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Applicable of teledentistry and digital platforms during the COVID-19 pandemic among dentists in Fiji: A qualitative study

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Abstract

Objectives: This research aims to explore the perception of dental officers (DOs) and dental managers (DMs) on the use of teledentistry and digital platforms during the COVID-19 pandemic in Fiji.

Methods: This qualitative study was conducted among 30 DOs and 17 DMs. The study was conducted in private dental clinics, government dental clinics and the School of Dentistry and Oral Health clinic (SDOH), in the Central Division, Fiji that were selected randomly. The participants were selected using the purposive sampling method using the inclusion and exclusion criteria. Data was collected through in-depth interviews via zoom using a self-developed semi-structure open-ended interview questionnaire. Manual thematic analysis of the data was conducted.

Results: Five themes emerged from data analysis: utilization of teledentistry and media during the pandemic, usefulness of teledentistry, confidence with teledentistry and digital platforms-associated risks, digital platforms for record keeping, and teledentistry promotion and training. Teledentistry was mostly utilized by private practitioners and the oral surgery department. Practitioners were not in favour of teledentistry as they thought it was putting them at risk.

Conclusion: Majority of DOs and DMs were not utilizing teledentistry except for a few private dental practitioners and the oral surgery department. Future research can be conducted in other divisions and include other healthcare professionals.

Keywords

COVID-19, teledentistry, digital, qualitative study, Fiji

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Introduction

Corona Virus Disease 2019 (COVID-19) emerged as acute pneumonia and was first identified in Wuhan City, China.^{1–3} It is a respiratory disease that emerged from a novel coronavirus in December 2019.^{4,5} The outbreak has become a public health crisis.³ The disease was declared a global pandemic by the World Health Organization (WHO) on 11 March 2020.^{6,7}

COVID-19 has created a significant impact on dentists and oral health professionals.^{1,8,9} Dentists work in close proximity with their patients which causes constant exposure to body fluids such as blood and saliva as well as the spread of aerosols during dental procedures.¹⁰

During the lockdown, it became difficult for patients to visit the dental clinics for check-ups. The increased usage

of smartphones and related software applications, the exchange of clinical data was possible between patients and clinicians.¹¹ Hence, during the lockdown period, teledentistry gained in popularity.¹² Teledentistry involves exchange of clinical information and images for dental consultation and treatment planning. Teledentistry proved as an

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advantage to manage dental emergencies during the lockdown period.¹¹ Teledentistry has many uses: it is economical for patients, improves communication, helps with patient education, helps monitor patients and is beneficial for patient in remote areas as it reduces the need for unnecessary travel.¹³ Teledentistry can have disadvantages or challenges as well; for instance, the set-up cost involved, information technology (IT) literacy, limited infrastructure and violation of patient privacy can be a risk. However, these can be overcome by government initiative, policies and programs.¹³

Oral health services are provided by both the public and private sectors in Fiji. Oral health services are provided under four main areas: emergency services; preservative and conservative dentistry; oral health education; and specialized clinical dentistry, which includes oral surgery, prosthodontics, orthodontics, oral medicine and pediatric dentistry. Community public dental services include oral health community outreach programs and school oral health programs. Most of the services provided at the School of Dentistry and Oral Health (SDOH) clinics as part of undergraduate training is free of charge for the public. There are approximately 10 government dental clinics including the main Colonial War Memorial Hospital (CWMH) dental clinic, 26 private dental clinics and one SDOH in the Central Division, Fiji. Each dental clinic is managed by a senior staff, referred to as the dental managers (DMs) in this study. The dental health care providers referred to as the DMs can be the principal dental officer (PDO) of a particular clinic, the senior dental officers (SDOs), or the dental officer (DO) managing the clinic in the absence of a PDO or SDO. The dental officers referred to as the DOs in this study are those officers working under the DMs in the respective dental clinics.

COVID-19 has significantly affected Fiji and its people. The pandemic had caused significant changes to dental settings, dentists and dental patients. A lot of dental services were not being provided during the pandemic. Dental clinics were not operational, and patients had difficulty seeking dental care. Although the worldwide health emergency caused by COVID-19 has accelerated the need and implementation of the provision of digital health services, such as telemedicine, these services are difficult to implement in small island nations like Fiji. This can be explained by the lack of equipment and infrastructure.^{14,15} Hence, this study aims to explore the perception of dentists on the use of teledentistry and digital platforms during the COVID-19 pandemic.

