



Research Article

**AWARENESS AND ATTITUDE OF UNDERGRADUATE INDIAN MEDICAL STUDENTS TOWARDS
2019-NOVEL CORONA VIRUS PANDEMIC: A STUDY IN TERTIARY CARE
CENTRE IN HARYANA**

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ABSTRACT

Due to the on-going coronavirus pandemic, it has become imperative for all of us to have adequate knowledge regarding the same. The objectives of this study were to assess the knowledge of COVID-19 disease and attitude towards it among undergraduate medical students in a tertiary care centre in the Indian state of Haryana. The survey was prepared in the form of an online form and was sent to 900 potential responders who included students of MBBS and BDS studying in the institute. The period of survey was October to November, 2020 i.e. 2 months and a total of 453 responders completed the survey with a response rate of 50.3%. Distribution of responses was presented as frequency and percentages. Data were tabulated in excel and descriptive statistics were performed using SPSS software version 17.

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INTRODUCTION

The COVID-19 pandemic is a matter of immense public concern; it being a significant cause of morbidity and mortality. It is therefore imposing a great burden on global healthcare.

World Health Organization (WHO) provisionally named this virus as 2019 novel coronavirus (2019-nCoV) on January 12, 2020. The disease caused by this virus was termed as Coronavirus Diseases of 2019 (COVID-19) on Feb 11, 2020 and the virus was renamed as Severe Acute Respiratory Syndrome 2 Coronavirus (SARS-2 coronavirus).¹

As of today (24th Jan, 2021) a total of 10.7 million cases and 153000 deaths have been reported in India. Out of these, Haryana accounts for 267000 cases and 3009 deaths.²

Coronaviruses are enveloped RNA viruses which differ from other enveloped viruses in its replicative cycle by the fact that its envelope is derived from the endoplasmic reticulum of the host cell not from the plasma membrane. This may add to its pathogenicity.³

Most medical students are directly or indirectly exposed to it. The highly contagious SARS-CoV-2 virus poses an additional hazard for the healthcare system of the burden of extended work hours, physical and psychological stress, burnout and fatigue.

The objectives of this study were to assess the knowledge of COVID-19 disease and attitude towards it among

undergraduate medical students in a tertiary care centre in the Indian state of Haryana.

METHODS

This survey was conducted at a tertiary-care hospital and teaching institute in Haryana. The survey was prepared in the form of an online form and was sent to 900 potential responders who included students of MBBS and BDS studying in the institute. The period of survey was October to November, 2020 i.e. 2 months and a total of 453 responders completed the survey with a response rate of 50.3%.

Inclusion criteria: All MBBS and BDS students who gave consent to participate in the study were included.

Exclusion criteria: The MBBS and BDS students who did not give consent and those students who did not completely fill the questionnaire were excluded from the study.

The questionnaire was designed by faculty from Pathology department of the institute. This self-administered questionnaire consisted of 5 socio-demographic questions and 36 questions based on knowledge, infection control practices, PPE kit donning and doffing and hand hygiene related to COVID-19 disease in the healthcare setting. This study was approved by the institutional ethics committee and consent was obtained from all participants.

Convenient sampling method was used for data collection and the distribution of responses was presented as frequency and percentages.

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Table 1 Distribution of Responses

