

# Tele-Dentistry during Covid-19 Pandemic; Perceptions of Dentists in Pakistan

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## ABSTRACT

**Objective:** The aim of this study is to analyze the perception of Dentists in Pakistan towards Tele-Dentistry and its usefulness during Covid-19 pandemic.

**Materials & Methods:** The study was conducted among general dentists of Lahore after taking approval from the Ethics and Research Committee of the institution. This descriptive cross-sectional study was completed over the period of three months. Non-probability snowball sampling technique was used.

**Results:** The results revealed that most of the dentists (89.5%) perceived that Tele-Dentistry can be of help during COVID 19 Pandemic in Pakistan.

**Conclusion:** Most of the dentists were aware of teledentistry, and its uses, advantages and disadvantages in Covid-19 pandemic.

**Keywords:** teledentistry, Covid-19, dentistry, Lahore, perception, health care professionals

## INTRODUCTION

COVID-19, a pandemic situation has initiated a mess around the world. At international level, it becomes an emergency condition towards public health. Pakistan is also going through a challenging situation as the number of infected/positive cases is increasing day by day. Fear of getting infected by corona virus due to the unique and rapid transmission which made the citizens hesitant to visit public places, even medical and dental hospitals. It also prevents them to seek prompt medical and dental care. The national health authorities restricted dental care to urgent and emergency services only.<sup>1</sup>

Considering the current scenario, many patients having oral health related issues are practically devoid of expert advice. There is a need for healthcare facility which provides remote dental consultation opportunity. This will prevent unnecessary commute and patient load in clinics and hospitals.<sup>(2)</sup> Tele -Dentistry services have a great potential to serve the current needs and is being utilized elsewhere in the world. Dental healthcare provider policies and procedures should be revisited to incorporate Tele-dentistry systems to address some of the unique challenges in managing dental diseases during this infectious disease outbreak of corona virus.<sup>(3)</sup>

A fundamental policy for health care rapid control was "forward triage" — the patients' categorization in advance, when coming to the department of emergency. Direct-to-consumer (or on-demand) Tele-dentistry is a method to advance triage that screen the patients proficiently which is equally patient-centered and favorable to self-quarantine. In the longer, it prevents the clinicians, patients and the public from exposure. Tele-dentistry is available 24/7 which is quite beneficial for patients.<sup>(4)</sup>

Tele-dentistry is a rapidly growing field as it is a proficient amalgamation of information technology in the field of dentistry. A quick and effective information transferring system works through smartphones and computers helps to connect patients with dentists in remote areas while ensuring the successful exchange of problem and solution among patient and dentist. It can also be effective in terms of panel discussions about treatment planning to have better results.<sup>(5)</sup>

Due to growth of technological capabilities, it is the possibility that introduction of Tele-dentistry may alter the current dental practicing ways. Tele-dentistry has become a quickly emerging sub-field of telehealth which already has a vast effect on medical industry.<sup>(6)</sup> Tele-dentistry can be greatly utilized with rural communities or those of underserved populations. It would increase the accessibility of specialists, besides decreasing time and cost associated with specialty consultations. It also decreases

isolation of practitioners by providing peer contact, specialist support and postgraduate education. General dentists will send patient records (images, text and sounds) to dental specialists, often enabling the specialist to make a diagnosis and develop a treatment plan without having to see the patient in person.<sup>(7)</sup>

The scope of Tele-dentistry is nearly non-existent in Pakistan but under the given circumstances, its pertinence is crucial. Scarce knowledge exists specifically to assess Dentists views regarding Tele-dentistry and its applicability during Covid-19 dissemination in Pakistan. The aim of this study is to analyze the perception of Dentists in Pakistan towards Tele-Dentistry and its usefulness during Covid-19 Pandemic.

## MATERIALS AND METHODS

The study was conducted among general dentists of Pakistan after taking approval from the Ethics and Research Committee of the institution. This descriptive cross-sectional study was completed over the period of three months (June 2020-August 2020). Non-probability snowball sampling technique was used. A sample size of 310 was calculated with 80% power of test and 5 % level of significance by using the formula:  $n = z^2 P(1-P)/d^2$ .