Methodology

A qualitative study helps to collect genuine ideas, provides valuable insights on relevant issues and experiences and helps explore and understand social and behavioural issues as well.^{16–18} Semi-structured in-depth interviews

are one of the common methods used in qualitative studies to collect data in health service research, which involves dialogue between the researcher and participant and is guided by a flexible interview protocol.¹⁹ It enables the researcher to collect open-ended data and share feelings, thoughts and views about a subject. It also helps to explore more deeply into personal and sensitive issues as well.¹⁹

Study design and setting

A descriptive qualitative study was conducted amongst dental officers (DOs) and DMs through in-depth interviews in Central Division, Suva, Fiji between 9 August and 12 September 2021. The study was conducted in eight government dental clinics, nine private dental clinics and one SDOH. The study settings were selected randomly.

Study sample

The study sample was selected using the purposive sampling method, based on the inclusion and exclusion criteria. The inclusion criteria for DOs included dentists and dental interns of any ethnicity and gender, and DOs and interns with at least 6 months of working experience. The exclusion criteria included any other dental practitioners apart from DOs and dental interns, DOs from other dental clinics apart from the ones selected and those DOs who were not willing to participate in the study. The inclusion criteria for DMs included sub-divisional dental officer (SDDO), SDOs and PDOs of the selected government and private dental clinics, DMs of any ethnicity and gender and DMs with at least 6 months of working experience. The exclusion criteria included DMs of other clinics apart from the selected dental clinic and DMs who were not willing to participate in the study.

Thirty DOs out of approximately 40 were selected for the study based on the inclusion and exclusion criteria: six from private dental clinics, 18 from government dental clinics and six from SDOH. Seventeen DMs out of approximately 35 were selected based on the inclusion and exclusion criteria. There were nine DMs from private dental clinics and eight from government dental clinics. All the participants participated in this study after giving their consent.

Data collection tool

A self-developed semi-structured open-ended interview questionnaire was used to collect data. The questionnaire was designed by the two authors of the study based on the review of the literature. Data was collected through in-depth interviews with DOs and DMs. The questionnaires had two sections, respectively. The first section recorded the demographic information for the DOs: unique identification number, age, gender, highest qualifications attained,

designations and job experience of the DOs. The second section included six open-ended questions to gauge the dentist's perception about the impact of COVID-19 on dentistry. The questionnaires had validity tests done, face and content validity. Face validity tests involved five participants of the study (3 DOs and 2 DMs) to gauge their understanding for the self-developed semi-structures open-ended questionnaire whilst the content validity involved experts to verify the semi-structures open-ended questionnaire.²⁰ The interviews conducted as part of the pilot study have not been included as part of the main data. The questionnaire is provided in the appendix section for reference.

Study procedure

The flyers were emailed to the DMs of respective clinics 2 weeks prior to commencing the data collection. The flyer contained brief information regarding the study. The DMs were requested to inform their staff regarding the study as well. The interested DMs and DOs contacted the principal investigator directly for participation. Based on the availability of the participants, an interview time was selected by the principal investigator. Each participant was given a participant information sheet. Those participants who agreed to take part in the research were given a consent form. The consent forms were collected and kept by the principal investigator safely, and 30–35 min in-depth interviews were conducted by a female trained researcher (the main investigator) who was a dentist via zoom for each participant by the principal investigator. The results from the first interview guided the subsequent ones.²¹ Voice recording was done along with written notes taken as a means of back up during each interview.

Data management and analysis

Each interview was transcribed manually by the principal investigator into Microsoft word. After the initial interview was transcribed, the principal researcher read the transcript repeatedly to identify any potential errors which were considered and improved in subsequent interviews.²¹ The principal investigator read the transcript multiple times also to become familiar with the content and identify common and significant elements to create codes, which are shorthand labels to describe the contents of the interviewee.²² These codes were grouped into sub-themes to identify common patterns; thus, broader themes were created.²² These themes, subthemes and codes were reviewed and confirmed by the second researcher. Data was interpreted in the context it was obtained to see if the interviewer had any influence on the participants answers and if the answers were requested or not. Data was entered after each interview until data saturation was reached.²¹

Study rigour

Methodological rigour is vital when conducting qualitative studies.²³ Four dimensions criteria (FDC) to establish trustworthiness were applied to this study; credibility, dependability, confirmability and transferability.²³ Credibility was ensured by engaging with participants, distribution of flyers, verbal explanation regarding the study, and in-depth interviews ranging from 30 to 60 min. Dependability was maintained by having a thorough literature search, data coding was done and transcripts were re-read to identify errors, and raw data were kept by the principal investigator. Confirmability was maintained in the following ways: thorough methodology and investigator and data source triangulation. Transcripts were only provided to those who wished to review their answers. Those participants who asked for the interview transcripts were satisfied with their answers. To ensure transferability, random and purposive sampling methods were used, and data was collected until data saturation was reached.

