seats, it enrolled 200 students in the batch of 2019, making a total of 800 students currently pursuing an undergraduate medical course in the university at the time of the study. A census method of sampling was employed. A list of phone numbers was generated from the Dean's office with due permission and after undertaking a vow of confidentiality.

Data collection procedure and tools. The link to the online questionnaire, along with a text message stating the purpose and objectives of the survey, was distributed to all the phone numbers registered in WhatsApp as well through text messages. To maximize the reach of the link, the class representatives of each of the batch were requested to distribute the link to all their fellow batchmates who might be using different phone numbers. A reminder text was also sent to all the numbers after five days of the initial distribution. The questionnaire comprised a total of 52 questions developed from the Centers for Disease Control (CDC), Atlanta, guidelines and the Ministry of Health and Family Welfare (MoHFW) guidelines, New Delhi (3,4) . It was divided into three sections. The first section included participants' characteristics and the other two designated as Section A and Section B. Section A consisted of subsections A1 to A4, which had multiple-choice questions with a single correct answer of awareness related to COVID-19 (4 items), knowledge about the disease epidemiology (14 items), management of COVID-19 (7 items), and prevention of COVID-19 (14 items), respectively. Section B included 13 true or false items designated to myths regarding COVID-19. The overall correct score was categorized using the modified blooms cut-off point(5).In the present study, scores of the 52 questions ranging from 80% to 100% (42-52 points) were categorized as good, moderate if the score was between 50% to 79% (27-41 points), and poor if the score was less than 50% (<26 points).The Google forms platform was utilized to prepare the survey collection tool that was pretested among five post-graduate students and five faculty members for face and content validity, clarity, and relevance. Answering all the questions formatted on the platform was made mandatory so that all of them are answered before submitting the final response.

Ethical Consideration. Approval of the study was obtained from the Institutional Ethics Committee (ID- 41/2020-21).Participation was voluntary without any coercion or deception. Apart from a text message stating the purpose and objective of the study, a piece of brief information was also included on the first page after which, the entry into the tool was taken as informed consent. Confidentially about the participants' personal information was strictly maintained.

Data Analysis. The spreadsheet subsequently obtained in Google spreadsheet upon submission of responses by the participants were extracted into Microsoft Excel version 2019 for Windows, and data refining was done. The data was subsequently coded and analyzed using SPSS V-24.0, IBM Inc. Chicago, USA software. The study tool was tested for internal consistency using Cronbach's alpha. Descriptive

analysis was used to determine the frequencies and proportion of responses. Boxplots were designed to illustrate the percentages of correct responses against the various sections. To determine differences in response scores of awareness and myths among gender and MBBS batch years, unpaired t-test and one-way ANOVA test were applied, respectively. Bonferroni's adjustment was performed to ensure the absence of any type 1 errors.

Results

We achieved a Cronbach's alpha of 0.835, and hence, the reliability of the study tool was accepted, and further analyses of the data were performed.

Characteristics of study participants.

Among the total number of 800 undergraduate students pursuing the undergraduate medical course comprising the study population, only 494 (61.75%) of the students participated and responded to the set of questions of the study (Figure 1).As presented in Figure 2, the majority of participants were first-year students as they made up 32% of the total population, followed by the fourth year (22.7%), and the least participation (8.5%) was seen from the fifth years or the interns. The average age of the respondents was 21.76 ±1.96 years. The majority of the participants were males (280, 56.7%).