A self-formulated structured questionnaire in English was administered. The questionnaire comprises of two sections, first section consists of questions regarding demographics. The second part consists of questions regarding perceptions of Dentists towards Tele-Dentistry during Covid-19 Pandemic.

A pilot study was conducted on 100 dentists prior to this study to pre-test the validity and reliability of the questionnaire. The subjects were asked to respond to each item according to the response format provided in the questionnaire. No identifiable data like name or email address was obtained from the participants to maintain their confidentiality.

**Statistical Analysis:** The data was compiled and analyzed using SPSS version 25. The chi-square test was used to compare the scores of the samples. P value less than 0.05 was considered statistically significant with confidence interval of 95%.

## RESULTS

As demographic variables, job status and year of dental practice was asked. 39.80% participants were general dentists, 20.39% were post-graduate residents, 9.53% participants were specialists dentists, 6.57% were working in academic faculty, 7.23% participants were practicing as general dentists as well as doing post-graduation and 9.86% participants were practicing as specialist dentists as well as were the faculty members of

academic institutions and 6.57% participants were practicing as general dentists as well as specialists along with working in academic faculty.

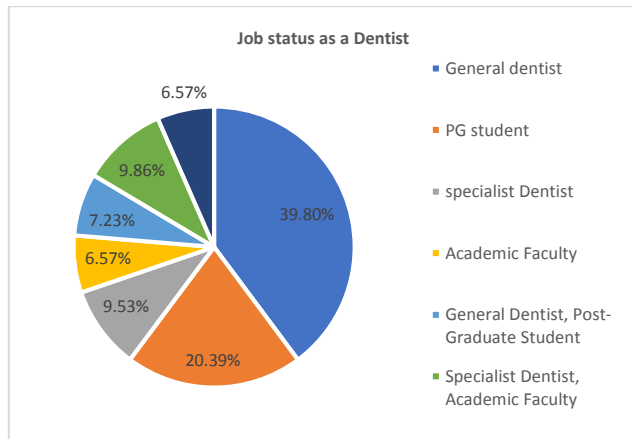


Figure 1: Job Status Percentage of participants of the study

Most of the participants fall under the 1 to 5 years of dental practice (43.75%), followed by participants with less than 1 year (24.01%). The dentists with 5 to 7 years of experience (16.77%) were participants of the study. Lastly, 15.46% participants were having more than 10 years of experience.

The descriptive statistics results revealed that most of the dentists (89.5%) perceived that Tele-Dentistry can be of help during COVID 19 Pandemic in Pakistan. On asking about Tele-Dentistry as aid in screening patients for COVID-19, 78.6% dentists replied in positive. According to 78.6% dentists' view, Tele-Dentistry should question the patient regarding Self-Management. 88.5% dentists believed that Tele-Dentistry could be helpful in reducing unnecessary visits to a dentist in the times of

COVID Pandemic. Majority of the participants (81.3%) reported that Tele-Dentistry can identify High Risk Category (Medically Compromised) patients. In identifying patients requiring Emergency Dental Care, 89.8% dentists reported that tele-dentistry could be a supportive practice. According to 89.5% participants reported tele-dentistry can preventive patients from self-medication, 91.8% reported the benefits of tele-dentistry in terms of aiding quick emergency referrals, and 92.1% dentists reported that tele-dentistry can also help in post-treatment follow-up. According to 91.8% dentists responded positively on providing training to dentists with regards to Safe Drug Prescribing for Tele-Dentistry Services. 58.9% dentists were in favor of providing free tele-dental consultation. 87.5% dentists were willing to provide their services as dentists at tele-dentistry platform.