Ethical considerations

Ethics approval was taken from College Human Health Research Committee (CHHREC) of Fiji National University (FNU) and Fiji Human Health Research Ethics Committee (FHHRERC). Facility approval was taken from various private dental clinics which were selected for the study. Written consent form was obtained from them before collecting data. To ensure participant confidentiality, each participant was given a unique identification number (code) instead of using their names. The participants were informed that their participation in the study is voluntary and they could leave the study at any stage. All raw data was only accessible to the principal investigator and was kept in a password-protected computer.

Results

Characteristics of DOs and DMs

Thirty DOs participated in the interview virtually via zoom. Six DOs were from the private dental clinics, six from the school dental clinics, and 18 from the government dental clinics. There were more female participants ($n = 20$, 66.7%) noted. Majority of participants were from the age range of 20–30 years ($n = 15$, 50%). Most participants were Fijians of Indian Descent (FID) ($n = 24$, 80%). Most participants' work experience ranged from 1 to 5 years ($n = 10$, 33.3%).

Seventeen DMs participated in the interview virtually via zoom: nine DMs from private dental clinics and eight DMs from government dental clinics. Participants were mostly male ($n = 10$, 58.8%). Majority of participants were from the age range of 31–40 years ($n = 8$, 47.1%). Majority of participants had work experience ranging from 11 to 20 years ($n = 10$, 58.8%) (Table 1).

Table 1. Characteristics of DOs ($n = 30$) and DMs ($n = 17$).

Characteristics		DOs	DMs
		Frequency (%)	Frequency (%)
Gender	Male	10 (33.3)	10 (58.8)
	Female	20 (66.7)	7 (41.2)
Age group (years)	20–30	15 (50)	4 (23.5)
	31–40	9 (30)	8 (47.1)
	41–50	3 (10)	3 (17.7)
	51–60	2 (6.7)	2 (11.7)
	above 60 years	1 (3.3)	0 (0)
Ethnicity	I-taukei (IT)	3 (10)	8 (47.1)
	Fijian of Indian Descent (FID)	24 (80)	8 (47.1)
	Others	3 (10)	1 (5.8)
Highest qualification	Bachelor level	21 (70)	16 (94.1)
	Postgraduate level	9 (30)	1 (5.8)
Number of years of practice	6 months–1 year	2 (6.7)	0 (0)
	1–5 years	10 (33.3)	3 (17.7)
	6–10 years	7 (23.3)	3 (17.7)
	11–20 years	7 (23.3)	10 (58.8)
	21–30 years	3 (10)	1 (5.8)
	More than 30 years	1 (3.3)	0 (0)

Five themes emerged from data analysis: utilization of teledentistry and media during the pandemic, usefulness of teledentistry, confidence with teledentistry and digital platforms-associated risks, digital platforms for record keeping, and teledentistry promotion and training. Table 2 summarizes the themes and codes.

Theme 1: Utilization of teledentistry and media during the pandemic

Majority of DOs from the private clinics and Ministry of Health and Medical Services (MoHMS) were not utilizing teledentistry or other digital means. Out of those who

were utilizing digital forms were using zoom and viber for patient consultations during the time of the pandemic.

And I had some sessions with patients on zoom and on viber, we had some tele-consultations and just the relief of pain during that time for my patients. (DO05, a 47-year-old, FID DO from Private Dental Clinic)

Apart from patient consultations, DOs from the school dental clinics were also exploring more means of imparting knowledge to students.

... just knowing how to use technology more. ... like the other day I had a session with the students on zoom, we did case discussions in break out rooms which I have never used before and that is a great tool. I've also used a few other tools like pad let and stuff like that. (DO10, a 46-year-old DO from school dental clinic)

Almost all DMs from the government dental clinics reported of not formally using teledentistry as a set platform, however, it was practiced in other departments (oral surgery) due to restrictions in place during the pandemic.

Ummmmm we'd love to but we haven't started that here. But I do know that our oral surgery team, in terms of referrals from other satellite clinics, we don't have a set platform that has been implemented, but the use of viber and other social media apps, our satellite clinics are able to discuss cases with our oral surgery officers, if needed pictures are sent to help the discussions to decide on a treatment plan and to see if the patients can be referred or not ay.... There are limited uses of teledentistry. (DM11, a 37-year-old, I-taukei (IT) DM from MoHMS dental clinic)

Participants gave varying views about teledentistry. Whilst some practiced it and others did not. A few DMs of private dental clinics were practicing teledentistry.