		Group			
		BDS		MBBS	
		Count	Column N %	Count	Column N %
1. Which year of MBBS/BDS you belong to? (e.g. Mention 1st year MBBS or 1st BDS)	Final Year	12	25.0%	63	15.6%
	First Year	24	50.0%	75	18.5%
	Second Year	6	12.5%	201	49.6%
	Third Year	6	12.5%	66	16.3%
6. What is COVID-19?	Beta corona virus genus	3	6.2%	3	0.7%
	Corona virus disease 2019	24	50.0%	276	68.1%
	No response	3	6.2%	3	0.7%
	SARS-CoV	18	37.5%	123	30.4%
7. Corona virus is an enveloped positive sense single stranded RNA virus	No	3	6.2%	12	3.0%
	No response	12	25.0%	24	5.9%
	Yes	33	68.8%	369	91.1%
8. What was the previous name of SARS-CoV-2 virus causing COVID-19?	2019-nCoV	12	25.0%	213	52.6%
	It was the original name	24	50.0%	150	37.0%
	No response	12	25.0%	42	10.4%
	ACE-2 on ciliated branches epithelial cells	12	26.7%	192	48.1%
9. In the case of SARS-CoV & SARS-CoV-2, receptor for virus is:	Both A & B	12	26.7%	147	36.8%
	DPP 4- CD 26 on non-ciliated respiratory epithelial cells	6	13.3%	15	3.8%
	No response	15	33.3%	45	11.3%
Can virus be inactivated by formalin & gamma radiation?	No	18	40.0%	66	16.4%
	No response	3	6.7%	84	20.9%
	Yes	24	53.3%	252	62.7%
11. Your knowledge about COVID-19 was obtained from:	Family & Friends	3	6.2%	60	14.8%
	Health care workers	3	6.2%	60	14.8%
	Research articles	21	43.8%	120	29.6%
	Social media	21	43.8%	165	40.7%
12. What is the incubation period of COVID-19 disease???	1-14 days	48	100.0%	396	97.8%
	3-5 days	0	0.0%	6	1.5%
	8-9 days	0	0.0%	3	0.7%
	Bats	48	100.0%	393	98.5%
13. Which was the first animal known to spread infection:??	Cats	0	0.0%	3	0.8%
	Pigs	0	0.0%	3	0.8%
	Respiratory system	48	100.0%	405	100.0%
14. COVID-19 affects which organ of body predominantly?	No	6	12.5%	99	24.4%
	Yes	42	87.5%	306	75.6%
15. Is the use of face mask/respirator essential for people who are fit and not in any contact with suspected or infected person???	All of the above	48	100.0%	405	100.0%
16. How to prevent COVID-19???	Wuhan, China	48	100.0%	405	100.0%
17. Where was the initial breakout of corona virus?	None	0	0.0%	3	0.7%
	Permissible protective exposure	0	0.0%	3	0.7%
	Personal protective equipment	48	100.0%	399	98.5%
18. What is PPE?	All of the above	48	100.0%	402	99.3%
	Chronic diseases like Diabetes mellitus, Hypertension, Asthma, Lung cancer	0	0.0%	3	0.7%
	2 meters or 6 feet of a positive patient	12	25.0%	231	57.0%
	3 meters or 10 feet of a positive patient	3	6.2%	21	5.2%
19. Which are the high risk groups associated with Corona virus???	Direct contact with infectious secretions	33	68.8%	150	37.0%
	No response	0	0.0%	3	0.7%
	No response	0	0.0%	9	2.2%
	Time is insignificant	0	0.0%	9	2.2%
20. Definition of close contact is:??	Washing hands with soap and water for at least 15 seconds	0	0.0%	60	14.8%
	Washing hands with soap and water for at least 20 seconds	42	100.0%	327	80.7%
	All of the above	48	100.0%	393	97.8%
21. Hand hygiene is: ??	N95 Mask	0	0.0%	9	2.2%
	No	45	93.8%	381	94.1%
22. What PPE must be worn by health professionals while in contact with asymptomatic but exposed COVID 19 person?	No response	0	0.0%	15	3.7%
	Yes	3	6.2%	9	2.2%
	No	36	75.0%	180	44.4%
23. Is there a specific vaccination or treatment available at present???	No response	0	0.0%	27	6.7%
	Yes	12	25.0%	198	48.9%
	No	33	68.8%	222	54.8%
24. Do you know about Donning and Doffing of PPE kits:	No response	0	0.0%	15	3.7%
	Yes	15	31.2%	168	41.5%
	No	0	0.0%	15	3.7%
25. Do you know about the proper CDC sequence of donning of face mask???	No response	0	0.0%	6	1.5%
	Yes	48	100.0%	381	94.8%
	No	0	0.0%	15	3.7%
26. Can corona virus spread from asymptomatic COVID 19 positive person?	All of the above	30	62.5%	276	68.1%
	ARDS and Pneumonia	18	37.5%	129	31.9%

