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Knowledge, attitude and perception towards covid-19 among dental students in Andhra Pradesh: a cross sectional study

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Abstract
Background: In this era of chaos, there camp up an entity, a virus that has uphended societies and put everyone onto their knees. The disease with its several negative ramifications is bombarding a high impact on healthcare with increased ventilators and beds demand globally thereby causing economic disruptions across the globe.
Aim: Assess the Knowledge, Attitude and Preventive behaviors of COVID-19 among Dental students in Andhra Pradesh.
Materials and Methods: This cross-sectional study was conducted to investigate the knowledge, attitude, perception and preventive behaviors towards COVID-19 among dental students during this pandemic. This current study included 249 study participants, comprising of postgraduates, 3rd year and final year students and interns in three dental colleges. The responses were categorized in a Likert scale. Data were analyzed using SPSS version 20. $P < 0.05$ was considered as statistically significant. Chi square test was used.
Results: Majority of the respondents was females (81.5%) and the remaining were male respondents (18.57%). The mean age was 23.6 years. Majority of the study participants are willing to do COVID detection test if available ($P > 0.005*$) and also Majority have answered that only older adults could become infected with COVID-19 ($P > 0.005*$).
Conclusion: both UGs and PGs in Andhra Pradesh have good and moderate knowledge about COVID-19 and none were poor. The study participants also possessed good attitudes and preventive behaviors. There were no observable factors influencing the knowledge, attitude and preventive behavior among the study participants.

Keywords: COVID-19, Perception, Dental

1. Introduction

December 2019 marked a new era of a biological disaster by an outbreak of a virus in China, known as COVID-19. In early 2020, World Health Organization identified it as a global emergency of public health concern. The entire world has been engulfed in chaos by this entity due to its outbreak around the globe. With the pandemic still on the rise and health personals going head on head with it, it still had a great toll across the globe as many lives were lost with the mortality rate to be as high as 3.4%. Globally, as of 2021, there have been 77,920,564 confirmed cases of COVID-19, including 1,731,901 deaths, reported to WHO [1].

Today this single disease has upended societies and dramatically altered everyday life across the globe. With the widespread of the pandemic by multiplying into several manifestations even the extreme efforts of health care personals there is little hope of revival anytime soon which is going in vain. The current scenario has compounded zero earnings in all sectors and even the profession of Dentistry is facing its darkest hour yet classified dentistry as the one of the high risk practice involved with infections due to aerosol production. Fever, fatigue, and dry cough accompanied with body pains are the most common symptoms of COVID-19 disease [2].

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The disease with its several negative ramifications is bombarding a high impact on healthcare with increased ventilators and beds demand globally thereby causing economic disruptions across the globe [3]. The COVID-19 pandemic has also affected dentistry by halting all procedures all over the world with restrictions to dental care globally [4].

The Dental Council of India released advisory on 16th April 2020 stating that dentists ought to now sternly follow all modus operandi to decontaminate, disinfect and sterilize at the dental clinics as given, permitting to treat an utmost of only 3 or 4 patients in a day [5]. The guidelines given by the Center for Disease Control (CDC) and the American Dental Association (ADA) laid out a set of measures for infection control during this pandemic to prevent the infection transmission [6].

Across the globe, India stands in top two with 10,094,801cases [7]. According to Ministry of Family Health Welfare (MoFHW), total active cases are 2, 81,919 Lakhs with 9,71,7834 Lakh recoveries and 1,47,092 Lakh fatalities with over 9,97,396 Lakh tests performed till date. Recently in December 2020, a new variant of SARS- CoV 2 virus [Variant under Investigation (VUI)-20212/01] has been reported by the United Kingdom Government to the World Health Organization (WHO).

This variant as estimated by European Center for Disease Control (ECDC) is said to be more transmissible. This variant has been defined by a set of 17 mutations that has several manifestations. N501Y is the most significant mutation in the spike protein through which the virus uses to bind to the ACE2 receptors of the human body. This amount of changes in this part of the spike protein may result in the virus becoming more and more infectious [8].

In India, Andhra Pradesh stands with 880,000 cases with 869,000 recoveries with 7,089 fatalities with Ananthpur standing at top with 672323 cases with 159 active cases and 66468 recoveries and 596 case fatalities and least in Vizianagaram with 40998 cases with 66 active cases, 40694 recoveries and 238 case fatalities [9].

Therefore, from the ongoing stats, there is a need to design educational programs to increase the compliance of dental students with universal precautions to minimize this infection. This is done by understanding and determining their behavior. In this study, students from various dental colleges were questioned in order to evaluate their general levels of knowledge, attitudes, and perception in regards to COVID-19. With this background, the present study is an attempt to elucidate the level of knowledge, their attitude and perception among dental students in Andhra Pradesh.

