Knowledge, practice and attitude towards COVID- 19 among undergraduate dental students in Karnataka: A cross sectional questionnaire based survey

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Citation of this Article: Dr. G. Suchitra, Dr. Mohd. Mohsin Ainapur, Dr. Syed Fazalullah Khadri, Dr. Vanishree B K, Dr. Krishna Pradeep K N, Dr. Parappa Sajjan, "Knowledge, practice and attitude towards COVID- 19 among undergraduate dental students in Karnataka: A cross sectional questionnaire based survey", IJDSIR- December - 2021, Vol. – 4, Issue - 6, P. No. 17 – 28.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: The current pandemic COVID-19 has affected the healthcare workers worldwide. Dental students are at a greater risk of contracting this infection due to their close proximity with the patients and thus have to update their knowledge and change their clinical perspective. This is a phase where there is a need for to enhance and improvise their way of practice.

Aims and Objective: To assess the knowledge, practice and attitude towards COVID-19 among undergraduate dental students in Karnataka.

Materials and methods: A web-based cross sectional survey was conducted from 9th September to 9th October 2021. A total of 424 undergraduate dental students from private, government and deemed universities within Karnataka participated in this online survey. A structured questionnaire with elaborative questions

related to knowledge, clinical practice and attitude towards COVID-19 was prepared and distributed online. Statistical analysis: Unpaired t test and ANOVA test were used to analyze the differences in knowledge, practice and attitude scores across the groups.

Results: Of the 424 dental students surveyed, 185 (43.6%) were male and 239 (56.4%) were female students with 168(39.6%) from third year, 197(46.5%) from final year and 59(13.9%) students pursuing internship. COVID-19 related knowledge (8.5 ± 1.8) was significantly correlated with practice (2.3 ± 1.0) and attitude (3.0 ±1.0). We found that the students had adequate knowledge with a significant p value of <0.001. Comparative analysis between third year, final year and internship students showed significant knowledge and attitude score (p value <0.001) when compared to the practice score.

Conclusion: It was inferred that dental students have adequate knowledge and positive attitude about the different aspects related to this pandemic. However along with this knowledge, they should utilize all the precautionary measures to treat the patients with maximum safety and ensure a safer environment both for patients and students.

Keywords: COVID-19, Infection control, Knowledge, Practice

Introduction

A communicable disease (COVID-19) identified around the end of December 2019 in the city of Wuhan, China was designated as the fifth pandemic after the 1918 flu.[1] The virus causing the pneumonia was officially named as the severe acute respiratory syndrome corona virus SARS-CoV-2 by the International Committee on Taxonomy of Viruses.[1] The SARS-CoV-2 virus belongs to the family Coronaviridae which lies within the order of Nidovirales and the suborder of Coronavirineae.[2] The virus contains a single- stranded RNA as a nucleic material with a length of 26-32kbs. It has subgroups of alpha (a), beta (b), gamma(c) and delta (d).[3] This infection has spread fast all over the globe and it has surpassed other previous pandemics both in the number of infected people and also in the spread of the epidemic area.[3]. It is mainly a respiratory infection and the transmission pathways are: aerosols and droplets (coughing and sneezing), and contact with an infected area or a person. The infected patients can be silent carriers (asymptomatic) and be a source of infection.[4] There are a lot of range of symptoms that usually begin with fever, dry cough, shortness of breath, fatigue, sore throat, rhinorrhea, hemoptysis, chest pain. Other gastrointestinal symptoms are diarrhea, nausea and vomiting. Musculoskeletal (muscle ache) and neurologic (headache, confusion) are also reported signs of infection. [5, 6] Patients with fatal disease can develop ARDS (acute respiratory distress syndrome) and kidney failure within a short period of time and can die of multiple organ failure.

The transmission route of this virus is mainly by respiratory droplets through direct contact [7] or inhalation with incubation period ranging from 2-14 days. [4] Various regulatory bodies have provided infection control guidelines and Standard Operating Procedures(SOP) related to work environment, personal protection, infection control, disinfection and operatory procedures.[8] The use of face mask, Personal Protective Equipment(PPE), social distancing, hand hygiene and frequent sanitization of surfaces are among the infection control strategies employed till now. Apart from these measures behavioral modifications play a significant role in combating this new epidemic.