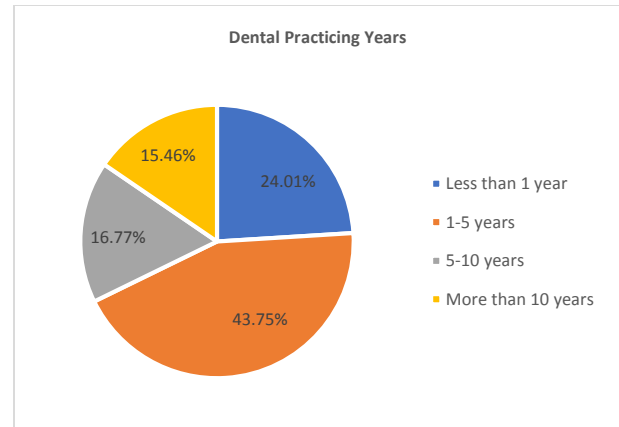


Figure 2: Dental experience categorization of participants of the study

Table 1:

Statements	No (%)	Yes (%)
Do you think Tele-Dentistry can be of help during COVID 19 Pandemic in Pakistan?	10.5	89.5
Can Tele-Dentistry aid in screening patients for COVID-19?	21.4	78.6
Should Tele-Dentistry question the patient regarding Self-Management?	6.3	93.8
Can Tele Dentistry help in reducing unnecessary visits to a dentist in the times of COVID Pandemic?	11.5	88.5
Can Tele-Dentistry identify High Risk Category (Medically Compromised) patients?	18.8	81.3
Can Tele Dentistry help in identifying patients requiring Emergency Dental Care?	10.2	89.8
Can Tele Dentistry prevent unnecessary self-medication?	10.5	89.5
Can Tele Dentistry help in quicker emergency referral?	8.2	91.8
Do you think, Tele Dentistry can help in post treatment follow-up?	7.9	92.1
Should the dentists be trained in Safe Drug Prescribing for Tele-Dentistry Services?	8.2	91.8
Do you think Tele-Dentistry should be free of cost?	41.1	58.9
Would you like to be a part of Tele-Dentistry portal if established?	12.5	87.5

Furthermore, on asking about the preferred way of Tele-dentistry communication, 9.9% dentists voted for text messages, 16.1% dentists favored recorded audio messages, 28.9% dentists responded positively for audio calls and majority of dentists was found to be in favor of live video calls (45.1%).

Table 2:

		What would you prefer for a Tele-Dentistry communication?				Total
		Text Message	Recorded Audio Messages	Audio Calls	Live Video Calls	
Dental Experience	Less than 1 year	50.0%	12.2%	19.3%	25.5%	24.0%
	1-5 years	23.3%	53.1%	43.2%	45.3%	43.8%
	5-10 years	6.7%	26.5%	17.0%	15.3%	16.8%
	More than 10 years	20.0%	8.2%	20.5%	13.9%	15.5%

Moreover, dentists' perception of accuracy of dental treatment at various steps was also been explored. The results revealed that 69.7% dentists reported that demographic details could be taken accurately. According to 75.7% participants, social history could be taken accurately using tele-dentistry, accurate medical history could be taken using tele-dentistry was reported by

The younger dentists opted for recorded messages more whereas the more experienced dentists were divided on the question and opting all answers across the board.

78.9%, 69.7% dentists believed that correct drug history could be taken using tele-dentistry. Presenting complaints, Clinical presentation and Provisional diagnosis could be adequately assessed via tele-dentistry was responded positively by 72%, 33.6% and 36.8% dentists respectively.

Table 3:

Which of the following can be adequately assessed via Tele-Dentistry?						
Demographic Details	Social History	Medical History	Drug History	Presenting Complaints	Clinical Presentation	Provisional Diagnosis
69.7%	75.7%	78.9%	69.7%	72%	33.6%	36.8%

On exploring nature of the pain or swelling relief management via tele-dentistry to get the idea of level at which tele-dentistry could be helpful, 23.4% dentists favored mild pain or swelling relief, 58.6% dentists favored mild and moderate pain or

swelling management, 14.1% dentists respond positive towards mild, moderate and severe pain or swelling management via tele-dentistry whereas 3.9% believed that pain or swelling could not be managed by tele-dentistry.