We also resorted to phone dentistry so we had to advice patients on phone like if they needed any prescription. We liaised with a pharmacy, so if a patient needed a prescription so we would send them a prescription though viber and they would you know go and pick it up. (DM6, a 29-year-old, FID DM from Private dental clinic)

Theme 2: Usefulness of teledentistry

Since some DOs were making use of teledentistry, participants had varying views regarding this. A few thoughts teledentistry was useful.

Well telemedicine, now you can talk to your patients, you can have conference with your patients, discuss the

Table 2. Themes and open codes from the interview

Themes	Open codes	Quotation examples
Utilization of teledentistry and media during the pandemic	Zoom, viber, teleconsultations, pain relief, referrals, treatment plans, teledentistry, phone dentistry	"And I had some sessions with patients..." "...just knowing how to use technology more..." "Ummmmm we'd love to but we haven't started that here..." "We also resorted to phone dentistry so we had to..."
Usefulness of Teledentistry	Conference, talk to patients, patient progress, teledentistry, social media platforms	"Well telemedicine, now you can talk to your patients..." "Teledentistry sounds good, looks good, doesn't work alright..." "Uumm but using social media, I have now gone pretty..."
Confidence with teledentistry and digital platform-associated risks	Putting me at risk, truth	"I don't really like it as it is putting me at risk..."
Digital Platforms for record keeping	Record, keeping record, recording	"I record as much as I possibly can..."
Teledentistry promotion and training	Webinar, speaker	"That day in the webinar the speaker mentioned..."

treatment plan with your patient, discuss with them the progress with their treatments and with their family members. So, it was very useful during this time. (DO27, a 37-year-old, IT DO from MoHMS)

Whilst a few other DOs were not in favour of teledentistry.

Teledentistry sounds good, looks good, doesn't work alright because there comes a point in time when.... I mean teledentistry is ok if you have like incipient lesions, you can say like brush your teeth, don't drink coke and all those things, but if you have a root stump what can tele dentistry do? And i don't think teledentistry offers more than what a you tube video offers you. (DO18, a 26-year-old, FID DO from MoHMS)

A few DMs were using media to promote oral health messages during the pandemic.

Uumm but using social media, I have now gone pretty active now using tweeter and on Instagram and other places (laughs), promoting oral health messages and things for the dental association on social media platforms (DO05, a 29-year-old, FID DO from Private Dental Clinic)

Theme 3: Confidence with teledentistry and digital platforms-associated risks

Whilst the DOs did not discuss this concept, the DMs did not have much confidence with teledentistry. The DMs

thought that practicing teledentistry could put them at risk as not all the time the patients could be truthful and may not be able to describe their symptoms appropriately.

I don't really like it as it is putting me at risk. That how I feel. It's really putting me at risk. I write a prescription, after that I will re-think, whether I did that right, was the patient telling me the truth that they are not allergic to penicillin you know all those kinds of things. I feel its riskier for me than seeing them like you know with my own eyes. (DM1, a 46-year-old DM from Private dental clinic)

Theme 4: Digital platforms for record keeping

The DMs did not implement this in various clinics, neither did they discuss about exploring this concept, however, the DOs thought of this method of using the digital platforms for record meeting to be safe from ethical issues.

I record as much as I possibly can and just send an email of what transpired in the phone conversation, I record the zoom conversations that we might have had, yeah so just keeping the records is what I have been doing for any case that comes up. (DO05, a 47-year-old, FID DO from Private dental clinic)

Theme 5: Teledentistry promotion and training

Although a few webinars were being organized for the dental professionals, a few other DOs thought that this

cannot be applied to Fiji's situation as the diagnosis is based on what patients tell you about their symptoms.

That day in the webinar the speaker mentioned about tele-triaging, but I feel like we can't really do that in Fiji because some of our patients tend to not tell us the truth.
(DO28, a 25-year-old, FID DO from MoHMS)

The DMs in particular did not mention of further trainings to be provided in regard to teledentistry or digital platforms.

Discussion

Thirty DOs and 17 DMs were interviewed for this study to explore the perception of dental officers (DOs) and DMs on the use of teledentistry and digital platforms during the COVID-19 pandemic.