28. Are you willing to participate in treatment or care of COVID-19 patients???	No	6	12.5%	57	14.4%
	No response	12	25.0%	99	25.0%
	Yes	30	62.5%	240	60.6%
29. Do you agree that health care workers should take hydroxychloroquine to prevent COVID-19 infections?	No	12	25.0%	171	42.2%
	No response	9	18.8%	72	17.8%
	Yes	27	56.2%	162	40.0%
30. SARS-CoV preferentially infects:	Alveolar Type I cells	0	0.0%	57	14.1%
	Alveolar Type II cells	24	50.0%	249	61.5%
	Both equally	9	18.8%	39	9.6%
	No response	15	31.2%	60	14.8%
31. Which of the following summarizes the hematological manifestations of COVID??	Lymphocytosis, Leukocytopenia, neutropenia, thrombocytosis	15	31.2%	105	26.1%
	Lymphopenia, leukocytosis, neutrophilia, thrombocytopenia	6	12.5%	204	50.7%
	No response	27	56.2%	93	23.1%
32. What is the predictor of subsequent clinical course in COVID-19??	Both a and c	33	68.8%	339	85.0%
	Cytokines	12	25.0%	48	12.0%
	D-dimer, fibrinogen, PT levels	3	6.2%	12	3.0%
	Diffuse alveolar damage with fibrin rich hyaline membranes and few giant cells	21	43.8%	303	74.8%
33. Pathological result of COVID-19 is:	Granulation tissue formation	0	0.0%	6	1.5%
	Marked inflammatory response only	6	12.5%	36	8.9%
	No response	21	43.8%	60	14.8%
34. Viral particles are seen in double membrane vesicles in the type II alveolar cells and along the apical microvilli	False	0	0.0%	18	4.5%
	FALSE	0	0.0%	6	1.5%
	No response	21	43.8%	96	24.1%
	True	0	0.0%	240	60.2%
	TRUE	27	56.2%	39	9.8%
35. Alternate entry for viral receptor is through receptor??	CD209L	6	12.5%	105	25.9%
	CD5	24	50.0%	102	25.2%
	No alternate entry	3	6.2%	30	7.4%
36. If one member in your family has symptoms of COVID-19, you will manage at home and keep it private or inform authorities??	No response	15	31.2%	168	41.5%
	Inform the authorities	42	87.5%	363	89.6%
	Keep it a secret	0	0.0%	18	4.4%
	Not sure	6	12.5%	24	5.9%
37. If you test positive for corona virus, you will:??	Be extremely stressed about it and avoid i	0	0.0%	6	1.5%
	Continue with your normal routine	0	0.0%	6	1.5%
	Go for isolation to avoid further spread	48	100.0%	372	91.9%
	No response	0	0.0%	3	0.7%
	Simply avoid isolation and will not stress	0	0.0%	18	4.4%
	a and c both	27	56.2%	270	66.7%
38. If your neighbor tests positive for COVID-19, you will:	Change your behavior towards them by avoiding them completely	0	0.0%	3	0.7%
	Contact the local authorities for proper measures	9	18.8%	33	8.1%
	Help your neighbors by pacifying them, giving them the right approach as a health care professional and catering to basic needs with adequate precautions	12	25.0%	99	24.4%
	Both Nasopharyngeal or Oropharyngeal swab	33	68.8%	231	58.3%
39. How is screening/ Diagnosing COVID-19 infection done???	Either Nasopharyngeal/ Oropharyngeal swab	12	25.0%	156	39.4%
	No response	3	6.2%	6	1.5%
	None is effective	0	0.0%	3	0.8%
	1 and 2	0	0.0%	3	0.8%
40. What are the investigations done for COVID-19 infection?? (1) RT-PCR 2) Coagulation screening 3) Serum- C-reactive protein 4) Serum- erythrocyte sedimentation rate 5) Serum IL-6 level	1 and 5	12	28.6%	93	24.0%
	1,2,3 only	3	7.1%	75	19.4%
	1 and 2	3	7.1%	27	7.0%
	2 and 5	0	0.0%	3	0.8%
	3 and 5	0	0.0%	3	0.8%
	All of the above	24	57.1%	183	47.3%
41. Are treatment options like O2 therapy, intravenous fluids, corticosteroids, broad spectrum antibiotics and antivirals applicable for COVID-19???	No	9	20.0%	51	12.6%
	No response	12	26.7%	48	11.9%
	Yes	24	53.3%	306	75.6%

