

Awareness of COVID-19 amongst undergraduate dental students in India – A questionnaire based cross-sectional study

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Abstract

Background Coronavirus disease caused by SARS-COV2, a potentially fatal disease has become a global public health concern. As the understanding of this novel disease is evolving, dental students and professionals should have an in-depth knowledge and understanding and should be updated with the practices that have to be adapted to identify a possible COVID-19 infection.

Aim and Objectives To assess awareness about COVID-19 amongst undergraduate dental students.

Material and methods A 28-item self-administered close ended questionnaire assessing awareness about COVID-19 was shared through online portal. Statistical analysis was performed at 95% confidence intervals with p value <0.05; statistically significant. **Results** The maximum number of students were in the average knowledge category (48.9%), followed by good knowledge (47.5%) Our results show that the overall mean knowledge score of all the undergraduate students was 12.67 (+ 2.98), which comes under the category “Good”. The practice domain states that most of the students were first informed of the disease through media.

Conclusion The undergraduate dental students in different colleges in India are well aware of the different clinical aspects of the disease. More emphasis should be put on updating their knowledge regarding the diagnosis and treatment component of the COVID-19 disease.

Introduction

Coronavirus or SARS CoV2 is one of the major pathogens that primarily targets the human respiratory system. There have been previous outbreaks of coronaviruses (CoVs) which include; the severe acute respiratory syndrome (SARS)-CoV and the Middle East respiratory syndrome (MERS)-CoV which have also been characterized as great public health threat.^[1]

In late December 2019, a cluster of patients were admitted to hospitals in Wuhan with a primary diagnosis of pneumonia of an unknown etiology. These patients were linked to a seafood and wet animal wholesale market in Wuhan, Hubei Province, China.^[2] Coronavirus disease caused by SARS COV2 represents the causative agent of a potentially fatal disease which is of global public health concern. Based on the large number of infected people that were exposed to the wet animal market in Wuhan City, it is suggested that COVID – 19 is most likely of zoonotic origin i.e. transfer of infection from animals to human.^[3]

The novel coronavirus is a single stranded RNA virus which belongs to *Coronaviridae* family *Betacoronavirus* genus and *Severe acute respiratory syndrome-related coronavirus* species. The World Health Organization on 11th February 2020 named the novel coronavirus as SARS CoV – 2 i.e. Severe acute respiratory syndrome coronavirus.^[4] The presence of SARS CoV–2 has been reported in various species of the *Rhinolophus* genus of bat species. Studies done using PCR and Serological tests have shown close relation between the genetic material of SARS CoV-2 and *R. sinicus*, *R. pearsoni*, *R. marcotis*,

R. pussilus and *R. ferrumequinum* are the other species of bat that have shown some correlation with SARS CoV-2. Malayan Pangolins have been considered as intermediate host as they have shown 91% genetic correlation with SARS CoV-2.^[5, 6] The outer part of the virus is made of 4 proteins namely Spike, Envelope, Membrane and Nucleocapsid. SARS CoV 2 uses spike glycoprotein for neutralizing antibodies, receptor binding, mediate membrane fusion and to gain entry into the system. A two-step sequential protease cleavage model has been proposed for activation of S proteins of coronaviruses, priming cleavage occurs between S1 and S2 and activating cleavage on S2' site.^[7, 8] The receptor utilized for entry is Angiotensin-Converting Enzyme 2 (ACE-2).^[9] The virus is primarily transmitted through respiratory droplets and direct or indirect contact. Droplet transmission occurs when a person is within 1 m of someone who has symptoms like coughing or sneezing and is therefore at risk of having himself exposed to potentially infective droplets.^[10, 11] Indirect contact with surfaces in the immediate environment or with objects used on the infected person like stethoscope can transmit virus. Airborne transmission can occur in specific circumstances and procedures or support treatments that generate aerosols like endotracheal intubation, bronchoscopy, etc^[12]. Sign and symptoms appear within two to 14 days after exposure. Common features include fever, cough, shortness of breath or difficulty in breathing. Other symptoms include fatigue, body aches, chills, sore throat, loss of smell and taste, diarrhea and severe vomiting. The severity of symptoms can range from mild to severe i.e some people can have show absolutely no symptoms and some might have combination of symptoms. People who are old or who have underlying heart, lung, liver, kidney disease, diabetes, severe obesity, or who have compromised immune systems may be at higher risk of serious illness.^[13, 14]