Table 4:

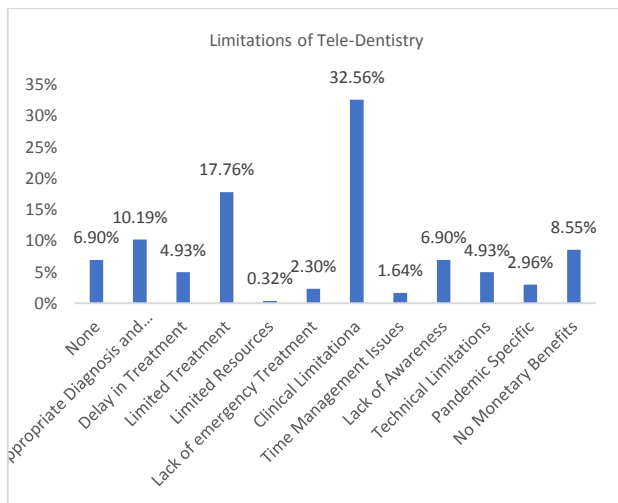
	Do you think Tele-dentistry is more useful to manage complaints of mild to moderate nature (pain/swelling)?				Total	
	Mild	Mild, And Moderate	Mild, Moderate, And Severe	Cannot Be Managed By Tele-Dentistry		
Since how long have you been practicing dentistry?	Less than 1 year	23.9%	25.3%	23.3%	8.3%	24.0%
	1-5 years	39.4%	43.8%	46.5%	58.3%	43.8%
	5-10 years	22.5%	17.4%	7.0%	8.3%	16.8%
	More than 10 years	14.1%	13.5%	23.3%	25.0%	15.5%

Lastly, 55.9% dentists thought that 1 to 2 years of dental practice is sufficient for working as a tele-dentistry professional, 40.8% dentists responded that minimum practice should be up to 5 years whereas only 3.3% dentists favored the minimum experience should be up to 10 years for serving as tele-dental health care provider.

Table 5:

What should be minimal years of experience of dentist advising and prescribing in Tele Dentistry?		
1-2 Years	Up to 5 Years	Up to 10 Years
55.9%	40.8%	3.3%

The graph showed the limitations of tele-dentistry in Pakistan. Majority of the dentists consider that tele-dentistry has clinical limitations followed by limited treatment options (17.76%). Risk of inappropriate diagnosis and treatment was the opinion of 10.19% dentists. 8.55% dentists responded that tele-dentistry has no monetary benefits as a limitation. 6.90% dentists said lack of awareness among general population is a limitation of tele-dentistry. 4.93% dentists reported that due to tele-dentistry, delay in treatment will be faced whereas same number of dentists responded technical issues such as internet issues could be a limitation. According to 2.96% dentists, tele-dentistry is only applicable in pandemic conditions. Lack of emergency treatment was reported by 2.30% dentists. Time management issues were reported by 1.64% dentists and limited resources were reported by 0.32% dentists.



Graph 1: Limitations of Tele-Dentistry

## DISCUSSION

Provision of healthcare services remotely is considered essential, and the most plausible way, to achieve the highly desirable yet ambitious goal of universal healthcare. Nothing has served to bring this need into sharper relief than the present-day pandemic situation.<sup>(8)</sup> With virtually all countries/regions of the world under varying degrees of economic and social lockdown, healthcare has become inaccessible for the underserved, surviving on the fringes of society, like never before. Doctors and practitioners have taken to online appointments and remote examination even in urban centers. Never has the need to study and research telemedicine been as pronounced and urgent as it is today, nor has there been a better opportunity to do so; with communications technology breaching all frontiers to roll back distances considered untraversable only few decades ago.<sup>(9)</sup> It is against this backdrop that we have attempted to initiate and set in motion the assessment and validation of the viability and effectiveness of tele-dentistry, as a first step to it someday becoming a reality.<sup>(10)</sup>

Extensive work and efforts have been conducted and underway to make tele-dentistry effective possibility. The U.S. Army's Total Dental Access Project is seen as being at the frontier of tele-dentistry which began in 1994, using a traditional plain old telephone system also known as POTS. Tele-dentistry has implications not only in an urban setting but also in rural areas, where seeking dental treatment can be a hurdle due to long distances or lack of health care.<sup>(11)</sup> Pakistan is a developing country and is undergoing COVID-19 pandemic that has created a chaos worldwide. In this study we have tried to assess if tele-dentistry can be a useful tool during this time of crisis. As the only logical first step we decided to elicit and gauge how dental professionals of Pakistan perceive the reliability and precision of tele dentistry and its usefulness during Covid-19 Pandemic.<sup>(12)</sup>

