



# To Evaluate Knowledge Awareness and Outlook Regarding Teledentistry Among Dentists in Bangalore- A Cross-Sectional Study

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## Abstract

A rapidly developing country like India still has to face the problems of lack of availability of access to medical and dental care even today. With rapid digitalization happening all across the globe, the idea of using it to clear the gap between the patient and the dentist is a new revolution in the field of telemedicine. This article evaluates the awareness and outlook of dentists in south Bangalore concerning teledentistry. It also includes a discussion based on different questions and how dentists from different specialties and age groups answered them. We can conclude with this article, that, teledentistry is a very viable option for oral health care for those who have difficulty accessing it and that dentists are very open to accepting and adopting it.

## KEYWORDS

Teledentistry, Telemedicine, Teleconsultation, Pandemic, Awareness, Outlook.

## 1 | INTRODUCTION

Oral healthcare is a basic amenity that must be accessible to all. Unfortunately, in today's world, access to healthcare for all is still a challenge due to the lack of availability of doctors and facilities in certain regions of the country due to various factors. In emergent countries, the inhabitants of rural establishments find it difficult to access an oral health care specialist, as they are mostly found in urban cities.<sup>1</sup> One way of overcoming this challenge is by the implementation of teledentistry. Through teledentistry, it is possible to reach patients who do not have access to a dentist or cannot make the visit to the dentist due to barriers such as lack of time, morbidities, disabilities, security concerns, poverty, etc.

Healthcare has been rapidly digitalized in the last few years with the advancement of technology in medicine. This development has become even more pronounced because of the pandemic that hit the entire world with fear and panic of visiting their healthcare providers for regular care, for the fear of contracting the virus. Telemedicine, which had been in use even before the pandemic, became even more popular during the pandemic-induced stringent lockdowns.

Telemedicine is derived from "tele" in Greek, meaning distance, and "menderi" in Latin, meaning to heal.<sup>2</sup> Teledentistry involves the use of communication technology for providing dental care, consultation, and awareness in urban as well as rural areas. Using teledentistry, it is easier to identify high-risk populations, arrange for a referral to a dental surgeon or specialist, and encourage locally-based treatment. These save time, productivity as well as travel expenditure for the patient as well as the doctor.<sup>3</sup> Teledentistry can be used in all the specialties of dentistry.<sup>4</sup> Teledentistry has many advantages such as being cheaper than traditional in-person consultations, reduced travel expenses and time, and easier to take multiple opinions from other specialties. There is substantial evidence that proves higher patient satisfaction with e-oral health care. Patients had shown willingness for teleconsultation for a dental problem, and they were on the whole content due to saved travel time, saved working days, and swift treatment onset.<sup>5</sup> A few studies conducted showed that the use of teledentistry reduced the time spent by patients in the ED for non-traumatic dental conditions and also allowed the ED doctor to be able to attend to other emergent patients more effectively. The mean waiting time for patient-provider interaction was 40 minutes, mean time spent by dental patients inside the ED room was 46 minutes.<sup>6</sup>

**Abbreviations:** ED, Emergency Department

Studies conducted on connecting medical personnel to the dentist via teledentistry have shown good responses with only a few technical errors due to a lack of training on how to use the technology provided.<sup>7</sup> Studies have also been conducted on the awareness and acceptability of teledentistry among patients, with results showing that many were accepting of teledentistry. This study in particular questions the dentists in the city of South Bangalore on their knowledge and acceptability of teledentistry.

This study aims to instill the knowledge, awareness, and implementation of teledentistry among the general practitioners and dentists in Bangalore it is important to assess the awareness and outlook toward teledentistry among them. Hence the study is conducted among general practitioners to know their knowledge, awareness, and outlook toward teledentistry.

## 2 | MATERIAL AND METHODOLOGY

### STUDY DESIGN AND STUDY POPULATION

The study is a cross-sectional study involving an electronic survey for general practitioner dentists, validated 18 close-ended, self-made questionnaires were incorporated to evaluate the knowledge, outlook, and awareness among the general practitioner dentists residing in south Bangalore. The survey was mailed to a random sample of 120 general practitioner dentists from all 9 specialties with professional experience from 0 to 25+ years. South Bangalore was chosen for this survey due to it being a metropolitan city with good access to the internet as well as dental care.

### INCLUSION CRITERIA

All the general practitioners who gave their consent to participate in the study were considered in the inclusion criteria.

### DATA COLLECTION AND ANALYSIS

This was a cross-sectional survey-based study, where a validated 18-item questionnaire was distributed via online Google Forms. The survey form comprised 3 parts which included as follows-

1. Part 1: Sociodemographic details
2. Part 2: Questions related to knowledge regarding teledentistry
3. Part 3: Questions relating to assessing the awareness and outlook regarding teledentistry.

