



Research Article

Journal of MAR Dental Sciences (Volume 4 Issue 2)

The Use of Teledentistry During the COVID-19 Pandemic and Beyond: A Survey

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Received Date: November 26, 2021

Published Date: December 01, 2021

Abstract

Aim: An online survey was conducted to assess the current state of the utilization of Teledentistry amid the current COVID-19 pandemic and before it, and to evaluate the benefits of continuing Teledentistry practice in the future. Methodology: A brief online questionnaire was sent across to 125 dentists in India out of which 101 participants responded. The topics covered by the survey included knowledge and usage level of Teledentistry, the general attitude towards Teledentistry applications, perceived efficacy of Teledentistry in enhancing the quality of care; and intention to practice it in the future. In all, 82.8% of respondents were aware of Teledentistry, only about half of the dentists are practicing it and most of them started it during the COVID-19 pandemic. However, many participants were not convinced that it could improve clinical practice. Better awareness of the state of the art of research and development in Teledentistry is needed. Better dissemination of information about it could make it, a game-changer, help prepare us for future catastrophes, and the future of healthcare.

Introduction

According to American Dental Association, teledentistry refers to the use of telehealth systems and methodologies in dentistry while telehealth refers to a vast variety of technologies and tactics to deliver virtual medical health and education services. (1,4) Telehealth is not a specific service but a collection of means to enhance care and education delivery.

Teledentistry can include patient care and delivery using synchronous or asynchronous modalities or sometimes more or both together. Synchronous includes live, two-way interaction between a person (patient/ caregiver/ provider) and a provider using audiovisual telecommunications technology (Live video). Asynchronous includes the transmission of recorded health information like radiographs, photographs, videos, digital impressions, photomicrographs, or charts of patients through a secure electronic communication system to a practitioner who then uses this information to evaluate a patients' condition or provide a service outside of a real-time or live interaction. (1,2)

Remote patient monitoring modality includes a collection of personal health and medical data from an individual in one location through electronic communication technologies which are then transmitted to a provider using a data processing service in a different location for use in care and related support of care. Mobile health is a widely used modality in which healthcare and public health practice and education is supported by mobile communication devices such as cell phones, tablet computers and personal digital assistants or the PDA. (3)

Background of Telehealth: (5)

The origins of telehealth date back to the use of hierographs and scrolls to share information and news about health-related events like an outbreak of a pandemic or an epidemic. Some ancient civilizations also used smoke signals to warn the nearby cities of sickness. 4

With the advent of advanced telecommunication systems and technology, the means of sharing health information and data changed. It started with the usage of telegraphs to report casualties during the civil war to the use of telephones during the Korean and Vietnam wars. The invention of television in the 1950s gave rise to videoconferencing with the first videoconference for telepsychiatry held by the Nebraska Psychiatric Institute in 1959.

A breakthrough in technology and telecommunications was the advent of the internet in 1990 that revolutionized the way telemedicine was used. Data such as X-rays, scans, ECG, medical reports, etc could be easily shared. The Internet also enabled real-time audio and video interaction between individuals.

Recent times witnessed the evolution of smartphones and electronic technologies that has made telemedicine more accessible and easier to use than ever before.

General Considerations:

Historically, the most direct way to provide patient care has been an in-person (face to face) direct examination but the advancements in telehealth have enabled dentists to communicate with patients remotely as well. This remote patient care can be an effective way to widen the reach of dental professionals and increase access to oral healthcare by delimiting distance barriers.

Teledentistry Before Covid-19:

The utilization of teledentistry is rapidly increasing and diversifying in the west and developed countries and 70-75% of the total number of hospitals in the US are already making use of it. Yet in India, only the unprecedented constraints of the COVID-19 accelerated the use of digital technologies as a way of functioning in healthcare delivery.

The concept of virtual healthcare “SEHAT” was launched by India way back in 2015. SEHAT was a novel initiative that aimed at connecting 60000 healthcare structures yet it failed to achieve the expected benchmarks in the Indian population. This was primarily because of the lack of a digital health ecosystem and adequate regulation of managing the medical data and legal validity to telemedicine practices.¹⁴

However, the outbreak of the COVID-19 pandemic and worldwide lockdowns resulted in the need and necessity of a virtual healthcare system. To fulfill such requirements, especially in rural India where there is a dearth of specialist and general medical practitioners, the government proactively took initiatives and issued guidelines to decongest healthcare facilities and paved the way to consult doctors remotely without impeding lockdown measures.