Aim
Assess the Knowledge, Attitude and Preventive behaviors of COVID-19 among Dental students in Andhra Pradesh.

Objectives
1. To investigate dental students' knowledge, attitudes and perception towards COVID-19 during the period of the outbreak.
2. To determine the self-education and awareness of dental students on COVID-19 during the pandemic.
3. To assess the responsibility of dental students as a part of the community in keeping abreast with the latest updates regarding COVID-19.

Ethical Consideration
This cross-sectional study was conducted to investigate the knowledge, attitude, perception and preventive behaviors towards COVID-19 among dental students during this pandemic. The participation was merely voluntary. Throughout the study, confidentiality of data was preserved. The study is online based in which the questionnaire was sent in the form of Google forms. Prior giving the questionnaire, consent which explained the study objectives was obtained by the participants. This study was approved by Anil Neerukonda Institute of Dental Science Visakhapatnam, AP Institutional Ethical Committee [Ref No. ANIDS\IEC\2121014]. Permissions were obtained by the deans of all the colleges enrolled in this study.

Methodology
Sample size estimation and type of sampling technique
The students who are pursuing third and final year BDS will be enrolled in are included in this study.

$$\text{Sample size estimation} = z^2pq \backslash L^2$$
$$= 4pq \backslash L^2$$

p = prevalence 90% (90/100=0.90) Based on previous literature, it was learned that the expected frequency of medical students increasing the practice of hand washing was 96.7% was noted.

q = 1- p (1 - 0.9 = 0.1)

L = allowable error 4%

Z = ~ 2 for 95% confidence interval for descriptive study

$$\text{Sample size} = \frac{4 \times 0.9 \times 0.1}{4 \times 4}$$

= 0.0225

= 225 participants (rounded off to 250 participants)

The sampling method used here was Simple Random Sampling which is a type of probability sampling. Using this sampling method, the colleges to participate in this study were selected randomly using lottery method that was applied to all the 16 dental colleges in Andhra Pradesh and randomly four colleges were chosen which are to be included in this present study. Out of the total 250 students enrolled in this study, 1 incomplete response was recorded which is excluded.

Inclusion Criteria
▪ Students pursuing BDS (3rd, 4th year BDS students and Interns) and MDS 1st, 2nd and 3rd year students of various dental colleges in Andhra Pradesh.
▪ Students who gave consent.

Exclusion Criteria
▪ Students who have submitted incomplete responses.
▪ Students who did not give consent.

Study Setting
A questionnaire-based cross-sectional study is obtained from the three dental colleges of Andhra Pradesh.

Data Collection
A modified self constructed questionnaire with questions compiled from previous study "COVID-19: Knowledge, Attitude and Preventive Behaviors of Medical and Dental Students" was used in this study. The study is online based and the questionnaire was administered through Google forms. Prior permission was obtained by the main corresponding author of the stated article and approval was granted. The questionnaire comprised of 4 sections.

Section 1 of the questionnaire comprised of student socio-demographic characteristics. List of questions included were

participant age, gender and year of study.

Section 2 comprised of 18 questions to assess the student's knowledge of COVID-19. They consisted of two varieties of questions, one is 'True' and 'False' and other are the multiple choice questions with a single answer.

Section 3 comprised of questions to assess the perception of students towards COVID-19. This portion shed light on the awareness of the disease burden in India, transmission of the virus and their opinions towards measures that can be enforced to mitigate the impact of COVID-19 in India.

Section 4 comprised student's attitudes and preventive behaviors towards COVID-19. A 5 point Likert scale was used. The five responses were "Definitely yes", "Certainly no", "Not sure", "Probably no" and "Mostly no", which were each assigned a score of 1,2,3,4 and 5 respectively. Each participant individual scores average was taken which was later converted to percentage to get an overview on their general attitude and preventive behaviors.

Statistical Analysis

The collected data is entered into Microsoft Word Excel Sheet 2019 version and was analyzed using statistical software (SPSS version 21) for Descriptive and Inferential statistics.

Results

Demographic data of the study population showed a total of two hundred and forty nine students had taken part in answering and completing the questionnaire. The socio-demographic characteristics of the study participants were given. Majority of the respondents were females (81.5%) and the remaining were male respondents (18.57%). The mean age was 23.6 years.

