



Original Research Article

Assessment of knowledge and attitude towards teledentistry during COVID pandemic among undergraduate dentistry students and interns of a private dental institute of Nagpur city

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ABSTRACT

Objectives: The objective of the study were to assess the knowledge and evaluate the attitude toward teledentistry during COVID pandemic among undergraduate dental students and interns of a private dental institute of Nagpur-MS.

Material and Methods: The study was conducted among the UG dentistry students and interns of VSPM Dental College & Research Centre, Nagpur, over a period of 1 month.

Results: A total of 307 students and interns were surveyed in this study. Out of them, 175 (57%) said that they were aware of the term teledentistry. Two hundred and twenty-seven (74%) participants felt that teledentistry can improve the reach of oral health care to rural areas and during pandemic and 256 (83%) said that they want to practice teledentistry.

Conclusion: The knowledge of interns regarding teledentistry was good. Their attitude toward applying it in the profession was satisfactory. More than 80% of students were willing to practice teledentistry and 60% thought that it is the future of dentistry. The future perspective will be assessing more students and interns for more insight on topic.

Keywords: Attitude, COVID-19, Dentistry, Knowledge, Oral health, Remote consultation, Students dental, Technology

INTRODUCTION

A type of pneumonia started to spread in Wuhan, China, in 2019 which was named as coronavirus by the WHO.^[1] This led to a nationwide lockdown in India in March 2020.^[2] People were asked to postpone hospital and dental visits unless absolutely necessary.^[3]

Dentistry is considered high-risk profession during pandemic as cross-infection can occur through saliva or blood.^[4] Therefore, newer protocols in dentistry have been implemented for personal safety.^[5]

Today, with speed in connectivity and unlimited data connections, internet plays an important role to connect patient and dentist. With the usage of newer technological applications, performing “Teledentistry” is possible to provide dental care across distance.^[6] Teledentistry not only serves the purpose of consulting over distance but it also helps in providing services to the rural population

over a distance through digital and online consultations.^[7,8] During the COVID pandemic, many countries allowed only emergency dental procedures, this can lead to neglect in oral care among the general population. Teledentistry can be a valuable tool in such situations.^[9,10]

For integrating practice of teledentistry in the future, it is essential to determine current level of dental students’ attitude and knowledge. Thus, we aimed to assess the knowledge and evaluate the attitude of undergraduate dentistry students and interns about teledentistry in Nagpur city.

Aim

The aim of the study was assessment of the knowledge and evaluation of attitude toward teledentistry among undergraduate dentistry students and interns of private dental institute of Nagpur city.

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Objectives

The objectives of the study were as follows:

1. To assess the knowledge regarding teledentistry
2. To evaluate attitude toward teledentistry, among undergraduate students and interns.

MATERIALS AND METHODS

After obtaining ethical clearance from the IEC committee of VSPM Dental College & Research Centre (VSPM DC RC), Nagpur, we proceeded with this cross-sectional study among undergraduate dentistry students and interns of a private dental institute of Nagpur city (Maharashtra). A self-administered Google Forms is used in study. Questionnaire consisted of 12 questions which have been taken from previously conducted different studies.^[11-13] The combined questionnaire was got validated again. Out of 12 questions, questions 1–3 were knowledge based and 4–12 were attitude based.

The questionnaire was virtually distributed among the students and interns of VSPM DC and RC, Nagpur. The participants were told about the purpose of study. The inclusion criterion was entire willing students and interns. The participant who was not willing was the only exclusion criterion. The questionnaire was distributed anonymously; they were instructed not to discuss the questions among themselves. The data obtained from these responses were collected back and inserted in Excel sheet for analysis.

RESULTS

There were a total of 307 participants. Out of 307, 247 (81%) were female and 60 (19%) were male. Maximum responses were received from the 3rd year, 127 (41%).

The distribution of students according to year of study is shown in [Table 1] and detailed result of every study year is given in [Table 2].

Among the study population of 307, majority of interns 22 (66%) and 3rd year students 79 (62%) had heard the term called teledentistry while most of the I BDS 18 (55%) and IV BDS students 37 (49%) did not hear the term teledentistry.

Teledentistry is consultation through only telephone was said by 12 (4%) students whereas 250 (81%) said that it is consultation through internet, telephone, and computer. The mode of consultation was not known to 45 (15%) students and interns.

Teledentistry can be applied in all branches of dentistry which was considered by 15 (45%) interns and 51 (40%) 3rd year students while it was considered not applicable by 19 (47%) 2nd year and 41 (55%) final year students.

Online dental examination is same and useful as the traditional office setting was said by 62 (20%) participants and opposite was considered by 246 (81%). Majority of III BDS students 66 (51%) and interns 19 (55%) felt that teledentistry is not as effective and useful as offline clinic setting.