Such measures reduced the chances of transmission of the virus. Thus, with gradual implementation, the concept of telemedicine/ teledentistry is expected to evolve significantly even in the post COVID phase and the present times providing an unparalleled opportunity to the government to adapt and advance virtual healthcare policies.

Research has also revealed that adoption of medical innovations in general and Telehealth, in particular, does not only have to do with government implementation but also relies on socioeconomic, demographic, psychological and communication-related factors. Another factor would be the user’s/ practitioner’s acceptance of technology. It wouldn’t be wrong to state that the practitioner’s perception

of the usefulness of telehealth is directly related to his intention of using the technologies related to it.
(10)

Aim and objective

A questionnaire was developed to ascertain the use of teledentistry by practitioners.

The questionnaire aimed at determining whether the practitioners practiced teledentistry before the COVID-19 pandemic or during it.

Moreover, it also provided an insight into the perceived advantages and benefits of teledentistry by dental professionals.

Methodology:

A precoded questionnaire was sent electronically to 125 dentists out of which 109 participants responded.

The respondent's email address was collected at the beginning of the questionnaire.

A structured custom-made questionnaire with 10 questions was designed to ascertain the use of teledentistry by dentists in India.

Samples were selected randomly without any inclusion criteria.

The survey was conducted with the consent and understanding of each subject.

Annexure

The Use of Teledentistry During the Covid-19 Pandemic and Beyond: A Survey

* Required

1. Email address *

2. Are you aware about the term 'teledentistry'?

Yes

No

3. Do you provide the service of teledentistry in your practice?

Yes

No

4. Have you been providing teledentistry before the COVID-19 pandemic?

Yes

No

5. Did you start providing teledentistry during the COVID-19 pandemic?

Yes
 No

6. Did teledentistry provide desirable results in your patient's diagnosis and treatment?

Yes
 No
 Not applicable

7. Was the patient content with the treatment through teledentistry?

Yes
 No
 Not applicable

8. Patient's turn up promptly for the recall check up?

Yes
 No
 Not applicable

9. Patient's flow for teledentistry consultation since you have begun has:

Increased
 No change
 Decreased
 Not applicable

10. Is teledentistry beneficial for your practice?

Yes
 No
 Not applicable

11. Would you like to promote your colleagues towards teledentistry service?

Yes
 No
 Maybe

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Google Forms

Figure 1, Figure 2: Sample survey form

Data Analysis

Data analysis is defined as a process of cleaning, transforming, and modeling **data** to discover useful information for business decision-making.

The purpose of **Data Analysis** is to extract useful information from **data** and taking decisions based upon the **data analysis**. Here we have analyzed the collected data by using **Python** software.

Study Design

The model or design of this study is **survey research**.

Survey research refers to a quantitative and qualitative method with two important characteristics. First, the variables of interest are measured using self-reports. Survey researchers ask their participants (who are often termed as **respondents** in survey research) to report directly on their thoughts, feelings, and behaviors. Second, considerable attention is paid in terms of sampling. In particular, survey researchers strongly prefer large random samples because these provide the most accurate estimates of what is true in the population. Survey research may be termed as the only approach in psychology in which random sampling is routinely used. Beyond these two characteristics, almost anything conforms to survey research.

Results

A total of 109 dentists out of a potential 125 responded to the survey.

Results of the survey indicated that 83.3% of respondents were aware of Teledentistry but only 56.7% qualify as adopters.

63.3% of respondents started practicing Teledentistry only during the COVID-19 pandemic while only a mere 36.7% practiced it earlier.

56.3% of the respondents felt teledentistry provided desirable results in their practice while 13.3% felt the results were not satisfactory. A not applicable category was left for the respondents who did not practice teledentistry at all and thus they contributed to another 13.3% as well.

The survey further suggests that 53.3% of the practitioners felt that their patients were content with the consultations provided through teledentistry and the same number of respondents indicated that their patients were turning up promptly following these consultations. The survey moreover revealed a 36.6% increase in patient in-flow for practitioners providing teledentistry. 13.3% revealing it was the same and another 13.3% revealing it decreased. 36.7% included the practitioners who did not practice teledentistry at all.

The majority of the practitioners (60%) felt that teledentistry was beneficial for their practice. What is surprising is 6.7% of respondents felt that teledentistry is not beneficial for their practice.