Person-to-person transmission of this disease makes isolation of patients an indispensable part of treatment. Once in the body, this virus is abundantly present in salivary and nasopharyngeal secretions of patients. Given the widespread transmission of SARS-CoV-2 and reports of its transmission to health care providers dental professionals are at maximum risk for nosocomial infection and can become potential carriers of the disease.^[15]

Dental care settings have the risk of 2019-nCoV infection due to the aerosols generated during procedures, handling of sharps, proximity of the dentist to the patient's oropharyngeal region. If adequate precautions are not taken, the dental office can potentially lead to cross contamination. As the understanding of this novel disease is evolving, dental students and professionals should have an in-depth knowledge, a better understanding and should be updated with the practices that have to be adapted to identify a possible COVID-19 infection, and refer patients with suspected, confirmed, or a history of COVID-19 infection to appropriate treatment centers.

Material And Methods

The study was conducted after obtaining relevant permissions from the Scientific Advisory Committee and Institutional ethics committee. A cross-sectional questionnaire study was conducted amongst the undergraduate students from different dental colleges in India. A census sampling approach was used.

The sample size was estimated using Epi info sample size calculator (v.3.01) and by using the “Sample size for Frequency in a Population” formula, considering prevalence from previous study^[16], at 80% power of the study and 95% confidence intervals; a total sample size of 560 was derived. The eligibility criteria followed for the participants was that all those students (First, Second, Third, Final year students and Interns) in dental college; who are willing to participate in the study and give informed consent were included in the study.

A pre-tested, pre-validated, 28-item Self-administered structured closed ended online questionnaire was formulated. Out of the 28-items in the questionnaire, 24-items comprised of Knowledge domain and 4-items comprised of Practice domain. The different COVID-19 disease related components of both the domains were Origin, Epidemiology, Etiology, Modes of transmission, Clinical features, Diagnosis, Prevention, Treatment, Pandemicity, Disaster management, Source of information and Educational purpose. The questionnaire was circulated online; using google forms among the students with the consent form. A completely filled questionnaire will be submitted online only to the investigator.

Statistical Analysis

Data obtained was entered in Microsoft Excel 2007. Frequency and descriptive analysis were done by using Statistical Package for Social Sciences SPSS software (v.21.0). Chi-square test of proportion was performed to find out significant differences within the components of the questionnaire. Mean and standard deviation of knowledge score was derived.

Results

A total of 560 undergraduate dental students from different colleges in India participated in the study; amongst which there were 73 (13%) First years, 195 (34.8%) Second years, 84 (15%) Third years, 134 (23.9%) Final years and 74 (13.3%) Interns.

Our study questionnaire recorded 24-items of knowledge domain and 4-items of practice domain; thus, overall, 28-items assessing the awareness about the pathogenesis, modes of transmission, signs and symptoms, diagnosis, treatment and prevention of COVID – 19 disease.

Knowledge Domain

In our study, the frequency analysis was performed of the different questions addressed under the knowledge domain. From the different components assessed in the knowledge domain, correct responses were lowest for Modes of transmission of disease [186 (33.2%)], diagnosis of disease [190 (33.9%)], treatment [174 (31.1%)], pandemicity [183 (32.7%)] and disaster management 134 [(23.9%)]. The remaining components showed more than 50% of correct responses of the students; with the highest correct responses of epidemiology and prevention of the COVID-19 disease. (Table 1). The knowledge score obtained was primarily categorized as 1–6 – “Low”, 7-12- “Average/Satisfactory”, 13–18 – “Good” and 19-24- “Excellent”. The maximum number of students were in the average knowledge category

(48.9%), followed by good knowledge (47.5%) (Table 2). However, our study results show that the overall mean knowledge score of all the undergraduate students was 12.67 (± 2.98), which comes under the category “Good”. (Table 3).