Table 1: Distribution of samples by demographic variables.

Level of education	Number of samples	Percentage of samples
BDS I	32	10
BDS II	40	13
BDS III	127	41
BDS IV	75	24
Intern	33	12
Total	307	100

Teledentistry can come handy in giving oral health and hygiene instructions for patients who were said by all the 1st and 2nd year participants but some 3rd year students 12 (9%) did not feel that it is a good tool for instructions.

Teledentistry was considered a time saver by 227 (74%) participants majority of which were 29 (88%) interns and 97 (76%) 3rd year students. The 1st year 20 (62%) and final year students 17 (23%) were not sure about the opinion.

Teledentistry can minimize patient numbers for offline consultation by delaying non-emergency cases appointment which was agreed on by 258 (84%) participants whereas 39 (12%) disagreed and 10 (4%) were not sure.

Majority of the 3rd year students 94 (74%) and all the 2nd year students said that teledentistry can enhance the reach of oral health-care services but 12 (16%) final year and 5 (15%) interns disagreed.

Government initiative is a must for increasing reach of teledentistry which was felt necessary by 254 (83%) participants. Nine (3%) disagreed whereas 44 (14%) were not sure.

Ninety-nine (78%) 3rd year students and 28 (85%) interns said that teledentistry can have a big role in the future practice, during the pandemic as well as after the pandemic but few 3 (9%) 1st year and 4 (10%) 2nd year students did not feel so.

Teledentistry can be a preamble in robotic dentistry which was agreed on by 173 (56%) participants and disagreed by 23 (8%) participants whereas 111 (36%) were not sure.

Practicing teledentistry in clinical practice in the coming future was said yes by participants, most of which were interns 30 (91%) and 1st year students 30 (90%).

The detail result of study is given in [Table 3].

DISCUSSION

Teledentistry is a fascinating and upcoming field of practical dentistry that involves the application of internet for the diagnosis and treatment of the patient by the dental professional. Very limited data were available about this field as research in Nagpur. This study was undertaken to fill this gap as this will help to explore and assess the knowledge and evaluate the attitude toward teledentistry among undergraduate students and interns of dental colleges of Nagpur city.

Therefore, an attempt was made to evaluate the knowledge level and attitude toward teledentistry among undergraduate students and interns of VSPM DC RC NGP-MS. A total of 307 students and interns participated in this study.

Table 2: Detailed result according to educational qualification.

S. No.	Question	I BDS (n=32)		II BDS (n=40)		III BDS (n=127)		IV BDS (n=75)		Intern (n=33)	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	Have you ever heard about teledentistry?										
	Yes	14	43.75	22	55	79	62.2	38	50.7	22	67
	No	18	56.25	16	40	41	32.2	28	37.3	9	27
	Do not know	0	0	2	5	7	5.5	9	12	2	6
2.	Teledentistry is consultation through_____?										
	Only telephone	2	6.25	0	0	4	3.2	4	5.3	2	6
	Internet, computer, and telephone	23	71.87	32	80	108	85	60	80	27	81.8
	Do not know	7	21.87	8	20	15	11.8	11	14.7	4	12.2
3.	Is teledentistry applicable to all the branches of dentistry?										
	Yes	6	18.75	15	37.5	51	40.15	21	28	15	45
	No	10	31.25	19	47.5	45	35.43	41	54.6	12	36
	Do not know	16	50	6	15	31	24.42	13	17.4	6	18
4.	Online dental examination is quite similar and beneficial as the normal offline clinic setting?										
	Agree	5	15.62	13	32.5	26	20.5	13	17.3	5	15.5
	Disagree	15	46.87	13	32.5	66	52	38	50.6	19	57.5
	Cannot say	12	37.5	14	35	35	27.5	24	32.1	9	27
5.	Teledentistry can be used to give oral hygiene instructions?										
	Agree	24	75	33	82.5	99	78	59	78.7	30	91
	Disagree	0	0	0	0	12	9.4	6	8	2	6
	Cannot say	8	25	7	17.5	16	12.6	10	13.3	1	3
6.	Teledentistry can save time of patients as well as that of consulting dental physician?										
	Agree	20	62.5	26	65	97	76.3	55	73.4	29	88
	Disagree	0	0	7	17.5	10	7.8	3	4	3	9
	Cannot say	12	37.5	7	17.5	20	15.9	17	22.6	1	3
7.	Teledentistry can reduce non-urgent patient flow during pandemic										
	Agree	24	75	32	80	109	85.8	63	84	30	91
	Disagree	0	0	0	0	4	3.14	3	4	3	9
	Cannot say	8	25	8	20	14	11	9	12	0	0
8.	Teledentistry can come handy to provide oral health-care advice to people in rural areas and also during pandemic.										
	Agree	20	62.5	33	82.5	94	74.9	52	69.3	28	84.84
	Disagree	3	9.37	0	0	10	7.8	12	16	5	15.16
	Cannot say	9	28.12	7	17.5	23	18.11	11	14.7	0	0
9.	Government initiative is needed to increase the reach of teledentistry.										
	Agree	24	75	32	80	110	86.6	56	74.6	32	97
	Disagree	1	3.12	1	2.5	3	2.4	3	4	1	3
	Cannot say	7	21.87	7	17.5	14	11	16	21.4	0	0
10.	Teledentistry can have a big role in future practice, during the pandemic as well as after the pandemic.										
	Agree	22	68.75	31	77.5	99	78	58	77.3	28	84.84
	Disagree	3	9.37	4	10	9	7	1	1.4	1	3
	Cannot say	7	21.87	5	12.5	19	15	16	21.3	4	12.16
11.	Teledentistry will be a preamble in robotic dentistry.										
	Agree	14	43.75	23	57.5	66	52	48	64	22	66.73
	Disagree	5	15.62	2	5	11	8.6	3	4	2	6
	Cannot say	13	40.62	15	37.5	50	39.4	24	32	9	27.27
12.	Do you wish to practice teledentistry in the coming future?										
	Yes	30	93.75	35	87.5	107	84.26	56	74.6	30	91
	No	2	6.25	5	12.5	20	15.74	19	25.4	3	9

