

The Application of Teledentistry : an Alternative Dental Service in Pandemic Era

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Abstract

Recently, the world has been facing the greatest threatening from the novel COVID-19 pandemic. Health services are undergoing a challenge in giving treatment to the patient in this era. The dental practice became an obstacle for dentists since the possibility of aerosol exposure in dental treatment may increase the risk of COVID-19 infection. Teledentistry is a developing area of dentistry that links dental providers to their patients using technologies to diagnose and provide service about treatment over distance. Teledentistry services could be the solution due to its method to avoid direct contact with patients and capability to reduce the number of people visiting in dental office during the pandemic.

The present study attempted to enhance respondents knowledge of teledentistry an electronic questionnaire survey with 10 questions was developed by Google Form, validated, and distributed electronically by zoom to 150 social participants before and after teledentistry consultation.

Statistical Analysis, collected data were analyzed for statistical significance by using SPSS software.

There is an increase in knowledge of the participants regarding the teledentistry consultation method for dental and oral cavity health.

Dental consultation via teledentistry is effective to increase respondents knowledge

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Introduction

COVID 19 has spread around the world, resulting in some long-term range global limitations that is currently burdening healthcare systems around the world.¹ On March 2nd, President Joko Widodo announced two people who got ill after attended a dancing event as a first covid case in Indonesia.² After the reports of infections, Indonesia started to determine several actions to overcome the situation including massal PCR testing and tracing, quarantine program for those who are infected, travel restrictions and promote social distancing.^{1,2}

The rapid spread of COVID-19 has urged

many countries to anticipate and perform strategies to deal with the pandemic.³ Lockdown system and quarantine for the infected countries have been applied worldwide as an effort to reduce the transmission of COVID-19.^{2,3} The government also recommend the citizen to approach healthcare system only for emergency used.⁴ Hospitals and clinics are asked to prepare their system to minimize direct treatment between the doctor and the patients.³ Dental service has the highest risk among all medical professionals in spreading out the disease because the production of aerosols and droplets is ideal route for the virus transmission.^{4,5}

Dental treatment usually involves the use of highspeed handpieces and scalers that produce aerosols. The aerosols contain microparticles and other debris that could spray out and stays in the air for several hours.^{5,6} Due to the virus particles could travel a short distance through direct contact with saliva, oral fluids, blood and airborne, the control of COVID-19 spread must be taken seriously.⁶ Many of dental

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service carry a high risk of exposure to sars-cov-2 virus due to the treatment that also increase the risk of infection in office.⁷

Since the outbreak of COVID-19 pandemic, WHO recommended all dental practices to stop except for emergency cases.⁴ Some stricts screening must be implemented in dental healthcare to protect both dentist and patients. Patient must fill questioner form about their health condition and last trip.³ Dentist must arrange the schedule to avoid contact between one patient to another.⁷ Due to this restriction, the application, knowledge and practices of teledentistry has raised and become familiar among dental professional.^{3,4,7}

COVID-19 cases trend to increase day by day in all over the world even the mortality cases is low. WHO has recently stated that this virus may just become endemic in communities and life may not back to normal soon.⁸ To respond the fact that no one could assure when COVID-19 will back to normality, dental practitioner must reform the way performing dental treatment to minimize the risk of infections. Teledentistry become innovative solution to continue dental care in this COVID-19 era.^{8,9} Teledentistry has been previously described as root of telemedicine related to dentistry, which has emerged from the combination of digital technology and dentistry.³ This innovative teledentistry method completely modifies our traditional approach of dental healthcare system.^{3,9}

The importance of using teledentistry method to allow dental clinician to give restricted dental treatment including screening methods, determining diagnosis, providing patient consultations, and determining a treatment plan.³ The COVID-19 pandemic offers opportunity to improve teledentistry with the main aim of social distancing as recommended by government.⁴ Recent studies suggested teledentistry as practical and innovative strategy to assess oral health status to support oral health care. Teledentistry is useful during period of lockdown in COVID-19 pandemic to connect patient in rural areas to health service needs where access to dental care is not available without any direct contact.^{3,4,7} Patient in urban areas often spend much time to make actual appointment and require hours of travel. This method is very effective to reduce the cost and travel time.¹⁰ Teledentistry could be used in diagnosis,

pharmacological treatment, clinical counselling and follow up treatment except invasive care.¹⁰ In addition, both dental practitioners and patients feel safe by avoiding direct contact and psychological effect of feeling fear and anxiety of COVID-19 infection.^{9,11} Although there is great interest about teledentistry, there is still limited published literature to show patient's knowledge of teledentistry services. The current literature on the knowledge of teledentistry is limited to dental practitioner and students.⁹ Therefore the authors perform this study to introduce teledentistry via zoom online consultation method so that it can increase the level of knowledge and understanding of patients about the teledentistry method.