Table 1 shows the knowledge of the study participants regarding COVID-19 comprising a total of 8 questions altogether. The highest correct response rate recorded of all questions was 85.9% where all 177 participants agreed that older people likely die from this infection. 83.6% respondents answered that the incubation period of the virus is up to 14 days and the PCR test was known by all of them. In regard to symptoms related to COVID 19 infection, 80% participants opted for the response "shortness of breath". In terms of selecting the right answers to actions that help to prevent COVID-19 infection, 84.1% selected 'avoiding close contact with sick people'. The last question in this section stated that 88.5% of the participants implicated there is no available vaccine that helps protect against COVID-19 virus.

Table 2 centered on perception COVID-19. It showed that 82 assumed that 100,001 to 1 million of the Indian population will be affected by COVID-19. 78.5% perceive that 0-20% of people who get infected with the common flu, ends up dying from the flu, 54.6% said that 0-20% of the people who are infected by COVID-19 will die from this infection. 81.0% perceive that this COVID-19 is capable of travelling 1-3 meters through air to transmit infection, 80.0% agree to consistent wearing a mask is highly effective, 86.6% said 0-20% of people who wear masks also have the probability of being infected by the COVID-19, 83.9 feel that the media does exaggerate this infection, 87.6 of all participants said that there is very low chance of COVID-19 being developed by a government or terrorist organization as a bio-weapon.

Table 3 showed the attitudes and preventive behaviors by the participants towards COVID-19. 81.4% will surely inform the health authorities if they have the symptoms of COVID-19. 91.9% agree to be isolated at home for a certain period. 91.2% will assuredly get tested if there is an available test for detection. 81.1% assured that they wash their hands regularly for enough period of time. 81.1% assuredly follow the updates about the spread of the virus in the country while 87.9% will follow the updates about the spread of the virus worldwide definitely. 85.7% are highly opinionated in attending a lecture about the virus if organized nearby. 89.0% definitely discuss COVID-19 prevention with their friends and family members. 88.2% assured that they wash their hands regularly for a considerable amount of time.

Table 1: Knowledge of Study Population about Covid-19

Question	Year of Study		P- Value
	UGs and Interns	**PGs**	
The origin of COVID-19 is not clear but it seems that it has been transmitted to humans by seafood or bats			0.697
1. Yes	164 (82%)	36 (18%)	
2. No	39 (79%)	10 (20%)	
Do you think that only older adults could become infected with COVID-19?			0.001*
1. Yes	26 (60.5%)	17 (39.5%)	
2. No	177 (85.9%)	29 (14.5%)	
The incubation period of COVID-19 is up to 14 days with a mean of 5 days and can be diagnosed by PCR test			0.012
1. Yes	188 (83.6%)	37 (16.4%)	
2. No	15 (62.5%)	9 (37.5%)	
Are those with other health problems more likely to die from infection with COVID-19 than those without any other health problems?			0.891
1. Yes	183 (81.3%)	42 (18.7%)	
2. No	19 (82.6%)	4 (17.4%)	
Do you think that COVID-19 can be treated using antiviral drugs?			0.093
1. Yes	116 (85.3%)	20 (14.7%)	
2. No	87 (77.0%)	26 (23.0%)	
Is it that currently, a vaccine is available that protects against infection with COVID19?			0.558
1. Yes	71 (83.5%)	14 (16.5%)	
2. No	132 (88.5%)	32 (19.5%)	

Question	Year of Study		P- Value
	UGs and INTERNS	**PGs**	
Which of the following are the symptoms of COVID-19?			

	UGs and Interns	PGs	
1. Nose bleeds	0 (0.0%)	2 (100.0%)	
2. Cough	41 (83.7%)	8 (16.3%)	
3. Aches	29 (90.6%)	3 (9.4%)	0.024
4. Shortness of breath	132 (80.0%)	33 (20.0%)	
5. Vomiting	1 (100.0%)	0 (0.0%)	

Question	Year of Study		P- Value
	UGs and Interns	PGs	
Which of the following actions help prevent catching an infection with COVID-19?			
Getting a vaccination against pneumonia, gargling mouthwash	11 (13.3%)	4 (26.7%)	
Washing your hands	51 (82.3%)	11 (17.7%)	
Eating garlic	8 (72.7%)	3 (27.3%)	
Avoiding close contact with people who are sick	58 (84.1%)	11 (15.9%)	0.063
Taking antibiotics	56 (85.7%)	1 (14.3%)	
Avoiding touching your eyes, nose, and mouth with unwashed hands	46 (83.6%)	9 (16.4%)	
Regularly rinsing your nose with saline	6 (20.0%)	0 (0.0%)	
None of the above	17 (70.8%)	7 (29.2%)	