Practice domain

The 4-items of the questionnaire were based on the current practices during the COVID-19 disease scenario; followed by the undergraduate students. Most of the students responded that Media [426 (76.1%)] was their first source of information whereas the current source which they follow for the disease updates is the Government website [362 (64.6%)]. In our study, about 395 (70.5%) students were aware of the short training courses on COVID-19 disease, but only about 249 (44.5%) students have completed such courses till date. (Table 4).

Table 1
– Frequency (%) of the responses of different components under the knowledge domain

Questions	Frequency - n (%)		p value
	Total (n = 560)		
	Correct Response	Incorrect Response	
1) Origin of COVID-19 disease	361 (64.5%)	199 (35.5%)	< 0.05*
2) Epidemiology	433 (77.3%)	127 (22.7%)	< 0.05*
3) Etiology of COVID-19 disease	298 (53.2%)	262 (46.8%)	< 0.05*
4) Modes of transmission of disease	186 (33.2%)	374 (66.8%)	< 0.05*
5) Clinical features	307 (54.8%)	253 (45.2%)	< 0.05*
6) Diagnosis	190 (33.9%)	370 (66.1%)	< 0.05*
7) Prevention	427 (76.3%)	133 (23.8%)	< 0.05*
8) Treatment	174 (31.1%)	386 (68.9%)	< 0.05*
9) Pandemicity	183 (32.7%)	377 (67.3%)	< 0.05*
10) Disaster management	134 (23.9%)	426 (76.1%)	< 0.05*
*p value < 0.05 statistically significant			

Table 2

Mean Knowledge range and Frequency (%) of undergraduate students in the different categories

		Frequency of correct responses (n)	Percentage (%)
Mean Knowledge Range (Category)	Low (1–6)	8	1.4%
	Average/Satisfactory (7–12)	274	48.9%
	Good (13–18)	266	47.5%
	Excellent (19–24)	12	2.1%
	Total	560	100.0%

Table 3

– Overall Mean Knowledge Score of the undergraduate students

Knowledge domain	Minimum	Maximum	Mean	Std. Deviation
Mean Knowledge score	3.00	24.00	12.67	2.98

Table 4
Frequency (%) of the responses of questions under the practice domain

Questions	Frequency – n (%)		p value
	Total (n = 560)		
1) First source of information: 2019 nCoV disease	Friends	34 (6.1%)	< 0.05*
	Family	21 (3.8%)	
	Educational institution	79 (14.1%)	
	Media	426 (76.1%)	
4) Current source of information about 2019 nCoV	Internet	43 (7.7%)	< 0.05*
	News	74 (13.2%)	
	WHO/IDA	81 (14.5%)	
	Govt website	362 (64.6%)	
7) Aware of short training courses on 2019 nCoV	No	165 (29.5%)	< 0.05*
	Yes	395 (70.5%)	
9) Completed any such training courses on 2019 nCoV	No	311 (55.5%)	< 0.05*
	Yes	249 (44.5%)	
*p value < 0.05 statistically significant			

Discussion

Our study highlights the need of spreading awareness and updating the relevant and appropriate knowledge of COVID-19 disease amongst the undergraduate dental students.

The recent spread of COVID-19 disease and its consequences has gripped the entire community and has caused widespread public health concerns. In spite of the efforts taken by the health organizations, the outbreak of the disease is still on a rise, because the nature of the spread of the infection and the difficulty in its containment.^[17] This is a zoonotic infection similar to other corona virus infections and is originated from bats and pangolins and later transmitted to humans. Once the virus enters the body, it is present in large number in the nasopharyngeal and salivary secretions of the affected patients. Virus spread is predominantly thought to be caused through respiratory droplet/contact in nature. Dental

students and health professionals might encounter such patients and will have to act diligently not only to provide dental care but at the same time prevent nosocomial spread of the infection. [18, 19]