With the future trends in emerging dental infections, the dental students who deal with the patients are at greater

risk of exposure, as they are not well trained yet. Dental students are potentially exposed to saliva, blood, contaminated instruments or surface, and to inhalation of droplets/aerosol from infected patients who may be symptomatic or asymptomatic. [9] Recent studies suggest that saliva and other oral fluids from oral and para oral structures act as a good reservoir of SARS-CoV-2 virus. [10] So it becomes very important for dental students to upgrade their knowledge and modify their attitude towards COVID-19. Thus assessing the knowledge, awareness and preparedness of these budding dentists will aid in changing the teaching methodology. This survey was mainly conducted on the third year, final year and internship students who are exposed to the patients during their academic postings.

Study design: The students of dentistry participated in an online survey that included a questionnaire to evaluate their knowledge, practice and attitude towards the COVID-19 pandemic. This survey was conducted from 9th September 2021 to 9th October 2021. Undergraduates (third year and final year dental students) and interns of private, government and deemed universities of Karnataka, India, aged above 18 years, who had access to the internet, could provide informed consent and with knowledge of English were invited for survey.

Exclusion criteria: Students without internet access, who could not understand English and first and second year undergraduate students.

Institutional ethical clearance was obtained. All the participants were requested to sign the informed consent to attest their willingness by answering an agree/disagree question. The anonymity of the participants was ensured and no personal identifiers like name, e-mail ID's were collected. Only one response per Internet Protocol (IP) address was allowed. Only fully completed questionnaire were collected for the survey.

Data sources and variables: The questionnaire was developed by faculty members and experts in the field of dentistry, medical science, infection control and statistics. A group of selected experts was formed to add/modify the questions for better understanding. The survey link was disseminated through what's app groups and e-mail among the students. The questionnaire consisted of a total of 26 questions with four sections: (1) demographic information comprising of 3 questions, (2) knowledge related 13 questions, (3) questions regarding clinical practice considerations{5 questions} and (4) questions related to their attitude towards this pandemic{5 Questions}.

Demographics: In this section their age, sex and year of pursuing the course was asked.

Knowledge parameter: This section evaluated the knowledge regarding the type of virus, its mode of transmission, symptoms, incubation period, procedural risk, sequence of donning protective equipment's, guidelines on COVID-19 infection control and its laboratory assessment.

Practice parameter questionnaire included queries on treatment protocol and vaccination status of the students. Attitude related questions were based to conceptualize the participant's fear of being infected when treating COVID-19 patients.

All these questions on various parameters were validated by cronbach's Alpha analysis and also descriptive score for these parameters was evaluated. [Table 1]

Statistical methods used

All characteristics were summarized descriptively. For continuous variables, the summary statistics of Mean and Standard Deviation (SD) were used. For categorical data, the number and percentage were used in the data summaries and diagrammatic presentation. The difference of the means of analysis variables between

two independent groups was tested by unpaired t test. The difference of the means of analysis variables between more than two independent groups was tested by ANOVA and F test of testing of equality of Variance. Cronbach's alpha was calculated to check reliability of scores.

If the p-value was < 0.05, then the results were considered to be statistically significant otherwise it was considered as not statistically significant. Data were analyzed using SPSS software v.23 (IBM Statistics, Chicago, USA) and Microsoft office 2007.

Results

A total of 424 responses were recorded. Demographic profile showed that 185(43.6%) were males and 239(56.4%) were females. Around 96.2% of them were aged below 25 years and greater percentage (46.5%) were final year dental students followed by 39.6% (third year students and 13.9% were pursuing internship. [Graph1] Most of the students had good knowledge with regard to the type of virus, its common mode of transmission, its symptoms and incubation period. [Table 2] Among the respondents 58.3% presumed that there was maximum risk of virus transmission through the use of high speed hand piece during treatment. Regarding the sequence of donning the PPE kit maximum number (59.7%) had right knowledge but 27.8% still had confusion in the correct sequence.[Table 2] Most of them (71.8%) believed that personal protective equipment kits were useful in preventing the risk of infection. Laboratory related knowledge was also better with most of the respondents.[Table 2]. The total mean knowledge score was 8.5±1.8. [Table 1]