$P \leq 0.05^*$ statistically significant, $P \leq 0.001^{**}$ highly statistically significant

Table 2: Perception of Study Population about Covid-19

Question	Year of Study		P- Value
	UGs and Interns	PGs	
India 2020 population is estimated at 1,380,004,385 people. What do you think is the number of people living in India who is infected with COVID-19? The number should include both those who have been diagnosed and those who have not been diagnosed.			
a) 0	1 (100.0%)	0 (0.0%)	
b) 1-100	10 (71.4%)	4 (28.6%)	
c) 101-1,000	11 (68.8%)	5 (31.3%)	0.636
d) 1,0001-10,000	34 (82.9%)	7 (17.1%)	
e) 10,001-50,000	40 (85.1%)	7 (14.9%)	
f) 100,001 - 1 million	107 (82.35)	23 (17.9%)	
What percent of people who get infected with COVID-19 will die from this infection? No one knows the correct answer to this, so please just give it your best guess.			
a) 0-20%	84 (78.5%)	23 (21.5)	
b) 21-40%	77 (81.9%)	17 (18.1%)	
c) 41-60%	25 (89.3%)	3 (10.7%)	0.744
d) 61-80%	12 (85.7%)	2 (14.3%)	
e) 81-100%	5 (83.3%)	1 (16.7%)	
Approximately how far do you think COVID-19 can travel through the air (in meters) to transmit the infection from one person to another?			
a) 0-5m	45 (83.3%)	9 (16.7%)	
b) 1-3m	64 (81.0%)	15 (19.0%)	
c) 4-8	48 (78.7%)	13 (21.3%)	0.880
d) 9-13	13 (81.3%)	3 (18.8%)	
e) 14-20	9 (75.0%)	3 (25.0%)	
f) More	24 (88.9%)	8 (11.1%)	
In the following statement _Consistently wearing a face mask is highly effective_., "highly effective" is defined as reducing your risk of getting infected by 95% for this question and a "face mask" is a common medical mask. Answer it as true or false.			0.377
a) Yes	140 (80.0%)	35 (20.0%)	
b) No	63 (85.1%)	11 (14.9%)	
Suppose that you see an adult in your neighborhood who wears a face mask. What is the probability (in percent from 0-100%) that he or she is infected with COVID-19?			
a) 0-20%	118 (86.6%)	18 (13.2%)	
b) 21-40%	43 (67.2%)	21 (32.8%)	0.005*
c) 41-60%	28 (82.4%)	6 (17.5%)	
d) 61-60%	12 (100.0%)	0 (0.0%)	
e) 881-100%	2 (66.7%)	1 (33.3%)	
Do you feel that the media coverage about this disease is exaggerated?			0.153
a) Yes	147 (83.9%)	18 (161%)	
b) No	56 (75.7%)	18 (24.3%)	
Do you think it is likely that the new COVID-19 is a bio-weapon developed by a government or terrorist organization?			0.222
a) Yes	97 (75.8%)	31 (24.2%)	
b) No	106 (87.6%)	15 (12.4%)	

$P \leq 0.05^*$ statistically significant, $P \leq 0.001^{**}$ highly statistically significant