As the study results showed, teledentistry and other digital platforms were not very common in this study. Limited participants made use of this; those belonging to oral surgery department and a few private dental practitioners. Teledentistry was mostly used for prescription purpose and patient consultation. Zoom was another common medium of patient communication used by a few dentists in this study. Teledentistry enables reaching those that are hard to reach, particularly in rural areas^{24,25} at a reasonable cost.²⁶ Teledentistry allows new opportunities for dental education by providing an easy access to primary care professionals, hence, enabling effective delivery of postgraduate education and continuing dental education programs. Teledentistry not only increases patients' access to dental care, but it also allows the improved quality of care and is cost effective.²⁵ Additionally, it provides opportunities for dentists by supplementing traditional patient care.²⁶ The American Dental Association (ADA) stated that only emergency dental care should be delivered via telephone consultation, with or without prescribing an appropriate medication based on the clinical judgment of the dentist.⁴ In a study,²⁷ most of the participants did not have any prior experience of using teledentistry. Participants had superficial knowledge regarding teledentistry or no knowledge.^{27,28} Majority of participants responded that teledentistry was not available at their set-up and they had never used it.^{29,30} However, a few studies did use teledentistry³¹ and participants felt it was a valuable tool to use during the pandemic.^{7,28,29,30} In a study²⁷ more specialists had knowledge about teledentistry. Specialists were more confident with teledentistry than general dentists.²⁷ The dentists did not charge any fee for services provided via phone.²⁸

Participants who utilized teledentistry, particularly the oral surgery department felt this very useful during the pandemic. Participants who used zoom for patient care as well as delivering dental education to students felt that this was a useful tool. Optimum oral health care can be provided with digitalization in dentistry.³¹ Furthermore, teledentistry can be beneficial for remote consultation as it reduces contact

between patients and oral health professionals, cost effective, along with short duration of treatments needed.³¹ Not only teledentistry is cost effective and allows improved access and delivery of dental care, but it also has the capabilities to reduce disparities in oral health care between rural and urban communities.³²

Majority of participants in this study were not very confident with teledentistry as they thought it was putting them at risk. Participants preferred having the patients face to face as they felt the former could lead them into making incorrect diagnoses and thus, add patient problems for the future. Nothing matches the accuracy of the diagnosis and treatments performed with patients present clinically.¹¹ Hence, teledentistry is more useful when it comes to preventive measures, however, for treatments such as restorations, endodontic treatments, and extractions, patients need to be present clinically. Diagnostic tests cannot be performed accurately over the phone or by digital means.¹¹ Additionally, dental practitioners in a study³³ could not correctly distinguish between oral viral and fungal infections based on the information given via digital means. Furthermore, other drawbacks of teledentistry and digital platforms can be a hindrance in network connectivity. Interactive videoconferencing method is preferred as there are chances of providing immediate feedback.²⁶ Other barriers include legal, educational and insurance issues.³² In a study,¹³ participants had high awareness and positive attitude toward teledentistry. However, this study reported limited infrastructure, cost implications and IT literacy, as the major challenges encountered.¹³

Digital platforms can be utilized for record keeping as well. This mass data can be beneficial for analytical purposes as well.³¹ However, with regard to digital platforms for record keeping, concerns may arise due to patient confidentiality and security of information being stored in computers.³⁴

There is a significant need for teledentistry education, training and regulations.³⁵ Teledentistry in the future can ensure all stakeholders work together. It is a tool that can provide inequitable access to dental and medical care.

Limitations

The study was limited to the central division only. Hence, it does not include perceptions of DOs and DMs other than this division. Thus, perceptions from other dental professionals have not been included in this study which could have added more value to the study. The in-depth interviews were conducted via zoom instead of face-to-face interviews, due to the pandemic. This resulted in connection issues at times which delayed and prolonged the interviews causing disruption in the thinking process of the interviewer and interviewees.

The strengths of this study were that this was one of the first studies regarding COVID-19 conducted in Fiji. Hence,

participants were eager to share their thoughts as this could lead to beneficial changes for future pandemics. Dental clinics from urban and rural settings were selected, hence, results can be generalized.

Conclusion

Majority of participants in this study were not utilizing teledentistry except for the oral surgery department and a few private practitioners. Of the ones who were utilizing teledentistry, few felt it was useful whilst the rest thought teledentistry is not applicable to Fiji patients. A few DMs thought that teledentistry was putting them at risk. Furthermore, participants who were utilizing teledentistry reported of using digital platforms for record keeping.

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Authors contributions: Both authors conceptualized the study. KK collected data, conducted analysis and wrote the main manuscript text. MM participated in all steps of designing, implementing, analysing and interesting the results. Both authors have read and approved the manuscript.


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