Out of total 307 participants, only 57% were aware of the term teledentistry. The percentage was more than study by Boringi *et al.* who found that 28% of participants were

aware of the subject^[14] and also the study by Alipour *et al.* 38% were aware.^[15] Plaza-Ruiz *et al.* had findings that 88% of participants aware of the term teledentistry and 12%

Table 3: Detailed result of questionnaire.

S. No.	Question	Response (n=307)	In %
1.	Have you ever heard about teledentistry?		
	Yes	175	57
	No	112	36.48
2.	Do not know	20	6.52
	Teledentistry is consultation through_____?		
	Only telephone	12	3.92
3.	Internet, computer, and telephone	250	81.43
	Do not know	45	14.65
	Is teledentistry applicable to all the branches of dentistry?		
4.	Yes	108	35.17
	No	127	41.36
	Do not know	72	23.47
5.	Online dental examination is quite similar and beneficial as the normal offline clinic setting?		
	Agree	62	20.2
	Disagree	151	49.2
6.	Cannot say	94	30.6
	Teledentistry can be used to give oral hygiene instructions?		
	Agree	245	79.8
7.	Disagree	19	6.2
	Cannot say	43	14
	Teledentistry can save time of patients as well as that of consulting dental physician?		
8.	Agree	227	74
	Disagree	23	7.5
	Cannot say	57	18.5
9.	Teledentistry can reduce non-urgent patient flow during pandemic.		
	Agree	258	84
	Disagree	10	3.25
10.	Cannot say	39	12.75
	Teledentistry can come handy to provide oral health-care advice to people in rural areas and also during pandemic		
	Agree	227	74
11.	Disagree	30	10
	Cannot say	50	16
	Government initiative is needed to increase the reach of teledentistry		
12.	Agree	254	82.7
	Disagree	9	3
	Cannot say	44	14.3
13.	Teledentistry can have a big role in future practice, during the pandemic as well as after the pandemic.		
	Agree	238	77.5
	Disagree	18	6
14.	Cannot say	51	16.5
	Teledentistry will be a preamble in robotic dentistry.		
	Agree	173	56.3
15.	Disagree	23	7.5
	Cannot say	111	36.2
	Do you wish to practice teledentistry in the coming future?		
16.	Yes	255	83
	No	47	15.3
	If no why _____		
17.	Because it is difficult to diagnose the disease through tele-examination. Many cancerous or pre-cancerous conditions can be missed by the doctor. Patient's presence in the office is must for the better understanding of the disease	1	
	I am not sure if it will work	2	
	Need some more idea about it, to draw any conclusion	1	
	Not so much understandable as well as effective	1	

were unaware.^[9] In the present study, majority of interns 22 (66%) and III BDS students 79 (62%) had heard the term teledentistry while most of the I BDS 18 (56%) and IV BDS students 37 (49%) had not heard the term teledentistry.