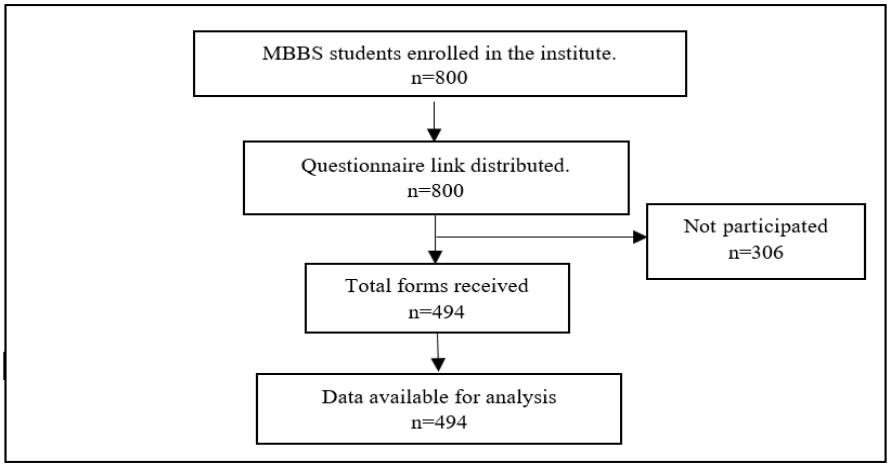

Figure 1: Study protocol

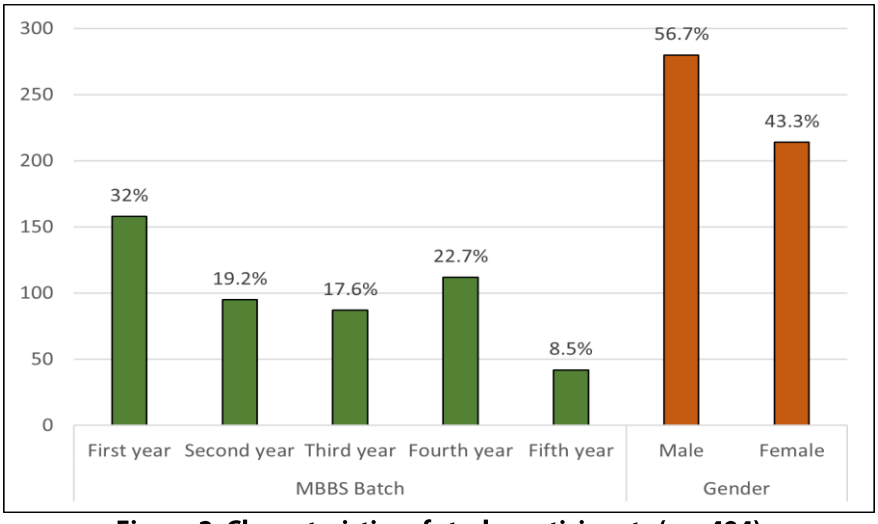

Figure 2: Characteristics of study participants (n = 494)

Participants' knowledge regarding the SARS-CoV-2 virus

The overall performance (Section A and B) was good, with a mean percentage overall correct score of 72.5%. While the majority 489 (99.0%) of students correctly knew the name of the virus causing COVID-19, only 199 (40.3%) and 280 (56.7%) of them got the nomenclature of SARS-CoV-2 and COVID-19 correct, respectively (Table 1).

Participants' knowledge regarding disease epidemiology

Most of them, i.e., 492 (99.6%), were aware of the transmission routes of the virus. The incubation period of the illness was incorrectly answered by 258 (52.2%) of the participants. The definition of 'close contact' appeared to be clear to only 287(58.1%) students. The number of students who believed that COVID-19 is fatal in every case found positive was 132 (2.7%). Other aspects of epidemiology were correctly answered by most of the students. (Table 1)

Participants' knowledge regarding disease management.

While 470 (95.1%) of the students were aware that medicines like hydroxychloroquine and remdesivir should not be taken without medical advice, 296 (59.9%) of them responded that consuming NSAIDs like Naproxen and Ibuprofen can lead to more severe disease. Very few students (37.9%) possessed the knowledge regarding infection control measures upon arrival of a suspected COVID-19 patient in a health center. (Table 1)

Participants' knowledge regarding disease prevention.

Surprisingly only 71 (14.4%) of the students correctly answered the minimum recommended distance to be maintained from another person during social distancing (Table 1)(6).This is evident as an outlier in the boxplot (Figure no.3, item 26). Although the responses to other preventive measures were good as the majority were aware of proper hand hygiene (95.7%) and disinfection (96.6%), they lacked awareness in terms of proper biomedical waste (41.5%) and dead body management (67.4).