Table 4: Attitude and Preventive Behaviors towards Covid-19

Question	Year of Study		P- Value
	UGs and Interns	PGs	
If I have any of the symptoms of COVID-19, I will inform the health authorities			
Definitely yes	83 (81.4%)	19 (18.6%)	0.272
Certainly yes	17 (70.8%)	7 (29.2%)	
Not sure	61 (83.6%)	12 (16.4%)	
Certainly no	5 (62.5%)	3 (37.5%)	
Mostly no	203 (81.5%)	5 (11.9%)	
If I find that I contacted a person with the virus, I agree to be isolated at home for a certain period until it is proven that I am free from the disease			
Definitely yes	124 (91.9%)	13 (19.4%)	
Certainly yes	54 (80.6%)	7 (43.8%)	
Not sure	9 (56.3%)	3 (21.4%)	0.001*
Certainly no	11 (78.6%)	12 (10.6%)	
Mostly no	5 (29.4%)	11 (8.1%)	
If there is an available lab test for detection of COVID-19, I am willing to do it			
Definitely yes	49 (75.4%)	16 (24.6%)	
Certainly yes	11 (73.3%)	4 (26.7%)	
Not sure	14 (66.7%)	7 (33.3%)	0.001*
Certainly no	5 (41.7%)	7 (38.3%)	
Mostly no	124 (91.2)	12 (18.8%)	
I usually follow the updates about the spread of COVID19 in my country			
Definitely yes	119 (81.1%)	27 (18.9%)	
Certainly yes	21 (75.0%)	7 (25.0%)	
Not sure	32 (78.0%)	9 (22.0%)	0.483
Certainly no	14 (87.5%)	2 (12.5)	
Mostly no	17 (94.4%)	1 (5.6%)	
I usually follow the updates about the spread of COVID-19 worldwide			
Definitely yes	116 (87.9%)	16 (12.1%)	
Certainly yes	28 (68.3%)	13 (31.7%)	
Not sure	31 (79.3%)	8 (20.5%)	0.055
Certainly no	16 (76.2%)	5 (23.8%)	
Mostly no	12 (75.0%)	4 (25.0%)	
If a lecture about the COVID19 is organized near me, I am willing to attend it			
Definitely yes	96 (85.7%)	16 (14.3%)	
Certainly yes	35 (70.8%)	14 (29.2%)	
Not sure	29 (76.3%)	9 (23.7%)	0.062
Certainly no	15 (75.0%)	5 (25.0%)	
Mostly no	28 (93.3%)	2 (6.7%)	
I discussed COVID-19 prevention with my family and friends			
Definitely yes	146 (89.0%)	18 (11.0%)	
Certainly yes	22 (57.9%)	16 (42.1%)	
Not sure	17 (70.8%)	7 (50.0%)	0.001*
Certainly no	5 (50.0%)	5 (50.0%)	
Mostly no	13 (100.0%)	0 (0.0%)	
I wash my hands regularly and for a enough period			
Definitely yes	142 (88.2%)	19 (11.8)	
Certainly yes	25 (67.6%)	12 (32.4%)	
Not sure	22 (66.7%)	11 (33.3%)	0.001*
Certainly no	7 (63.6%)	4 (36.4)	
Mostly no	7 (60.0%)	0 (0.0%)	

P≤0.05* statistically significant, P≤0.001** highly statistically significant

Discussion

This study was conducted among dental students attending various dental colleges in Andhra Pradesh to investigate the students' knowledge, perception, attitude and preventive behaviors towards COVID-19 to determine their level of awareness. Questions in this study examined the participant's knowledge in COVID-19's epidemiological characteristics, susceptibility, signs and symptoms of this disease and its treatment measures. This current study included 249 study participants, comprising of postgraduates, interns, 3rd year and final year students and interns in three dental colleges.

Positive symptoms of COVID-19 as reported by the WHO and Center of Disease Control included shortness in breath was identified in 80.8% of the participants respectively.

85.3% of study participants felt COVID-19 cannot be treated by using antiviral drugs. As there have been numerous clinical trials on the efficacy of remdesivir and hydroxychloroquine antiviral drugs, there is no approval. In India, a questionnaire-based study among 1,562 healthcare students and professionals regarding awareness of COVID-19 disease and

infection control practices was conducted. They reported that overall knowledge scores calculated was 71.2% with medical and dental students having the highest knowledge [10].

In accordance with WHO, majority of students agree with hand washing as a critical activity in breaking the chain of transmission was highly regarded with 88.2% practicing regular hand washing. Students were also found to be keen on following the news and updates of the virus nationally and globally. This is in line with a study conducted in Bangladesh among 305 medical students showed that 89.5% of participants were washing hands frequently and thoroughly to curb COVID-19 infection and transmission. This may be due to the reason that this particular disease is highly contagious and persists with fatalities [11].

Based on the results in this study, participants are aware of wearing masks and proper hand washing are one of the most key preventive measure which are the guidelines given by WHO and also the Indian Ministry. In our study, 81.3% of the participants were aware that those with other health problems are most likely to die from COVID-19 infection which is in line with a study conducted among medical students in Jordan which showed 95.0% of medical students also say that people with chronic illness are highly susceptible to being infected by the virus [12].

Conclusion
In summary, we observed both UGs and PGs in Andhra Pradesh have good and moderate knowledge about COVID-19 and none were poor. The study participants also possessed good attitudes and preventive behaviors. There were no observable factors influencing the knowledge, attitude and preventive behavior among the study participants. Not only medical students but also we dental students should keep abreast with all recent developments and ongoing trails be it vaccines or any preventive behaviors. We recommend using this opportunity to further educate students thereby widening their knowledge in this ongoing COVID-19 pandemic in times of crisis and suggests that all the dental students should be considered as an effective personnel. Students with greater knowledge about this ongoing COVID-19 pandemic will have better attitudes towards this disease and will get involved in more preventive behaviors programs with "Health for All" being the beauty of our profession.

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