Subgroups were classified on the basis of gender, age (17-19 years, 20-22 years, and 23-25 years), undergraduate course (MBBS or BDS) and year of professional training. Data were tabulated in excel and descriptive statistics were performed using SPSS software version 17.

RESULTS

A total of 453 medical undergraduate students from a tertiary care centre in Haryana responded to the survey. Among these, 405 were MBBS while 48 were BDS students.

The majority of the responders from both fields were from the age group of 20-22 years (60.3%), 53% (n=240) of the total responders were females.

Around 66.2% (n=300) of the responders were aware that COVID-19 was the acronym for corona virus disease 2019. However, 49.7% responded correctly to the fact that it was the earlier name of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Approximately 91% of the MBBS students and 69% of BDS students were aware that Corona virus was an enveloped positive sense single stranded RNA virus⁴. Angiotensin Converting Enzyme 2 (ACE-2) receptors of the epithelial cells in the respiratory mucosa are the receptors for

SARS-CoV2 viral entry⁵ which was answered correctly by 45.9% of the subjects. Approximately 61.7% respondents answered correctly to the question that virus can be inactivated by formalin and gamma radiation.

Only 13.9% of the subjects had obtained their knowledge of COVID-19 from health care workers and the same percentage from family and friends. The major source of COVID related information for the students was found to be social media (41.1%, n=186) while research articles accounted for the major source of knowledge for 31.1% of the students. (FIG 1)

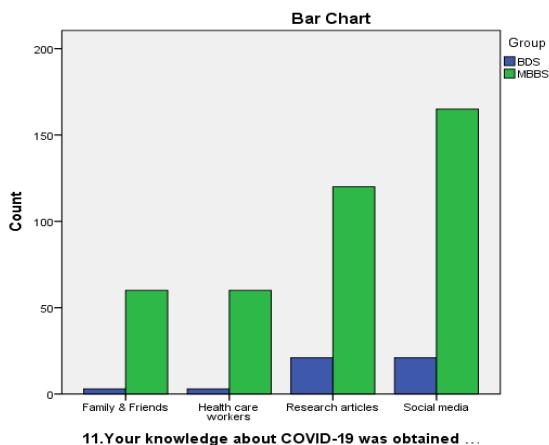


Figure 1 Sources of COVID related information

The incubation period of COVID 19 disease is 1-14 days which was answered correctly by 98% of the students. When asked whether the use of face mask was essential for people who were fit and not in any contact with suspected or infected persons, 76.8%(n=348) replied in positive while 23.2%(n=105) replied in negative. On asking about the prevention of COVID- 19, all students were aware about social distancing, repeated hand washing and wearing of masks. Ninety four percent of the total respondents were able to correctly define “close contact”, while 82.6% (n=369) were aware of hand hygiene. Interestingly, 100% of the BDS students were aware of the method of hand hygiene (Fig 2). 98% of the students were aware of as tow hat PPE must be worn by health professionals while in contact with exposed COVID 19 persons. However, only 46.4% were aware of the donning and doffing procedure of PPE kits, while 47.7% were not. 6% students gave no response. (Fig 3). Only 40.4% were aware of proper CDC sequence of donning of face mask.