Table 1: Participants' knowledge about COVID-19 (n= 494)

Items	Correct N (%)	Incorrect N (%)
Knowledge about the SARS-CoV-2 virus		
Virus causing COVID-19	489 (99.0%)	5(1.0%)
Correct nomenclature of the Virus causing COVID-19	199(40.3%)	295(59.7%)
Type of virus	466(94.3%)	28(5.7%)
Subfamily of SARS-CoV-2 virus	492(99.6%)	2(0.4%)
Knowledge about disease epidemiology		
Full form of COVID-19	280(56.7%)	214(43.3%)
Incubation period	236(47.8%)	258(52.2%)
First reported from	494(100%)	0(0.0%)
The main mode of transmission	355(71.9%)	139(28.1%)
Groups with the highest risk of severe illness	465(94.1%)	29(5.9%)
Underlying chronic disease as high risk	474(96%)	20(4.0%)
Major body system affected	491(99.4%)	3(0.6%)
Most common symptoms	476(96.4%)	18(3.6%)
Symptom triad	425(86%)	69(14.0%)

Continue of Table 1: Participants' knowledge about COVID-19 (n= 494)		
Danger signs and symptoms	317(64.2%)	177(35.8%)
Indications for testing	443(89.7%)	51(10.3%)
Definition of close contacts	287(58.1%)	207(41.9%)
Mortality rate of COVID-19	370(74.9%)	124(25.1%)
Whether fatal in each positive case	362(73.3%)	132(26.7%)
Knowledge about the management of COVID-19		
Antibiotics indication in COVID-19	354(71.7%)	140(28.3%)
Whether antibiotics are the first-line treatment	290(58.7%)	204(41.3%)
Whether the use of Naproxen and Ibuprofen lead to more severe infection	198(40.1%)	296(59.9%)
Whether drugs like Hydroxychloroquine, Remdesivir, be taken without any medical advice	470(95.1%)	24(4.9%)
Room standards for isolation of positive cases	433(87.7%)	61(12.3%)
Infection control measures when dealing with positive case	187(37.9%)	307(62.1%)
Availability of specific treatment	453(91.7%)	41(8.3%)
Knowledge about prevention of COVID-19		
Physical distancing distance criteria	71(14.4%)	423(85.6%)
Use of UV lamps for disinfection advisable?	297(60.1%)	197(39.9%)
Time to properly wash hands	473(95.7%)	21(4.3%)
Whether habits such as smoking, wearing multiple masks, and consuming alcohol aid in the prevention	292(59.1%)	202(40.9%)
Methods of disinfection	477(96.6%)	17(3.4%)
Available vaccine for protection against COVID-19	465(94.1%)	29(5.9%)
The rationale behind the non-recommendation of use of gloves in the community	417(84.4%)	77(15.6%)
A most effective method of preventing transmission in the health care settings	351(71.1%)	143(28.9%)
Whether aerosol-generating procedures are a part of the infection, prevention, and control.	208(42.1%)	286(57.9%)
Disinfection of soiled linen	316(64%)	178(36.0%)
Gloves disposal	205(41.5%)	289(58.5%)
Safe methods for disposal of dead bodies	184(37.2%)	310(62.8%)
Whether embalming recommended	333(67.4%)	161(32.6%)
Whether autopsies be performed	368(74.5%)	126(25.5%)