In the parameters related to the clinical practice, 79.5% preferred teleconference of the patients and 63% were ready to render the treatment using the PPE kits.[Graph 2] Most of the respondents (43.4%) had attended seminar on infection control and 42.2% were interested to attend the seminars. 45.5% of our respondents were fully vaccinated.[Graph 2]

Among the total students 75% believed that COVID 19 is a very dangerous infection and 74.5% suggested that dentists played a significant role in educating the patients and creating awareness. [Graph 3] Around 77.6% believed that this infection will be long dealt with in future years and around 83.5% were prepared for the situation. 68.4% were of the opinion that this infection and its protective measures be incorporated during practical training procedures. [Graph 3]

Overall knowledge parameter seemed to have an upper hand both in males and females with a statistically significant p value of <0.001 when compared to practice score and attitude score. [Table3] A statistically significant p value of <0.001 was also seen in knowledge score and attitude score among the third year, final year and internship students in comparison with the practice score. [Table 3]

Discussion

This study was done mainly to assess the knowledge, attitude and practice related behavior among dental students in Karnataka regarding COVID-19. We found that overall all the undergraduate students and interns had high levels of knowledge across various topics such as the type of virus, mode of transmission and its various symptoms. This was in accordance to the previous studies by Batra k et al,[11] Basma Salameh et al,[12] Khasawneh et al [13] and a Nigeria based study. [14] 81.8% of students in our study correctly mentioned the incubation period as in other previous study, [11] but this response was relatively greater when compared to Jordan based research. [15] This disparity may be attributed to the time period of the studies. The Jordan based research was conducted at the early phases of pandemic wherein

there was still uncertainty regarding the life cycle of the virus. While our study period was done at the time when sufficient information related to the pandemic is now currently available.

Around 58.3% of our respondents were of the opinion that there was maximum risk of transmission of the virus while treating COVID patients with the use of high speed handpiece and also 79.5% reported the use of teleconference and delaying the dental treatment if possible. This emphasizes that operatory measures to prevent or diminish aerosol generation, such as the use of manual instruments, rubber dam and high vacuum suction may be employed during treatment. Also use of high speed dental pieces can be avoided. [16] Thus preventive and minimally invasive dentistry should be preferred, and the use of rubber dam must be made mandatory when high-speed instruments are used. Around 95% of our participants were well aware of the guidelines on COVID-19 infection control. 45.5% of participants had been vaccinated with both doses and 48.6% had got their first dose at the time of the survey. This implied that the students were well aware of the role of the vaccine in the prevention of the disease which is in contrast with study by Akan et al in Turkey [17] where the participants of the study were unwilling to get vaccinated. This can be again attributed to the different timelines of the study where the efficacy of the different vaccines available in the world is now well known.

In the previous studies, [11, 14, 18, 19, 20, 21, 22] it was observed that there was significant difference in the COVID-19 knowledge and protective behaviors among the clinical and pre-clinical students. But our study compared only the clinical students of third year, final year and the students during internship period. It was found that all the clinical students had significant knowledge and attitude score but there was less implication of infection control measures during actual practical procedures. Thus formal training in the safety protocols, imparting appropriate practical skills for infection control practices is of utmost importance. About 75% of the participants perceive COVID to be a very dangerous infection and that role of dentist in creating patient awareness was very significant. But only 59.7% of the students had the correct knowledge in the sequence of donning the personal protective equipment which again implies s that though students perceive infection to be dangerous, they are not well aware of the right infection control protocol measures. Therefore from our study we can perceive that continuous education, assessment in clinical setting and imparting infection control practices in health care should be employed. [23] Maximum number of respondents (77.6%) believed that this infection will be dealt with to a great extent in the future and they were willing to attend lectures/ seminars pertaining to this infection. Majority of them wanted practical training for protective measures (68.4%) which implies that they have lack of practical training. This is of concern to the modern educators which can be addressed through the use of modern technological innovations.[24, 25] Both the educators and students should be trained for new entities such as virtual platform for teaching and practical purpose and adapt to the future teaching methodology.

Study limitations: The cause-effect relationship could not be studied due to the cross- sectional nature of the study. There may be sampling bias as the participants were approached by web-based platforms. The study uses only small sample size. Prospective studies using large representative samples and use of safety compliance during clinical practice among dental students in various institutions may be further assessed.

