Teledentistry: Is it the Future of Rural Dental Practice? A Cross-sectional Study

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Aim: To bridge the gap between urban and rural population, a vast number of researches are being carried out. Teledentistry is one of the technological advances in dentistry. It is defined by Cook in 1997 as “the practice of using video-conferencing technologies to diagnose and provide advice about treatment over a distance.” This study aimed to assess the knowledge, attitude, and practice of teledentistry among general dentists in and around Coimbatore district, Tamil Nadu, India. Materials and Methods: A self-administered closed-ended questionnaire was designed. The questions were divided into three sections based on knowledge, attitude, and practice. Data collected from the questionnaire were entered in Microsoft Excel. Level of significance (P < 0.05) was set at 95% confidence interval and P < 0.01 at 99% confidence interval was maintained, and the data were statistically analyzed. Results: The majority of the dentists had less knowledge about teledentistry. About 73% of the dentists believe that teledentistry can provide access of specialists to the rural population. Conclusion: Of the dentists, 90% agree that teledentistry would be the major advancement in the future; however, there needs to be a specific module of operation and promotion of the module in future.

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Introduction

In the recent era, the need to maintain oral health has increased dramatically. In a country with a vast majority of the population in the rural area, access to specialty dental care is much reduced due to varied reasons such as economy, distance of the rural area from the urban area, awareness of oral health, and negligence.[1,2] To bridge the gap between urban and rural population, a vast number of researches are being carried out. Teledentistry is one of the technological advances in dentistry. It is defined by Cook in 1997 as “the practice of using video-conferencing technologies to diagnose and provide advice about treatment over a distance.” Teledentistry is the way by which quality dental care can be delivered to rural patients with the help of computers, internet, and softwares.[9] This study aimed to assess the knowledge, attitude, and practice of teledentistry among general dentists in and around Coimbatore district, Tamil Nadu, India.

Materials and Methods

A cross-sectional questionnaire study was conducted among practicing dentists in and around Coimbatore district, Tamil Nadu. Sample size calculation was done using the formula:

Sample size = \( \frac{Z_{\alpha/2}^2 P(1-P)}{d^2} \)

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Sample size derived was 200. A total of 345 dentists were approached for the survey; few of them rejected to take up the survey due to their busy schedules. Using convenience sampling method, a representative population of 200 was selected from the district.

Data collection
A self-administered closed-ended questionnaire was designed. The questions were divided into three sections based on knowledge, attitude, and practice. Dentists were contacted and prior appointment was taken before the survey. Each dentist was met in person and explained about the purpose of the study followed by procuring an informed consent. Duration of data collection was 30 min. Of 200 dentists surveyed, only 73 of them were aware about teledentistry. Excluding 127 from the study, the data collected from 73 dentists were analyzed.

Statistical analysis
Data collected from the questionnaire was entered in Microsoft Excel. Level of significance ($P < 0.05$) was set at 95% confidence interval and $P < 0.01$ at 99% confidence interval was maintained.

Results
This questionnaire was given to 200 dentists in Coimbatore district. Only 37% dentists (51 males and 22 females) responded to the questionnaire. Of the dentists, 60% were postgraduates and 40% were undergraduates [Figure 1].

Among 73 dentists, majority of them were aware about teledentistry as shown in Table 1. Majority of the dentists had positive attitude about teledentistry in different aspects as shown in Table 2. Of the dentists, 78% agree that it provides accessibility of specialists to rural population.

Table 3 shows practice of teledentistry among the dentists. Most of the dentists agree that teledentistry have positive aspects such as reduced cost, less time consuming, good availability and efficiency of teledentistry equipments and helpful in rural practice. 96% of dentists believe that teledentistry could violate patient privacy and might have data entry mistakes.

Discussion
Teledentistry is an innovative tool whose potentials are yet to be explored. The increased access to internet and other telecommunication systems offers a wide array of scope for the development of teledentistry.[3,4] A questionnaire was used to assess the knowledge, attitude, and practice of teledentistry among the general dentists in and around Coimbatore district.

A group of 200 general dental practitioners were assessed, of which only 73 dentists were aware of teledentistry, which shows a lack of awareness among the three-fourths of the general dental population. Of the 73 respondents, the basic operational knowledge of teledentistry was present for almost all of the respondents. The results were in accordance with the study conducted at Minnesota University.