The completed questionnaire was collected and subjected to statistical analysis in terms of frequencies (yes or no) with a statistical package for social science (SPSS).

Furthermore, the sample was stratified by qualification and gender to get more representative samples of general practitioner dentists.

## 3 | RESULTS

A total of 250 general practitioner dentists from all 9 specialties with professional experience from 0 to 25+ years were covered in the study but only 200 participants responded and gave consent to participate in the study. Thus the response rate was 80%.

The majority of general practitioners (90%) had an understanding of teledentistry. 90% of general practitioner dentists think teledentistry helps to seek advice from an expert about a specified patient's problem.

86.7% knew that teledentistry is used for oral health education and continuing education in dentistry.

85% of general practitioner dentists feel teledentistry is a good option rather than in-person examination during a pandemic.

81.7% of general practitioner dentists think teledentistry is useful; in early diagnosis and easy consultation on oral diseases.

When dentists were asked whether teledentistry comprises the practice of using computers, the internet, and technologies for diagnosis and to give their opinion on a patient's treatment, a high response of 88.3% was obtained. 93.3% of participants agreed that teledentistry lessens chair side time, money, and travel for the dentist and the patient.

The majority of study participants concurred that teledentistry is a good option for the dentist as it reduces personal contact and lessens the risk of contamination during a pandemic.

85 % of participants think that teledentistry can expand the ease of access to specialists in rural and underserved communities for the dental communities for dental needs.

High responses (88.1%) were observed for the question: "Can teledentistry be an addition to regular dental care?".

Regarding the question of whether teledentistry is useful in quick diagnosis and effortless consultation, the response was 81.7%.

Similarly, 67.8% of respondents agreed with the question: "Do you think that teledentistry can be used to train dentists in primary dental care?".

Only a few respondents (45%) believed that teledentistry can violate patients' privacy.

66.1% of participants have had a consultation with a patient using a smartphone and its camera.

When enquired about attending a lecture or course about teledentistry, only 30% of participants responded with 'yes'.

Similarly, only 21% of participants have experience in using teledentistry. 65% of respondents think that teledentistry will be a standard method of oral health care delivery in the future.

66.7% of general practitioner dentists have communicated with the patient during the (pandemic) situation.

A high response of 91.7% was obtained for the question: "Will you practice teledentistry in the future?".

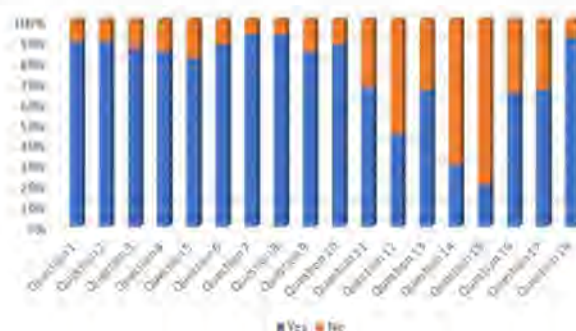


Fig 1: Bar diagram representing the responses to all the questions.

Teledentistry is not a new specialty. It is, in actuality, a different method for providing dental services. The advantage of teledentistry in remote areas cannot be stressed enough. Its application is of greatest significance in rural and urban areas where there is a dearth of specialist consultation. Teledentistry has been advancing since 1994 as a means to allow dental professionals to communicate with one long distance, allow collaboration by multiple practitioners, and involve the exchange of clinical information and images over remote distances for dental consultations and treatment planning.<sup>8</sup>

In the present study, the knowledge and awareness regarding teledentistry were assessed among general practitioner dentists. The majority of practitioners were aware of teledentistry but very few had attended a lecture or hands-on training in using teledentistry.

The majority of participants (86.7%) were aware that teledentistry can be used for dental health education. 93.3% of participants believed that teledentistry lessens chair time, money, and travel for the dentist and the patient. Similar results were seen in a study conducted by Bauer et al. (2001).<sup>9</sup>

The questions regarding the use of teledentistry to seek advice from an expert about the patient's ailment had been agreed upon by 90% of participants. Similar results have been obtained in other studies regarding the same.<sup>10,11</sup>

Noteworthy contrast was found in response to questions like, "Do you think that teledentistry can be used to train dentists in primary dental care?" (67.8%).

In a study aimed at discerning the willingness of patients to undergo online consultation, it was found that a major portion (87%) were inclined towards recommending the use of digital, remote counseling instead of face-to-face appointments with their family and friends, while only 13% were apprehensive of recommending it.<sup>12</sup>

In the present study, it was found that 90% of general practitioner dentists knew teledentistry.