In our present study, majority of the dentists, around 45%, said that they would prefer live video call over other mediums of communication (text, voice call, recorded voice call). In Japan, the staff of the Rural Health Center in Hokkaido, participated in video-conferencing for more than one year (1998 to 1999). The study's results showed that tele-dentistry significantly elevated healthcare knowledge and computer skills of dental practitioners. Video-conferencing leveraging the latest Internet technologies allow for low-cost, real-time, two-way communication between dentists and patients, making long-distance interaction more effective and viable – hitherto only possible through physical visit to a clinic and practitioner.<sup>(13)</sup>

When asked if tele-dentistry could be of help during COVID-19, 89.5% of dentists replied positively, agreeing that tele-dentistry could reduce unnecessary visits to a dentist in times of calamity such as the pandemic of today. A study done in Italy, at the Magna Graecia University of Catanzaro, highlighted the utility of tele-dentistry during the strict lockdown and social restrictions in light of

the pandemic situation. Aware that oral pathology must be based on clinical examination, telemedicine was employed to distinguish potentially malignant lesions from those that were indeed malignant, and required an immediate approach. The study supported the use of tele-dentistry, presenting it as a promising tool in remote management of surgical and non-surgical patients, reducing costs and waiting-times.<sup>(7)</sup>

A study was conducted by Rollert et al. to evaluate the efficacy of tele-dentistry for preoperative assessment. A benefit of tele-dentistry brought to the fore by this study was its tremendous cost economy. Our study has also concluded (58.9% of the dentists opined so) that tele-dentistry can be free of cost whereas 41.1% did not agree to it. The reason could be the economic conditions of Pakistan, especially during the pandemic that has caused an upheaval within the country.

According to our results the clinical presentation is least likely to be assessed using tele dentistry and was found to be the frequent answer when asked regarding the limitations of tele dentistry. However, study conducted by Duka M et al. concluded that diagnostic information obtained from tele dentistry assessment was similar to the real-time assessment information obtained by clinical diagnosis. This disconnect could be due to a natural human affinity and preference for the status quo and an instinctive initial disapproval of any novel idea. And in the case of our study, this instinct could have been at its most potent since the responses of most dentists were most likely based on mere perception without drawing on any empirical experience.<sup>(14)</sup> We are convinced that practical work and increased familiarity with this mode of clinical examination would go a long way in changing this unconsidered, premature perception. A pilot study was undertaken at the Oral Medicine Department, University of California at Los Angeles on the diagnosis and management of oral mucosal diseases. The results of the pilot study suggested that face-to-face patient examination is more accurate in establishing a correct diagnosis for oral mucosal pathologies.<sup>(15)</sup>

The overwhelming positive response and confidence of respondents in the dependability of tele-dentistry as a treatment follow up tool pays testimony to its utility and potential for dental care provision.<sup>(16)</sup>

The good dental health care provision comprises three stages; clinical examination and diagnosis, physical intervention and treatment, and postoperative care and treatment follow up. Whereas the first and the last could be expected to be performed admirably, the physical treatment would always remain impossible without visiting a dentist.<sup>(17)</sup> Since awareness about dental care is still poor in the country, most people seek expert assistance only when the condition has aggravated to a point where physical intervention has become necessary, and mere medication would no longer suffice.

Teledentistry approaches have the potential to address a number of issues in Pakistan and around the world, including access, cost, efficiency, and overall dental care quality. Practitioners who choose to include teledentistry into their practices should educate themselves on the legal, technological, and ethical challenges associated with this new practice medium. Practitioners are encouraged to stay informed about the legal requirements in their respective states of practice and to stay on top of legislative developments in this rapidly evolving area. It is likely to imagine that teledentistry may become just another option to access an oral health care provider in the near future.

## CONCLUSION

Most of the dentists were aware of teledentistry, and its uses, advantages and disadvantages of teledentistry. There are a lot of

gray areas in teledentistry to be worked on. The results revealed that dental professionals of Pakistan are knowledgeable and have positive perception towards teledentistry. Also, dental professionals believe that teledentistry has to be integrated into the current dental practice during Covid-19 pandemic. However, the practice of teledentistry is still at low level in Pakistan compared to other advanced applications of teledentistry done in developed countries.

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