Only a 50% of the general dentists had the knowledge of the use of teledentistry in different branches of dentistry, in assessment and improvement of dental care to rural population. One half of the general dentists’ attitude to understand and monitor patients’ oral health problem over internet and to accept it as a standard system of operation was positive.[5,6]

More than three-fourths of the population of dentists believed that teledentistry can provide accurate information over telecommunication devices and provide specialist dental care to rural population, and also believed that teledentistry can be a convenient form of examination and health care delivery.[7-9]

A majority of the dental practitioners accept the fact that teledentistry can reduce cost of treatment and also save time for the patient and the dentist.[10,11] More than 90% the dentists believe that teledentistry can violate the privacy of the patient.[12,13] More than 90% the dentists believe that teledentistry can violate the privacy of the patient.[12,13] More than 90% the dentists believe that teledentistry can violate the privacy of the patient.[12,13] More than 90% the dentists believe that teledentistry can violate the privacy of the patient.[12,13] However, almost all the dentists believe that there was a wide scope for teledentistry in India, owing to the advantages weighing over the disadvantages of teledentistry.

Conclusion
The exponential growth in the use of the telecommunication devices and its use in the transfer of data would definitely change the way of diagnosis and
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Treatment rendered to rural population. Teledentistry is yet to become an integral part of the oral health care system. However, in the future it will be the novel way to access an oral health care for the rural population. The awareness of teledentistry was more for the postgraduate dentists when compared to the undergraduate dentists, suggesting the need for increasing the awareness among general dentists at undergraduate level. Also a model should be proposed to implement teledentistry, which could be funded by the government to take teledentistry to all horizons of oral health care systems.

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Conflicts of interest
There are no conflicts of interest.

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Table 1: Knowledge

| Question                                                                 | Yes   | No  |
|--------------------------------------------------------------------------|-------|-----|
| Teledentistry is a practice to provide advice about treatment over a distance | 69 (95%) | 4 (5%) |
| Is teledentistry a face-to-face interview?                                | 4 (5%) | 69 (95%) |
| Can teledentistry help in obtaining an expert opinion?                   | 37 (51%) | 36 (49%) |
| Can teledentistry be used for dental education and training primary health care dentists over internet? | 22 (30%) | 51 (70%) |
| Can teledentistry monitor patient health?                                | 39 (53%) | 34 (47%) |
| Is teledentistry used in every branch of dentistry?                      | 36 (49%) | 37 (51%) |
| Access to oral health care can be improved by teledentistry             | 43 (59%) | 30 (41%) |
| Can current dental services also include teledentistry?                  | 48 (66%) | 25 (34%) |

Table 2: Attitude

| Question                                                                 | Yes   | No  |
|--------------------------------------------------------------------------|-------|-----|
| 1. Teledentistry can help understand and monitor patients’ oral health problem over internet? | 39 (53%) | 34 (47%) |
| 2. Can teledentistry provide accurate information regarding dental condition using computers and intraoral cameras? | 47 (64%) | 26 (36%) |
| 3. Can teledentistry be a convenient form of oral health care examination and treatment delivery? | 43 (59%) | 30 (41%) |
| 4. Will teledentistry be a standard way of oral health care delivery?    | 39 (53%) | 34 (47%) |
| 5. Can teledentistry increase accessibility of specialists to rural population? | 57 (78%) | 16 (22%) |

Table 3: Practice

| Questions                                                                 | Yes   | No  |
|--------------------------------------------------------------------------|-------|-----|
| 1. Teledentistry reduces cost and saves time for patient and dentist?    | 58 (79%) | 15 (21%) |
| 2. Do you think teledentistry can violate patient privacy?               | 67 (92%) | 6 (8%) |
| 3. Do you think proper equipments are available for practice of teledentistry? | 55 (75%) | 18 (25%) |
| 4. Do you trust the efficiency of teledentistry equipments?             | 53 (73%) | 20 (27%) |
| 5. Do you think the use of teledentistry equipment may be difficult?     | 57 (78%) | 16 (22%) |
| 6. Do you think teledentistry might have data entry mistake?             | 68 (93%) | 5 (7%) |
| 7. Will teledentistry be the future of rural dental practice?            | 70 (96%) | 3 (4%) |
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