Very few (45%) participants think teledentistry can violate patients' privacy, dentists who are engaged in teledentistry must ensure the safety and security of their systems and transmitted data. User access logs, password protection, and data encryption can help in protecting patient confidentiality.

A study conducted in Saudi Arabia showed that one-third of participants think that teledentistry might breach patient privacy, and it was ranked by participants as one of the most significant hurdles to teledentistry use.<sup>13</sup>

Other studies conducted showed that dentists with 11 to 15 years of experience showed the lowest score for excitement as they were resistant to the new technology not to lose their patient pool.<sup>14</sup>

In other studies conducted it was found that only 74% of dental practitioners feel that dental examinations via computers and intraoral cameras are as precise as dental clinic exams.<sup>15</sup>

The study is limited in the aspect that it included only dentists practicing in south Bangalore who live in a metropolitan city and have good access to the internet and also that they cannot be used to extrapolate the results to other populations. The study also did not include dental students who are going to be the most influenced by changes such as teledentistry entering clinical dentistry.

**Table 1: Sociodemographic characteristics**

Age (Years)	Frequency (in %)
20-30	73.8
30-40	23
40-50	3.2
<b>Sex</b>	
Males	65.6
Females	34.4

The above table gives the sociodemographic details of the participants of the study. With the help of this data, it was made possible to understand the differences in the adaptability of practitioners with different years of work experience. (Table 1)

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**Table 2: Dentists from various specialists who participated in the study**

Field of Specialty	Frequency (in %)
General Practitioner	37.70
Oral and Maxillofacial Surgery	8.30
Endodontics	14.8
Oral Diagnosis/ Radiology	4.66
Orthodontics	2.33
Pediatric Dentistry	16.00
Periodontology	2.33
Restorative Dentistry	4.66
Prosthodontics	9.32

The above table gives the distribution of the participants who participated in the study based on their specialty. This data gives insight into what practitioners of different specialties feel they can achieve through teledentistry and are more open to adapting it. For example, in a study conducted. It was seen that the majority of participants selected community dentistry followed by oral medicine, dental hygiene, and orthodontics to be benefited from teledentistry. (Table-2) This reflects a narrower vision of limiting teledentistry to screening, diagnosis, or patient education.<sup>16</sup>

**Table 3: Response to Knowledge, Awareness and Outlook-Related Questions**

Q. No	Knowledge, awareness, and outlook-related questions	Yes (%)	No (%)
1.	Do you know what teledentistry is?	90	10
2.	Do you think teledentistry helps to consult with an expert about a specific patient's problem?	90	10
3.	Do you know that teledentistry is used for dental health education and continuing in dentistry?	86.7	13.33
4.	Do you think teledentistry is a good option rather than an in-person examination during the pandemic?	85	15
5.	Do you think teledentistry is useful in early diagnosis and easy consultation on oral diseases?	81.7	18.33
6.	Is teledentistry about the practice of the use of computers, the internet, and technologies to diagnose and provide advice about treatment over a distance?	88.33	11.66
7.	Do you think that teledentistry lessens chair side time, money, and travel for a dentist and the patients?	93.33	6.66
8.	Do you agree that teledentistry is a good option for the dentist as it reduces personal contact and lessens the risk of contamination during the pandemic?	85	15
9.	Do you think that teledentistry can increase the accessibility to specialists in rural and underserved communities for their dental needs?	85	15
10.	Can teledentistry be an addition to regular dental care?	88.1	11.66
11.	Do you think that teledentistry can be used to train dentists in primary dental care?	67.8	32.5
12.	Do you think that teledentistry can violate patients' privacy?	45	55

Sl. No	Knowledge, awareness, and outlook-related questions	Yes (%)	No (%)
13.	Have you ever had a consultation with a patient using a smartphone and its camera?	66.1	33.33
14.	Have you attended a lecture or course about teledentistry?	30	70
15.	Did you think that in the future, teledentistry will be a standard method of oral health care delivery?	21	79.1
16.	Did you have hands-on training in using teledentistry?	65	35
17.	Have you communicated with any patients during the pandemic situation?	66.7	33.33
18.	Will you practice teledentistry in the future?	91.7	8.33

#### 4 | CONCLUSION

The results of the study indicated satisfactory knowledge, awareness, and outlook regarding teledentistry among general dentists. The knowledge and awareness can be improved further by the continuation of dental education programs and awareness campaigns. Concerns such as adaptability to new technology and security risks need to be addressed. With all the technological developments taking place in the field of teledentistry, practitioners may eventually link up to virtual health clinics and an entirely new era of dentistry can be created.<sup>16</sup>

#### 5 | ACKNOWLEDGMENT

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#### CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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