When asked about the mode of consultation in teledentistry, telephone, internet, and other media were said by 72% I BDS, 80% by II BDS, 85% by III BDS, 80% by IV BDS, and 82% by interns whereas only telephone was said by the remaining. This was alike the study by Boringi *et al.*, 92% I BDS, 86% II BDS, 82% III BDS, 95% IV BDS, and % interns said that it is the consultation through telephone and other media.^[14]

Teledentistry is considered applicable only for consultation services and imparting oral health-care advice to patient. When the participants were asked do they feel if teledentistry is applicable in all branches of dentistry, 35% said yes, 41% said no, while 23% said that they did not know. The results were nearly alike to a study by Nagarajappa *et al.* where 49% said yes, 23% said no, while 33% said that they did not know.^[11]

Online dental examination is similar and as useful as the normal offline clinic was said by 20% participants and it was considered not effective by 80%. It was similar to a study by Alipour *et al.* where 27% gave positive response.^[15] The study by Sen *et al.* showed contrasting results where 55% of participants considered it effective.^[12] Majority of III BDS students 66 (52%) and interns 19(57%) felt that teledentistry is not as effective as traditional dental office setting.

The fear of COVID-19 pandemic and increase in mucormycosis cases has forced people to stay indoors; hence, they are often reluctant to approach a dentist in person for an oral hygiene routine, which is an absolute necessity in current time. It was agreed on by most II BDS students 82% and interns 91% in our study whereas in a study by Boringi *et al.*, most positive responses were from I BDS 79% and II BDS 71%,^[14] and in a study by Sen *et al.*, they were also mostly from I and II BDS, 70%.^[12]

Teledentistry can act as a time saver for patients as well as that of consulting dental physician was agreed by 54% of participants in a study by Aboalshamat,^[13] and in our study by 74% participants, majority of which were interns 88% and III BDS 76%. Furthermore, a study by Alipour *et al.* had 77% of participants agreeing on this.^[15]

Most of the participants, 84%, said that teledentistry can lead to lesser number of non-urgent appointments, thus leading to decreased patient numbers. It can be seen that if online consultation is done, dentist can judge if patient needs prompt treatment or they are non-urgent.

Reach of oral care services in distant areas and also during pandemic can be improved by teledentistry which was agreed by 62% I BDS, 82% II BDS, 74% III BDS, 70% IV BDS, and 83% interns as compared to Sen *et al.* study showed that 66% I BDS, 26% II BDS, 33% III BDS, 67% IV BDS, and 50% interns agreed.^[12]

The study showed that 82% of participants felt that there is a need for government measures to increase the reach of teledentistry. Naragajappa *et al.* study showed the same 89% results.^[11]

Aboalshamat study found almost 50% of participants felt that teledentistry may have a huge role in future practice, during the pandemic as well as after the pandemic.^[13] The present study showed that 77% of participants felt this, most of which were interns 84%.

Khan and Omar, Bradley *et al.*, and Brüllmann *et al.* said that the main techniques used in teledentistry are pixel images and computerized records.^[16-18] All these aims to bring improved quality of oral care also reduce the burden of oral disease. Thus, teledentistry can be a preamble in robotic dentistry which was agreed on by 173 (56%) participants and disagreed by 23 (8%) participants whereas 111 (36%) were not sure, same to a study by Boringi *et al.*^[14] and Sen *et al.*^[12]

In our study, 83% said that they were interested to practice teledentistry in the future; most were I BDS 94% and interns 91%. In a study by Plaza-Ruiz *et al.*, 60% were affirmative^[9] while in a study by Aboalshamat, 77% were affirmative.^[13]

As every coin has two sides, likewise, teledentistry also comes with its pros and cons. It can act handy in providing dental services to people in remote areas or also during pandemic where social distancing is to be maintained but at the same time, there are many challenges to the use of teledentistry which include network connectivity, technological illiteracy, and emergency cases which cannot be assessed online. Thus, teledentistry can be handy while diagnosing a case or giving online instructions but physical appointment is must for dental procedures.

Limitations

It was a questionnaire-based study so the answers attempted by the students and interns can be biased. Furthermore, the study was conducted for a short duration of time. The study population is limited to only one institution; thus, these results cannot be generalized.

The study will have to be extended by involving other institutes and for longer duration of time so that a more precise results can be achieved which can be generalized.

CONCLUSION

The knowledge of participants concerning teledentistry was good. The attitude of participants toward teledentistry was found to be positive. Furthermore, there was keen interest in participants to practice teledentistry in the future. Promotion and motivation regarding teledentistry can be done through lectures and workshops.

There is a need for increasing the knowledge and expanding the reach of teledentistry in India. The current COVID pandemic tells us how disease transmission can be a rapid process. Thus, reducing the dental appointments and scheduling them through teledentistry can be a better

option as it is safe for the dentist as well as the patients. The Government of India along with Indian Dental Association should look into the perks of teledentistry and make amendments in the current dental practice. This will act as a boost for the budding dentists to practice teledentistry in coming future.

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Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

Author Dr. Usha Radke is in the Executive Advisory Board of the journal.

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