66.7% of the participants showed a positive attitude towards teledentistry and hence wanting it to promote it with their colleagues while 33.3% were more likely not to promote it.

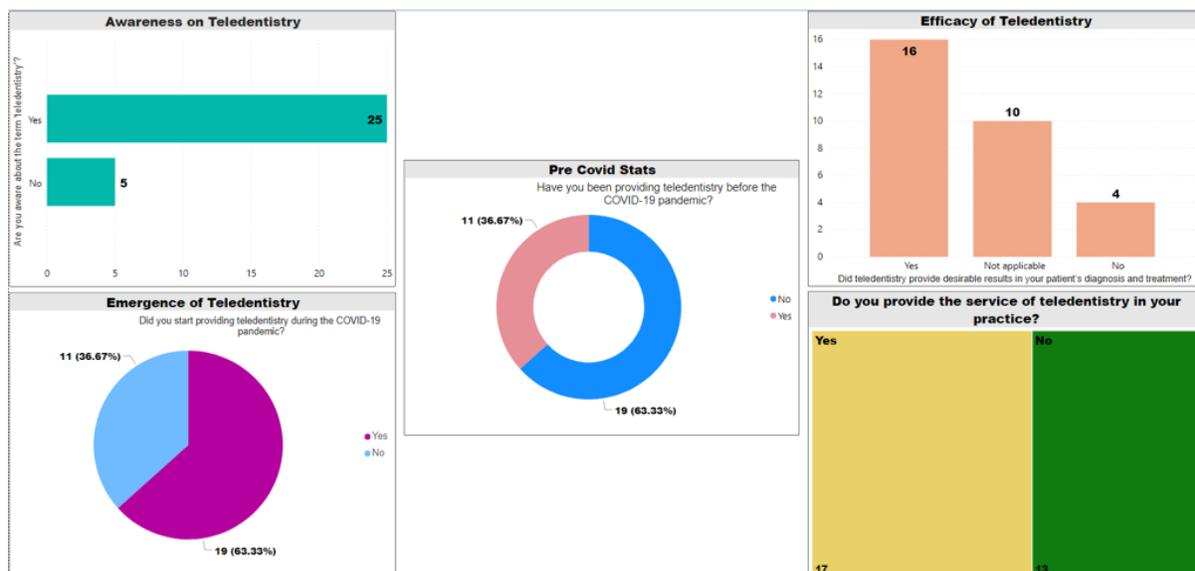


Figure 3

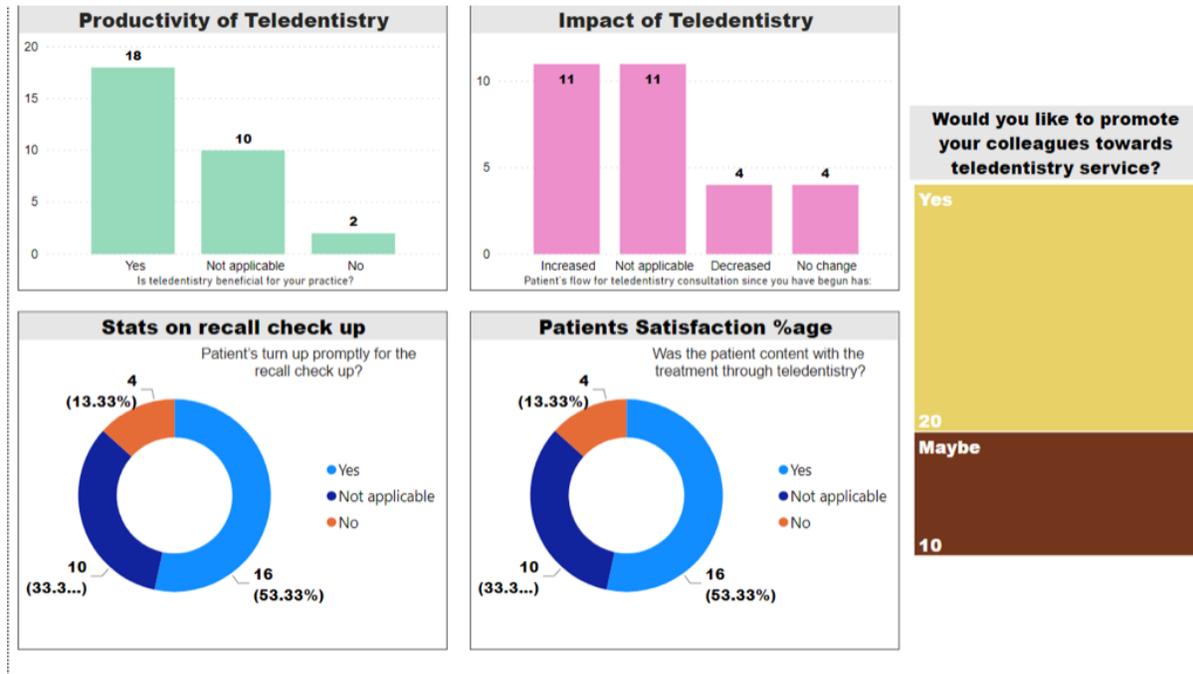


Figure 4

Discussion

A major limitation of this survey was the low response rate. As such the results of this survey cannot be generalized to all dental practitioners. Assuming there may be bias, the results from the 109 practitioners who responded suggest the following.

The experience of the dentists with teledentistry can be called very limited. 83.3% of the respondents were familiar with the term ‘teledentistry’ yet only 56.7% qualified as adopters. The most remarkable finding from the survey is that how the impact of COVID-19 had prompted practitioners to adopt teledentistry in their practice.

In these extraordinary times, teledentistry enabled immediate patient-doctor contact, reducing the need to travel and waiting time in practices. This greatly reduced chances of cross-contamination and further spread of the virus.

One major patient benefit of Teledentistry is reduced cost. In addition, teledentistry also allows patients to choose their dentist on factors except for the distance, thus allowing patients to get an opinion from a practitioner who might otherwise be geographically away.

A major limitation of telehealth practices would always remain that they are only limited to consultations, especially in dentistry. The need to visit the practitioner for scans and treatment will always continue.

The survey further suggests that the dentist's perception of patient satisfaction from teledentistry was moderate. This could be attributed to the need for physical examination and patients' perception of the advantages of teledentistry.

These estimations can be interpreted in several ways.

It may be because the practitioners weren't convinced that their patients can use teledentistry technology or because of the absence of a physical examination of the oral cavity. This reason could also serve as the basis of average patient recall check-ups following teledentistry consultations.

Despite all the above factors, patient in-flow for most of the practitioners had increased. As mentioned previously, teledentistry makes it easier to connect private practices with outreach programs by eliminating the barrier of distance.