Materials and methods

This study is an effort of the Faculty of Dentistry, Andalas University, Padang, West Sumatera to educate the public about dental service via teledentistry during the COVID-19 pandemic. The activity was held in the form of a medical consultation between participants and dentists via zoom meeting and breakout room media to improve patient understanding of online consultation (teledentistry). The subject of this study was second semester college students from non medical faculty in Universitas Islam Negeri (UIN), Padang, West Sumatera.

Participants entered the breakoutroom and filled out the pre-test provided related to teledentistry. The patient is being asked about their oral cavity health, given education and treatment options related to the complaint by the dentist. Participants then fill out the post-test after completing consultations with the dentist. This social service activity was carried out because during the Covid-19 pandemic, it was difficult for people to access dental health services except for emergency cases. This teledentistry method activity can help the community to determine the condition and health of their oral cavity.

The total participants for this study were 150 people. The questionnaire consisted of 10 questions that were given online twice as pre and post test to all participants. The questionnaire is created in the form of a Google Form and distributed via a link in the zoom meeting. The questions were designed such that they assess the prior knowledge of teledentistry among the participants and delivered in *Bahasa Indonesia* to

ensure the participants understand the proper meaning. Post-test is given to see the degree of understanding of the participants after the intervention.

The validity and reliability of the questionnaire were previously tested and the results were valid and reliable to be applied to social service participants. The total respondents who completed the survey so that proper to be analyzed in this study is 51 respondents. The minimum number of respondents to be tested of this questionnaire is at least 50 respondents following the provisions used by Sapnas and Zeller (2020).¹² The data that has been obtained were entered into an Excel spreadsheet analysed using SPSS (Version 16.0).

Results

Characteristics of Respondents

The questionnaire was applied to college students which have the same age and educational background so in this study the description of the characteristics of respondents is only based on gender. Based on the data, respondents with male gender were 16 respondents (31.7%) while female respondents were 35 respondents (68.63%).

Bivariate Analysis

Based on table 1.1, it can be seen that as many as 35 respondents (68.63%) were female and 16 respondents (31.37%) were male. The average pretest score for women was 4.29 higher than the average score for male pretest which was 3.75. The F test is performed with the hypothesis to find out whether there is a difference in the pretest mean score between female and male. The table above shows p-value of 0.539 > 0.05 means that there is no difference in the mean pretest scores between the groups of female and male.

Gender	Pre-Test					
	N	%	Mean	Std. Deviation	F	p-Value
Female	35	68,63%	4,29	2,652	0,382	0,539
Male	16	31,37%	3,75	3,317		
Total	51	100%	4,21	2,854		

Table 1.1 Relationships between Gender and Pre-Test Results.

Gender	Post-Test					
	N	%	Mean	Std. Deviation	F	p-Value
Female	35	68,63%	8,09	2,650	0,274	0,603
Male	16	31,37%	8,50	2,556		
Total	51	100%	8,22	2,602		

Table 1.2 Relationships between Gender and Post-Test Results.

Based on table 1.2, it can be seen that as many as 35 respondents (68.63%) were female and 16 respondents (31.37%) were male. The average pretest score for women was 8.09 lower than the average score for male post-test which was 8.50. The F test is performed with the hypothesis to find out whether there is a difference in the post-test mean score between female and male. The table above shows p-value of 0.603 > 0.05 means that there is no difference in the mean post-test scores between the groups of female and male.

The Wilcoxon test

Test Statistics^b

	Postes – Pretes
Z	-5.397 ^a
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Table 1.3 the Differences between Pre-Test and Post Test Value.

Based on the table above, the sig. (2-tailed) shows value of 0,000 which is smaller than 0.05. It can be concluded that there is a difference in the average score between the pre-test and post-test so there is an effect of online medical consultation treatment on teledentistry understanding.