Considerable measures to reduce person-to-person transmission of the disease are required to control the outbreak. Adequate measures should be taken on a large scale to reduce transmission in susceptible populations like children, health care providers, and elderly people. The early death cases of COVID-19 outbreak occurred primarily in elderly people, possibly due to a weak immune system that permits faster progression of viral infection. [20, 21] The public services and facilities should provide decontaminating reagents (eg. Alcohol based sanitizer) for cleaning hands on a routine basis. Physical contact with wet and contaminated objects should be considered in dealing with the virus, that can potentially serve as an alternative route of transmission. China and other countries including the US have implemented major prevention and control measures including travel screenings to control further spread of the virus. [22, 23] Epidemiological changes in COVID-19 infection should be monitored taking into account potential routes of transmission and subclinical infections, in addition to the adaptation, evolution, and virus spread among humans and possible intermediate animals and reservoirs. [24] Still there remains a considerable number of questions that need to be addressed.

Amongst the healthcare professionals, almost 90% chances of infectivity are there for dental health professionals. This can have serious implications in the routine dental practice. So, it is essential that at the basic level undergraduate dental students must be educated, empowered and provided appropriate and relevant knowledge of the disease. The infection control protocols, the personal protective equipment's for safety and handling even asymptomatic patients is of utmost importance for the dental students. This study has given an insight to understand the primary level of awareness that the undergraduate students have regarding the disease.

Our study has involved the undergraduate students from first year to interns as this is a generalized epidemic related topic (COVID-19) and not an academic topic where the intellect and knowledge of the student can be from outside textbooks and the student can refer to any related healthcare website to improve and gain his / her knowledge depending upon their interest. Furthermore, we thought that it is a best opportunity for the undergraduate students to get involved in such a questionnaire study as they might get exposed towards different types of research studies and might further develop interest in the same. All these contribute to the strengths of our study. The limitations of our study are no comparative assessment of the knowledge status between the different academic year students and no control over the previous knowledge gained by the students through authenticated training courses on the disease which may act as a confounding factor.

Conclusion

Our study concludes that the undergraduate dental students in different colleges in India are mindful, informed and well aware of the different clinical aspects of the COVID-19 disease and have good knowledge regarding the COVID-19 disease, except for a few disease domains. These include modes of

transmission of the disease, diagnosis, treatment, pandemicity and disaster management. The lower knowledge score for all these domains may be specifically attributed to the aspect that the undergraduate students haven't been exposed to a larger extent to handling clinical cases and participated much into case discussions and thus may lack a relevant knowledge of the same. Moreover, their ability to make decisions regarding treatment must be less comprehensive as compared to the dental health professionals. Furthermore, the interactions and discussions amongst their fellow batchmates must have led to the development of a common interest of learning the whereabouts of the disease. The more complex domains of the disease like pandemicity and disaster management are slightly difficult for the undergraduate students to grasp at this stage, thus may have responded less to these components of the knowledge domains. Despite this, the fact that most of students are aware of the short training courses conducted by different portals like government websites, WHO, IDA etc; shows their interest towards updating their knowledge about the disease.

More emphasis should be put on updating their knowledge regarding the diagnosis and treatment component of the COVID-19 disease. Interactive educational webinars can be conducted for them which focus primarily on the pandemicity and the disaster management of such infectious disease. Further research studies can be conducted on the comparative assessment of the knowledge amongst the different academic year students and dental health professionals. Moreover, the studies can focus upon the psychosocial impact of the disease on the dental

Declarations

1. Ethical approval and consent to participate:

The study was conducted after obtaining relevant permissions from the Scientific Advisory Committee and Institutional ethics committee.

2. Consent for Publication:

Not applicable

3. Availability of data and materials:

Not applicable

4. Competing Interests:

The authors declare that they have no competing interests.

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6. Author's Contributions:

RK designed the concept and framework of study. RK and AS formulated the study instrument (questionnaire). MK and SP collected and sorted the data. AS and MK analyzed and interpreted the data. RK and AS wrote the manuscript which was reviewed by MK and SP.

7. Acknowledgement:

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