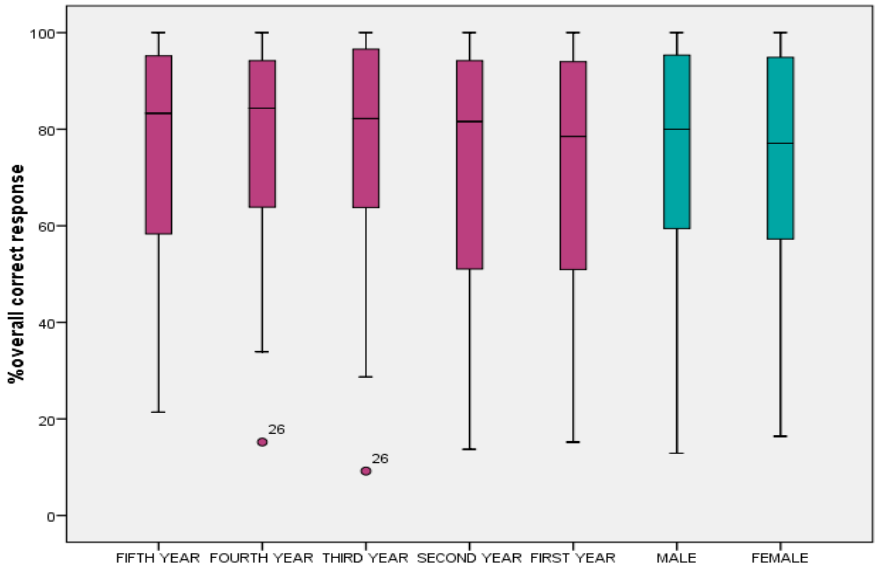

Figure 3: Percentage overall (Section A and B) correct responses for different MBBS batches and Gender

Myths regarding COVID-19.

The notion that the immunity of the Indians is better than that of the Westerners and hence Indians will have greater chances at survival was believed to be true by 290 (58.7%) students, of which the majority was from the fifth year MBBS students or the interns as shown as outlier 3 (Figure 4). Almost half of the study participants (41.5%) also believed that adding garlic, honey, and pepper to food to cure COVID-19. Other questions in the Myth section were correctly responded to by a significant number of the students (Table 2).

Table 2: Participants' perceptions regarding myths related to COVID-19 (n= 494)

Items	Correct	Incorrect
Myths regarding COVID-19		
If you are young and healthy, you do not need to follow precautionary steps or physical distancing.	476 (96.4)	18 (3.6)
Religious chants can kill the virus.	474 (96)	20 (4)
The Indian immune system is better than the west and thus Indians will survive COVID-19 infection better.	204 (41.3)	290 (58.7)
The government institutions capable of combating the pandemic of the corona virus.	203 (41.1)	291 (58.9)
Clapping hands creates vibrations that destroy the coronavirus.	472 (95.5)	22 (4.5)
Curfews like the "Janta curfew" implemented on 22nd March in India are enough to kill most viruses.	434 (87.9)	60 (12.1)
Garlic, honey, and adding more black pepper to food, helps in curing the disease.	289 (58.5)	205 (41.5)
People cannot completely recover from the disease after getting affected by COVID-19.	420 (85)	74 (15)
Drinking excessive alcohol protects a person against COVID-19 and is not dangerous.	473 (95.7)	21 (4.3)
Exposing yourself to sun or temperature higher than 25 degrees Celsius prevents COVID-19.	401 (81.2)	93 (18.8)
Regularly rinsing your nose with saline help prevent with new coronavirus.	294 (59.5)	200 (40.5)
Eating well-cooked meat leads to the transmission of coronavirus.	441 (89.3)	53 (10.7)
Hand hygiene a useful measure to prevent cross-infection of coronavirus.	461 (93.3)	33 (6.7)