From the table 1.4 we could see the significance level of the 10 questions on pre-test and post-test was analyzed using chi-square. The result shows that the difference of participant's answers from 9 out of 10 questions are statistically significant. Question number 7 is the only one that is not statistically significant between pre and post test with value >0.05. Table shows 90,19 % respondents answer that they never had experienced teledentistry method before. 94,11% of total respondents answer that they feel the advantage of using teledentistry method after they experienced it through online consultation via zoom. 98,03% respondents answer that they are willing to use teledentistry method for dental consultation in future.

Discussion

Table 1.1 and 1.2 show that the result have no relationship with gender. Aboalshamat (2020) in his study about awareness of

teledentistry among dental student states that lack of knowledge is not related to any gender or age but more generalized. Dental student have less knowledge than any dental practitioner due to less experience of patient treatment using teledentistry method.¹³ This is consistent with Nila kasuma (2020) that gender doesn't play role in knowledge of oral health. The level of respondents's education affect the level of oral health knowledge.⁷

The pre-test data shows that in table 1.4 question no 1 and no 2 out of 68,62% of have no knowledge about teledentistry and 90,19% never experienced it before. This shows that most repondents are not familiar with the term of teledentistry. The recent studies lately only focusing on teledentistry from dental care providers.^{9,13} There is limit data about level of awareness in teledentistry among society to measure whether people understand about teledentistry or how to get dental service through teledentistry. The knowledge and awareness about teledentistry was assessed among dental practitioner in aim to dentist-patient, dentist-specialist or dentist-student relationship.¹⁴ The level of teledentistry awareness among dental professionals are related to country, education and experience.¹³

Question no 3 shows 76,41% respondents don't know how to approach dental treatment through teledentistry method. Question no 4 shows that 66,66% respondents never obtain any information related to teledentistry. This shows that people are still lack of information related to teledentistry. The promoting effort of teledentistry information is essential to support in handling the pandemic crisis situation.¹⁶ Health-seeking behaviour affect the way to reach information about health service among people in Indonesia. Recommendation of families or friends and perceptions of medical treatment influence someone's health-seeking behaviour. Cultures and beliefs affect the way people to determine whether they choose to use medical or traditional method. Many people reluctant to go to health facilities due to long waiting and complicated administration procedures.¹⁵ Therefore teledentistry could be one of the solution to fill this gap by reducing unnecessary travel and waiting time for appointments.¹⁶

Digital platform and social media has been playing a significant role in Indonesia and

become the source of information to educate people and to raise awareness against COVID-19.¹ Suherlina (2020) found that people are relied on information from social media rather than direct to government. The study also shows that people tend to search information from health website rather than government website. Pramiyanti., et al (2020) shows that public perception of government's transparency of information release is very low. This low level of trust increase skepticism towards the government so that could affect the level of success in handling the pandemic.¹⁷ Therefore the government should take precise communication strategies to share the information to all levels of society. The government must provide adequate and accurate information in clear messages and easy to understand. The government also have responsibility to make the information accessible for people.¹⁸ Government and journalist could work together to spread the information about health system including teledentistry method to all levels of society in Indonesia.

The challenge to give the right information to people through media is often challenging. The pandemic cause change in people life behaviour that they must wash their hands regularly, wear mask and do social distancing. This changes also affect the way to seek healthcare system including the used of technology.^{1,16} The fear of adaptation to the new life behaviour, including dentist and patients relationship, affect the perception because no one knows when the life will back to normal. Dentist must protect themselves to treat patient only in emergency case and limit patient visit on dental office.^{3,7,9} The pandemic is having a big impact to the entire community, especially the healthcare sector workers with a significant number of doctors, nurses and allied workers died in battle sick.¹⁹ The fear of COVID-19 contagion has impact such as burden and stress to caregivers.²⁰ Not only caregivers but also patients must adapt to the new healthcare system and manage to use technology to be able to access their needs.²¹

The table post test shows that 82,35% respondents think that teledentistry is effective to be used during COVID-19 pandemic (Question no 7) even though it is not statistically significant with value >0.05. 94,11% respondents feel the advantage of dental consultation using teledentistry method (Question no 9). Question

no 10 shows that 98,03% respondents are willing to use teledentistry method in the future. The respondents feel the effectiveness of the teledentistry method after they experienced it perhaps because it has been used worldwide as digital platform as innovative solution for continuing dental care.²² They might feel the advantage of teledentistry so that eager to use this method in future due to its cost effective and beneficial to society by using mobile phones/system with internet-based application. The system used to be easy and handful both for dentist and the patients. The stored data also could be saved and seen several times.²³