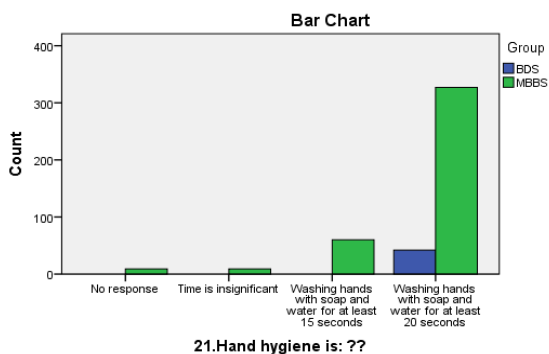


Figure 2 Knowledge regarding Hand Hygiene

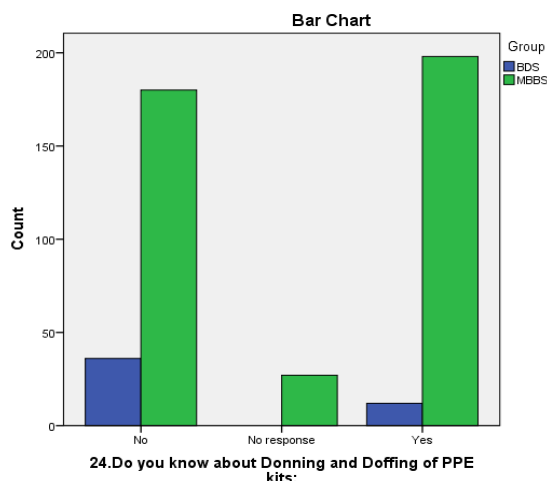


Figure 3 Knowledge of PPE kit usage

As far as the willingness of the students to participate in the treatment or care of COVID-19 patients goes, only 60.8% were willing to do so while 25% gave no response. Surprisingly, this percentage was higher among the BDS students as compared to the MBBS students. (FIG 4)

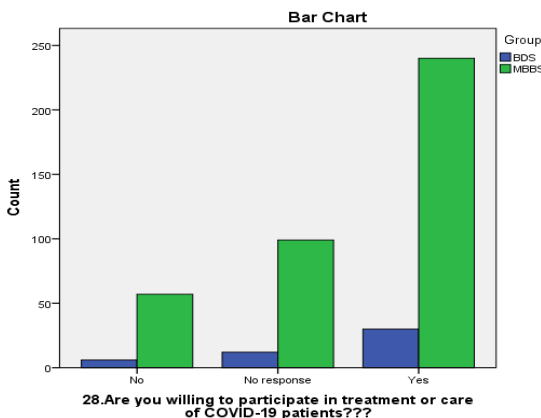


Figure 4 Attitude towards participation in COVID care

SARS-CoV preferentially infects type II alveolar cells⁶, which was answered correctly by 60.3% of the students. A wide spectrum of hematological manifestations are observed in COVID-19 cases, however lymphopenia, leukocytosis, neutrophilia and thrombocytopenia which have been documented to be more specific⁷ were correctly answered by only 46.7% of the students, while 26.7% gave no response. Around 89.4% of the students responded that they would inform the authorities if anyone in their family would be symptomatic while 4% responded that they would keep it a secret. However, 92.7% agreed that they would go for isolation to avoid further spread in case they test positive as against 4% who said they would avoid isolation. Six students (1.3%) responded that they would be stressed about it.

In case their neighbours test positive, 65.6% of the students responded that they would contact the local authorities for proper measures and also help their neighbours by pacifying them, giving them the right approach as a health care professional and cater to basic needs with adequate precautions.

Only 59.5% of the students responded correctly regarding diagnosis of COVID-19 while 48.3% (n=207) were aware of other investigations done for the same. As far as the treatment

is concerned, 73.3% (n= 330) were aware of the treatment options available for COVID-19.

The highest numbers of correct responses regarding COVID related knowledge were from the MBBS student sub-group. Most of the responders were able to correctly answer questions related to COVID-19 exposure that required medical attention.

DISCUSSION

Due to the on-going coronavirus pandemic, it has become imperative for all of us to have adequate knowledge regarding the same. MBBS and BDS students might be the lowest in the food chain of doctors but of utmost importance.