Conclusion: Our study highlighted that dental students had good knowledge of COVID-19 pandemic. Being

vaccinated, they exhibited responsible social behavior and were well prepared to handle such pandemics in future. They emphasized the practical training sessions on infection control to be implicated more in the educational curriculum.

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Legend Tables and Figures

Table 1: Reliability analysis and descriptive statistics of scores

Scores	Reliability analysis		Descriptive statistics	
	Cronbach's Alpha based on Standardized Items	No of Items	Mean	SD
Knowledge score	0.375	13	8.5	1.8
Practice score	0.463	4	2.3	1.0
Attitude score	0.378	4	3.0	1.0

Table 2: Distribution of Cases according to Knowledge Parameter

Knowledge parameters	No. of cases (n=424)	Percentage (%)
1.SARS-CoV-2 virus is a		
A] double stranded DNA virus	11	2.6
B] double stranded RNA virus	57	13.4
C] single stranded RNA virus	356	84
2. Which is the common mode of transmission?		
A] through aerosol contamination	208	49.1

B] direct contact with infected person	205	48.3
C] intravenous route	1	0.2
D] through salivary contamination	10	2.4
3. The common symptoms of COVID-19 infection is		
A] fever	114	26.9
B] dry cough	36	8.5
C] sneezing	8	1.9
D] shortness of breath	61	14.4
E] sore throat	118	27.8
F] red eyes	1	0.2
G] loss of sense of smell and taste	85	20
I] asymptomatic	1	0.2
4. The incubation period of COVID-19 infection is		
A] 2–14 days	347	81.8
B] 1–7 days	42	9.9
C] 2–5 days	16	3.8
D] 1–14 hours	19	4.5
5. Which dental procedure carries the maximum risk of virus transmission while treating a COVID-19-positive patient?		
A] ultrasonic scaling	128	30.2
B] use of high speed hand piece instrument	247	58.3
C] dental procedures under rubber dam	22	5.2
D] crown cementation	25	5.9
E] use of lasers	2	0.5
6. The sequence for putting on the protective equipment is as follows		
A] gloves, mask, eye protection, gown	32	7.5
B] gown, mask, eye protection, gloves	253	59.7
C] mask, gown, eye protection, gloves	118	27.8
D] eye protection, mask, gown, gloves	21	5
7. Are the personal protective equipment's (PPE kit) useful in protection from confirmed / suspected COVID-19 patients		
A] agree	330	77.8
B] disagree	79	18.6
C] don't know	15	3.5
8. Are you aware of any guidelines on COVID-19 infection control?		

A] yes	403	95
B] no	8	1.9
C] not sure	13	3.1
9. Which is the confirmatory laboratory test		
A] western blot	2	0.5
B] DNA hybridization	1	0.2
C] RT-PCR	415	97.9
D] ELISA	3	0.7
E] do not know	3	0.7
10. What can you infer from a positive rapid antibody test (RAT)?		
A] confirms that the person tested is infected with COVID-19	296	69.8
B] confirms that the person tested was infected with COVID-19	122	28.8
C] confirms that the person tested is not infected with COVID-19	6	1.4
11. Type of immunoglobulin elevated during active infection period is		
A] Ig G	167	39.4
B] Ig M	218	51.4
C] Ig A	39	9.2
12. Mycotic infection related to SARS-CoV-2 is		
A] candidiasis	26	6.1
B] mucormycosis	380	89.6
C] aspergillosis	17	4
D] cryptococcosis	1	0.2
13. Current variant of SARS-CoV-2		
A] mu variant (b.1.621)	60	14.2
B] delta variant	356	84
C] eta variant	4	0.9
D] kappa variant	4	0.9

Table 3: Demographic characteristics of study group and analysis of scores

		N (%)	Knowledge score		Practice score		Attitude score	
			M±SD	p value	M±SD	p value	M±SD	p value
Age Group	19-24Years	408(96.2)	8.6±1.7	0.493	2.4±1.0	0.055	3.0±1.0	0.74
	25-30Years	16(3.8)	8.3±2.2		1.9±0.7		2.9±1.0	
sex	Male	185(43.6)	8.9±1.7	<0.001*	2.3±0.9	0.131	3.0±0.9	0.261
	female	239(56.4)	8.3±1.8		2.4±1.1		2.9±1.0	
Year of	Third year	168(39.6)	8.3±1.6	<0.001*	2.3±1.1	0.976	2.8±1.0	<0.001*

pursuing study							
	Final year	197(46.5)	8.9±1.8		2.4±1.0		3.2±0.9
	internship	59(13.9)	8.1±1.8		2.4±1.0		2.8±1.0