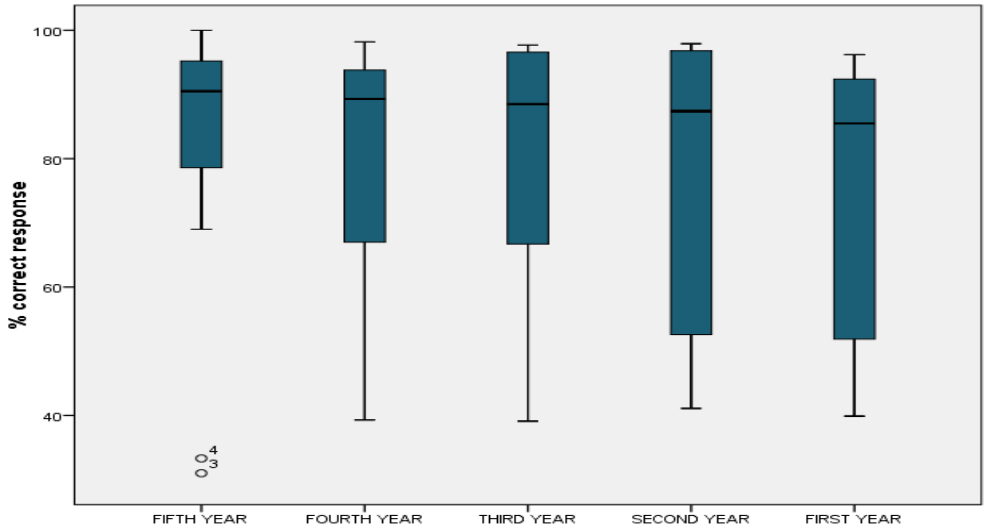

Figure 4: Percentage correct responses for Myths regarding different MBBS batches and Gender

Overall performance

According to modified Bloom's cut-off scores, 406 (82.2%) students performed moderately, followed by 81 (16.4%) students who performed good, and 7 (1.4%) performed poorly (Table 3). The mean ± SD of responses on Awareness about COVID-19was 26.82 ± 3.90 and 26.69 ± 3.92 in males and females, respectively, with a P-value of 0.933 (tables 4 and 5).For the same set of responses, the P-value among MBBS batches was calculated to be 0.093.

Table 3: Overall (Section A and Section B) performance according to Bloom's cut off score

Performance	Frequency (%)
Good	81(16.4%)
Moderate	406 (82.2%)
Poor	7(1.4%)

Table 4: Comparison of Mean ± SD of correct responses on Awareness about COVID-19 with Gender and MBBS batch academic years

Variable		Mean ± SD of correct responses on Awareness about COVID-19 (N=39)	P-value
Gender	Male	26.82 ± 3.90	0.933*
	Female	26.69 ± 3.92	
MBBS Batch Academic year	Fifth	28.05 ± 3.69	0.0932
	Fourth	26.35 ± 3.95	
	Third	27.08 ± 3.37	
	Second	26.26 ± 4.49	
	First	26.84 ± 3.77	

* Unpaired t-test applied

2 One way ANOVA applied

Table 5: Mean ± SD of correct responses on Myths about COVID-19 with Gender and MBBS batch academic years.

Variable		Mean ± SD of correct responses on Myths about COVID-19 (N=13)	p-value
Gender	Male	10.29 ± 1.95	0.656§
	Female	10.10 ± 2.26	
MBBS Batch Academic year	Fifth	10.50 ± 1.59	0.740¥
	Fourth	10.50 ± 2.08	
	Third	10.37 ± 1.72	
	Second	10.20 ± 1.99	
	First	10.21 ± 2.09	

§ Unpaired t-test applied
¥One-way ANOVA applied

Discussion:

Acquiring proper and the correct knowledge about any disease as infective as COVID-19, as a health care worker, is of utmost importance to be able to impart effective treatment and successfully prevent the transmission from one. As the current pandemic continues to demand a huge medical workforce, there might be a time when the young medical students in training are required to be called upon for help(7,8). Although even before such a situation arises, the medical students, among all the other healthcare workers, need to incorporate the knowledge into their day-to-day life and guide others in adopting preventive measures. The knowledge and preventive measures will be required, especially when they return to their respective colleges to continue medical education after the lockdown has been lifted. This will ensure adopting proper preventive measures such as proper hand hygiene, maintaining social distancing, acute awareness about signs and symptoms, and confidence in debunking myths related to COVID-19. The overall (Section A and Section B) mean correct response in this study was found to be almost similar (72.4%) to the study conducted by Pranav D Modi et al. among healthcare students and professionals (71.2%).9