Teledentistry method has proven to ease the accessibility and availability of health care provider in remote area. Many social media platform could be used for teledentistry method such as chat application (whatsapp, telegram, etc) or video conference (Google meet, Zoom, etc).^{24,25} Those social media are linked by the internet which today is the only developed platform to connect between dental practitioner and patients.²⁶ The development of internet and devices such as smartphones or laptop has support to serve community better by changing the way people approach dental services. Online conversation, voice or video messages allow exchange several data of patient's description of problems for diagnostic suggestions.^{25,27}

However, this study faced challenge such as require stable of internet connection. Some respondents don't understand how to use breakout room in Zoom meeting properly. Recent studies show high speed mobile data, the internet, is essential in building clear communications between dental practice and patients.²⁸ The low resolution of images that is provided by patient could be another challenge.²⁶ High quality of images is acquire in teledentistry to exchange data such as photo of lesions or radiology report.^{25,26} The technical error during data transmission should be avoided because it could lead into misdiagnosis.²⁹ In a study, COVID-19 survivor perceived that preventive measures were useful to reduce amount of viral load in body and stop the transmission.³⁰ Even though there are several limitations, teledentistry as one of the preventif method to reduce infection still become the technology that is potential to help people get dental access during COVID-19 pandemic.³¹

Conclusions

Online medical consultation (teledentistry) is effective on respondent's knowledge. There is an significant increasing of knowledge among respondents before and after dental consultation via teledentistry method.

Teledentistry is very useful in COVID-19 pandemic and beneficial to prevent direct contact between dentist and patient. This study shows that there is a need of government involvement in spreading information about teledentistry among people so that they could understand how to access teledentistry method in COVID era.

The limitation of this study is the number of respondents involved and filled out the survey form. The authors suggest to increase the number and the characteristics variable of the respondents for further studies.

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Declaration of Interest

The authors declares no conflict of interest.

No	Questions	Pre-Test			Post-Test			Pre-Post Test	
		Male	Female	Total n (%)	Male	Female	Total n (%)	Exact Sig. (1-sided)	
1	Do you know about Teledentistry?	Yes	5	11	16 (31,37)	14	29	43 (84,31)	.000
		No	11	24	35 (68,62)	2	6	8 (15,68)	
2	Have you ever had dental consultation using Teledentistry method?	Yes	0	5	5 (9,80)	9	19	28 (54,90)	.000
		No	16	30	46 (90,19)	7	16	23 (45,09)	
3	Do you know how to seek treatment using Teledentistry method?	Yes	3	9	12 (23,52)	14	27	41 (80,39)	.000
		No	13	26	39 (76,47)	2	8	10 (19,60)	
4	Have you ever got any information about Teledentistry method?	Yes	6	11	17 (33,33)	15	30	45 (88,23)	.000
		No	10	24	34 (66,66)	1	5	6 (11,76)	
5	Do you know that you can have dental consultation from home using Teledentistry method?	Yes	6	12	18 (35,29)	14	30	44 (86,27)	.000
		No	10	23	33 (64,70)	2	5	7 (13,72)	
6	Do you know that you can get medical prescription after consultation via Teledentistry?	Yes	5	9	14 (27,45)	13	27	40 (78,43)	.000
		No	11	26	37 (72,54)	3	8	11 (21,56)	
7	Do you think dental consultation via teledentistry is effective within covid-19 pandemic?	Yes	7	10	17 (33,33)	12	30	42 (82,35)	.055
		No	9	25	34 (66,66)	4	5	9 (17,64)	
8	Do you know that having dental	Yes	6	14	20 (39,21)	13	25	38 (74,50)	.000

	consultation via teledentistry method is legally permissible?	No	10	21	31 (60,78)	3	10	13 (25,49)	
9	Do you feel any advantage by using teledentistry method?	Yes	10	7	17 (33,33)	16	32	48 (94,11)	.000
		No	6	28	34 (66,66)	0	3	3 (5,88)	
10	Are you willing to use teledentistry method in future?	Yes	12	28	40 (78,43)	16	34	50 (98,03)	.002
		No	4	7	11(21,56)	0	1	1 (1,96)	

Table 1.4. Percentage of Participants Answering Teledentistry Questions.

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