In our study, we found that more than half the percentage of students relied on social media and research articles as a source of information. This was in concordance with previously done studies on a previous strain of coronavirus (MERS-CoV) ⁸. However, one should be cautious while relying on social media alone as the source since it also spreads false information, which can have detrimental effects. This puts an increased liability on health care authorities to enhance the availability and approachability of required authentic information by using varied and effective means of communication. Medical students participated in our study, who usually have access to research papers to enhance their understanding. Careful evaluation of COVID related awareness material should be done by medical students, professionals and other healthcare workers so that they can educate the society and also apply it to their day to day routine as well. Also, greater endorsement is needed for health care workers especially and all medical students generally to refer to the authentic sources for awareness and knowledge about coronavirus.

Majority of respondents were aware of incubation period. This shows a better awareness level of medical students about coronavirus than that showed for other strains of coronaviruses in previously conducted surveys.⁹

The identification and isolation of a suspected case is the most important step in curbing the spread of COVID-19. In our study, 94% of the responders were aware of "close contact" definition. According to the United States Centres for Disease Control and Prevention (CDC), a "close contact" is defined as: "being within approximately 6 feet (2 meters) of a COVID-19 case for a prolonged period of time or having direct contact with infectious secretions of a COVID-19 case".¹⁰

Correct hand hygiene practices are important to prevent the spread of COVID 19 infection. The CDC recommends alcohol based hand rub (ABHR) in most situations. However, the question in our survey was focussed on the recommended hand hygiene technique viz. h and washing with soap and water for at least 20 seconds with the whole process lasting for up to 40-60 seconds.¹¹

Awareness of the use of personal protective equipment (PPE) for COVID-19 cases was high among both groups of students. The CDC has provided recommendations for use of PPE in healthcare settings. One should be aware of the required PPE and also should know the correct sequence of "donning and doffing" of PPE. Our questionnaire also enquired regarding sequence of donning a face mask, which is as follows: securing ties or elastic bands at the middle of head and neck,

fitting the flexible band to the nose bridge, fit snug to face and below the chin, fit-check respirator.¹²

In our study, more than 75% of the respondents were of the opinion that the use of a facemask/respirator is essential for people who are well and not in contact with a suspected or infected COVID-19 patient. This was in striking contrast to other study conducted.¹³

Around half of the students were well aware of the investigation protocols followed for the workup of COVID patients including RT-PCR, Coagulation screening, Serum C-reactive protein, erythrocyte sedimentation rate and Serum IL-6 levels.⁷ Apart from these, chest X-Ray and CT scan are also recommended as per the case scenario. As of now, the treatment protocols are dynamic and the healthcare professionals need to be well updated with their knowledge and the government norms.

As anticipated, discipline and year of study was appreciably linked with higher levels of information. Students belonging to MBBS and having a higher year of study showed higher level of knowledge and awareness. Thus, educational programs should be intended to target the population with established lower level of awareness, i.e. in our study this turns out to be dental and MBBS students who were in their initial year of study.

To the best of our knowledge, this is one of the very few studies that evaluate the awareness and attitude of COVID-19 among Indian healthcare undergraduate students with comparison between MBBS and BDS students.

As the pandemic is progressing and peaks of new cases may be expected after the current decline too, the Indian health ministry has given a proposal to permit medical undergraduates to treat COVID-19 patients, albeit provisionally.¹⁴ Most of the respondents in our study had a generally encouraging outlook towards participation in treatment and care of COVID positive patients.

Although we are beginning to understand seasonal variations, antigenic shift and other processes which underlie the evolutionary dynamics of these viruses, the timing and nature of their emergence is always sudden. The need of the hour, thus, is to prepare medical students from the initial years to make them aware about the pandemic and also to train them to embrace the situation in the scenario of shortage of healthcare professionals. Hence, we included undergraduate medical students in our study.

Limitations of the study: The study was done in a single medical institute in Haryana, India, thus the results shown here may not be applicable to other areas of the country. Conduction of extensive studies from other regions is important to investigate awareness and attitude of students at the national level.

CONCLUSION

The undergraduate medical students in a tertiary care centre of Haryana showed a satisfactory level of awareness and positive attitudes towards coronavirus pandemic with an obvious difference in awareness level between the students in different years of professional training. Better educational efforts with effective techniques are pointed to further increase the level of awareness and to suffice for the shortcomings.

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