The majority of the students in this study were well aware of the transmission routes of the virus (99.65). In contrast to this, studies conducted by Kushalkumar H. Gohel et al. and Bhargavathula AS et al.reported only 53.7% and 39% of participants knew about the modes of transmission.(10,11)In this study, 52.2% of the students incorrectly answered the incubation period of COVID-19 whereas, 85.4% of medical students correctly answered the incubation period in a study done in Iran (12). The study participants in the present study also fared poorly in defining 'close contact' correctly (58.1%). This may be the result of partial information being imparted through unreliable media sources. The mushrooming of irresponsible media nowadays has led to people developing misconceptions. Even healthcare workers are vulnerable to such misinformation and hence start cultivating and spreading myths and gossips. Thus, it is recommended to update oneself from reliable sources such as WHO (Geneva), CDC (Atlanta), and MoHFW (New Delhi), etc.

The participants lacked the infection, prevention, and control aspects as only 187 (37.9%) possessed the knowledge regarding isolation room criteria recommended for the isolation of patients with confirmed COVID-19 and those under investigations for COVID-19(13). These are being updated regularly but not currently included in their academic syllabus. It has been reported that 99% of cases are of mild disease with a recovery rate of 95%(14).However, 362

(73.3%) of students in this study believed that COVID-19 is fatal in every case that is found positive. This is a significantly colossal misconception discovered in this study. Proper hand hygiene can be achieved by simple concepts of limiting touch and regularly washing soiled hands with soap and water and, if not soiled, using an alcohol-based hand sanitizer. It is one of the standard precautions to be undertaken to prevent the spread of disease(15).It is essential to know the duration and the step of hand washing. The students were aware of hand hygiene techniques and the associated hygienic practices, including disinfection, as the majority of them gave correct responses.

WHO recommends maintaining a minimum of 1 meter (3 feet) among people to prevent breathing in or contact with droplets containing the coronavirus when someone coughs, sneezes, or speaks, which crucial in preventing transmission of the virus when in public places.6 This information seemed to be a cause of confusion among the study participants as only a few were aware of the minimum distance to be kept from others. Proper management of biomedical waste is a crucial intervention in preventing COVID-19(16). Every healthcare worker must know the correct and appropriate disposal of biomedical waste as well the management of them, the knowledge of which was found significantly lacking among the study participants. More than half of the study participants in the present study did not know in which colored bin the gloves will be disposed of. This indicates a lack of training in this aspect.

Before the pandemic spread to India, many believed that the virus would not be as infective as it in other countries of stronger immunity of the residents(17).This misconception was also found in this study, as about half of the participants believed the same. Myths such as religious chants, banging utensils, clapping hands, and lighting lamps can drive out the coronavirus came forth. These do not have any scientific evidence and hence should not be encouraged as it can lead to low acceptance of other effective preventive measures. More than half of the study participants in the present study responded positively to questions on myths.

On comparing the mean scores in the present study among the gender and MBBS batches, it was found that the P-values are >0.005, which signifies that awareness, knowledge, and myths about COVID-19 are not influenced by gender and the years of medical training. This result was obtained since the overall performance was similar among both gender and MBBS batches. This leads us to speculate that the training need not be focused on one group but rather the whole population of undergraduate students.

The present study provides new insight into the lacunae in awareness and knowledge in certain aspects of COVID-19. The data contributes a more precise understanding of the need for special training at regular intervals of medical students regarding awareness, management, and prevention of COVID-19. This is backed by a similar study conducted in Saudi Arabia, which recommended conducting seminars/symposiums at regular intervals in medical colleges(18).This study, being web-based, is self-reported and hence may be subjected to recall bias. Another drawback is that due to the small sample size, the generalizability of the result may be low. There is a possibility for the respondents to check the answers from the internet/other sources leading to an information bias. The overall performance of the 494 medical students was good. However, there is a significant lacuna in certain aspects of awareness, management, and, more importantly, prevention of COVID-19 among them. This calls for a need to implement regular training programs and academic activities. It will help students keep in touch with updates and remain aware of the correct knowledge regarding the current pandemic, as well as become trained if the future requires them to fight COVID-19 as frontline workers.

Conflicts of Interest: The authors declare that there are no conflicts of interest.

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