It also enhances relationships between practitioners and specialists. Moreover, reduced chairside times enable practitioners to treat more patients per day since consultations are virtual. Follow-up checkups can be done virtually as the patient can be reached electronically.

Teledentistry can help dentists increase their patient reach and number of patients as it can help connect their practice with far-off and remote locations where there is a scarcity of practitioners. This holds exceptionally true for rural India.

All these factors suggest the reason for most of the practitioners being convinced that teledentistry is beneficial for their practice. The practitioners who are more confident about the potential of teledentistry to improve the effectiveness of therapeutic intervention and patient compliance are more willing to adopt this technology and promote it with their colleagues.

Adoption Challenges of Teledentistry

- Although the benefits of Teledentistry are established and the pros outweigh the cons, yet several challenges are standing in the way of professionals adopting it and introducing it into their practice.
- Individually, a pronounced challenge would be the lack of direct contact with patients. In India, in a large number of areas, IT literacy is weak. There may be a decline in the accuracy of health information available, and there may be too high of an increase in clinic time and workload.
- Talking about Indian infrastructure, there is a lack of internet access and technical support in most rural areas. The technology may also seem too complex for many people.

- Lastly, on an organizational level, there is a lack of reimbursement structures and taxation guidelines. There is also a higher danger of malpractice and legal problems in the adoption of teledentistry.

Conclusion

The findings of this survey suggest that if implemented correctly and with improved infrastructure, teledentistry could be a complete game-changer. It can give dental access to people who wouldn't otherwise have it.

Teledentistry has multiple applications, optimal care and virtual care are possible and extremely helpful in a pandemic scenario like COVID-19. It uses high-definition transmission and clarity to provide rapid, accurate and real-time consultation from professionals with expertise. Healthcare professionals can evaluate, diagnose and treat in a seamless environment.

With its many benefits, for dentists and patients alike, teledentistry is exponentially advancing and becoming more popular in the dental field.

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