Note: p value * significant at 5% level of significance (p<0.05)

Graph 1: Distribution of Cases according to Demographic Parameters
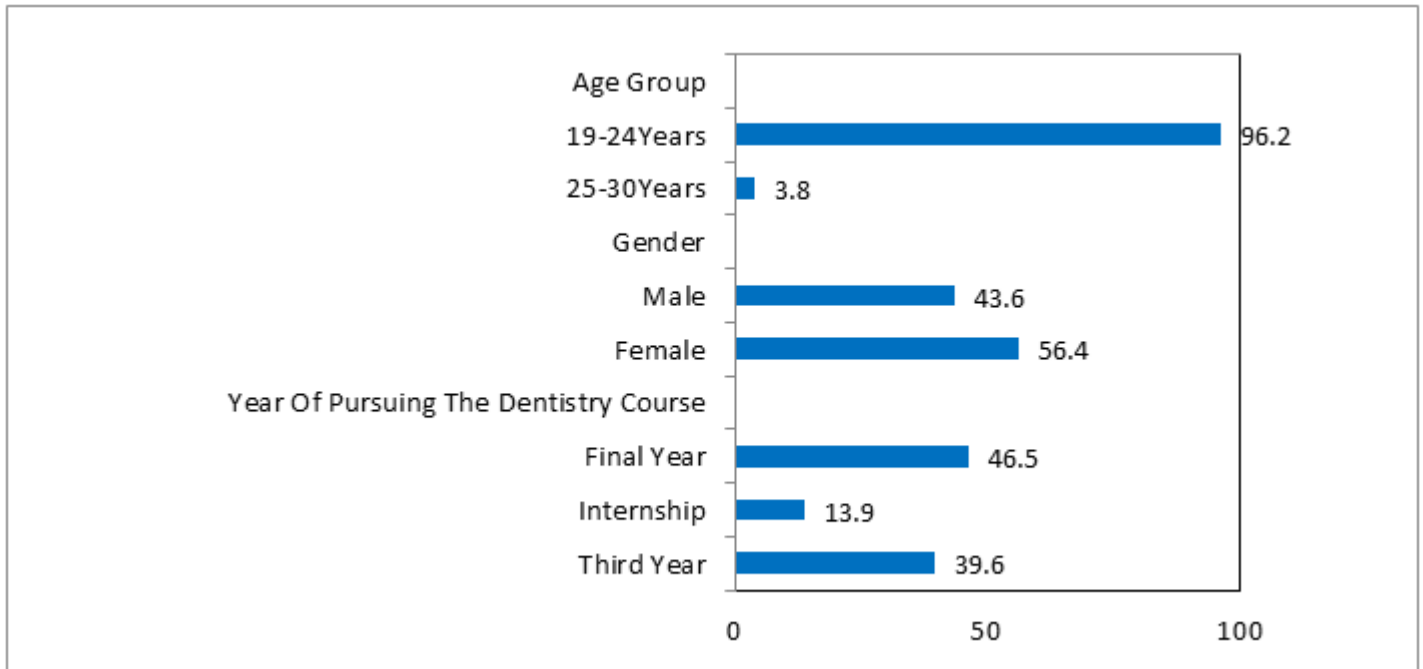
Graph 2: Distribution of Cases according to Practice Parameters
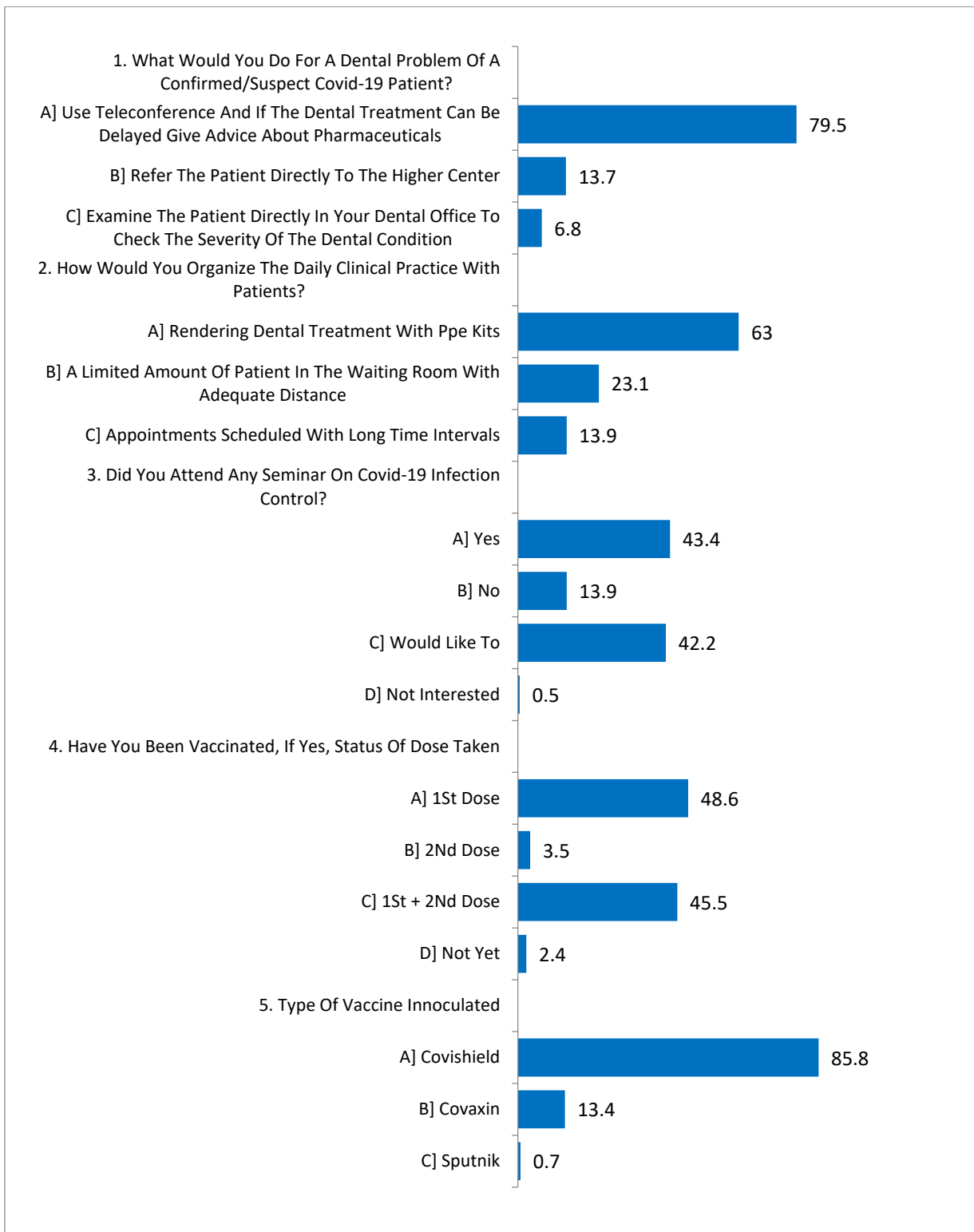
Graph 3: Distribution of Cases according to Attitude Parameters

1. How Do You Perceive The Covid-19 Infection Among The Dental Students?

A] Very Dangerous — 75

B] Moderately Dangerous — 19.3

C] Mildly Dangerous — 5

D] Not Dangerous — 0.7

2. How Important Is The Role Of A Dentist In Teaching Patients About Covid-19?

A] Very Significant — 74.5

B] Moderately Significant — 23.8

C] Mildly Significant — 1.4

D] Not Significant — 0.2

3. To What Extent You Will Be Dealing With Covid-19 Infected/Suspected Patients In The Future?

A] To A Great Extent — 77.6

B] To A Little Extent — 20.3

C] Not At All — 2.1

4. Do You Consider Yourself Prepared For Covid19?

A] Yes — 83.5

B] No — 5.7

C] Not Sure — 10.8

5. How Would You Like Information About Covid19 To Be Further Integrated Into The Curriculum?

A] Lectures — 19.6

B] Seminars — 12

C] Practical Training For Protective Measures — 68.4