Pesquisa Brasileira em Odontopediatria e Clínica Integrada 2023; 23:e210164
https://doi.org/10.1590/pboci.2023.070
ISSN 1519-0501 / eISSN 1983-4632

ORIGINAL ARTICLE

Factors that Influence the Use of Teledentistry in Indonesia During the COVID-19 Pandemic

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Academic Editor: Alidianne Fábia Cabral Cavalcanti

Received: 21 December 2021 / **Review:** 30 October 2022 / **Accepted:** 30 November 2022

How to cite: Samad R, Akbar FH, Pratiwi R, Nuraini. Factors that influence the use of teledentistry in Indonesia during the COVID-19 pandemic. Pesqui Bras Odontopediatria Clín Integr. 2023; 23:e210164. https://doi.org/10.1590/pboci.2023.070

ABSTRACT

Objective: Evaluate the factors that influence the use of teledentistry during the COVID-19 pandemic in Indonesia. **Material and Methods:** An analytical observational study with a cross-sectional design with 163 respondents was conducted. The factors of using teledentistry studied in this study were knowledge, attitudes, beliefs, technology, benefits, and needs. The original questionnaire was constructed in English, later translated into Bahasa Indonesia, and modified to conform with Indonesian. Data analysis used univariate and bivariate (Chi-square test). **Results:** Respondents who have used teledentistry were 23.3%, while respondents who have never used teledentistry were 76.7%. There is no relationship between knowledge about teledentistry and the use of teledentistry ($p>0.05$). There is no relationship between the use of teledentistry and knowledge ($p>0.05$), attitudes ($p>0.05$), and beliefs ($p>0.05$). **Conclusion:** There were no factors associated with the use of teledentistry. The most influencing factor is the benefit of using teledentistry, which can affect the increase in the use of teledentistry during the COVID-19 pandemic.

Keywords: Telemedicine; Pandemics; COVID-19.

Introduction

Oral health is very important for general health and quality of life. Oral health is the state of being free from oral and facial pain, mouth and throat cancer, oral and wound infections, periodontal disease, tooth decay, tooth loss, and other diseases and disorders that limit the ability to bite, chew, smile, speak, and psychosocial well-being [1]. The results of the Basic Health Research on 2018 stated that the largest proportion of dental problems in Indonesia were damage, cavities, and toothache (45.3%). Meanwhile, the majority of oral health problems experienced by the Indonesian population are swollen gums or abscesses (1.4%) [2].

The current COVID-19 pandemic has challenged existing healthcare systems around the world. Because it spreads through droplet, fomite and contact transmission, face-to-face interactions of health workers with patients carry the risk of transmission. Since dental care always involves inspection, examination, diagnostics and therapeutic intervention of the naso-oro-pharyngeal area, dentists are most vulnerable to Coronavirus infection. As a result, during the current pandemic, most routine dental procedures worldwide are postponed, and only emergency dental procedures and surgeries are performed. However, seeing the current trend of increasing COVID-19 cases, it seems this pandemic will not end soon. In fact, the World Health Organization (WHO) has recently been concerned that this virus will simply become another endemic virus in our community and may never go away. If these speculations are true and COVID-19 does become endemic, the dental practice must reorganize and innovate to continue dental care with minimal risk of cross-infection. Teledentistry can provide innovative solutions to continue the practice of dentistry during the current pandemic [3].

Teledentistry (a subunit of telehealth and telemedicine) is the facility for remote dental care, guidance, education or medicine through information technology rather than through direct face-to-face contact with patients. Teledentistry is not a new concept and one of the earliest teledentistry projects was started by the United States (US) military in 1994 to serve US troops worldwide. Over the years, teledentistry has proven useful for remote dental screening, making diagnoses, providing consultations, and proposing treatment plans. This has proven comparable to real-time consultations in areas with limited facility access. In the current state of the ongoing COVID-19 pandemic, with the increased likelihood of becoming endemic, the main goal is to avoid person-to-person contact. The word 'tele' means 'far', and therefore teledentistry fulfills the need for social distancing as has been advocated by health authorities around the world to contain the spread of the SARS-COV-2 virus. Teledentistry can be incorporated into routine dental practice. It offers various applications, such as remote triaging of patients with suspected COVID-19 for dental treatment and reduces unnecessary exposure of healthy or uninfected patients by reducing their visits to dental practices and hospitals [3].

In realizing the implementation of teledentistry, it is estimated that factors can affect the use of teledentistry. Based on the description above, we will evaluate the factors that influence the use of teledentistry during the COVID-19 pandemic.

Material and Methods

Study Design and Ethical Clearance

An analytical observational study with a cross-sectional design with 163 respondents was conducted in March-April 2021. This study has received ethical clearance from Hasanuddin University Dental Hospital Health Research Ethics Committee (Protocol Number 0067/PL.09/KEPK FKG-RSGM Unhas/2021).

Sample and Data Collection

The inclusion criteria of the subject are Indonesian people aged 17-60 years who can use Indonesian, can use communication tools, and have an application such as WhatsApp, Instagram, or Facebook. The questionnaire was adapted from several relevant research results, such as from Nagarajappa et al. [4], who assessed knowledge and attitudes in the use of teledentistry in Udaipur, India. Aboalshamat [5] and Rahman et al. [6] measures current technological perceptions of the use of teledentistry. Al-Khalifa and AlSheikh [7] measured the current benefits of teledentistry. Then, Dusseja et al. [8] measured current perceptions of dental problems and teledentistry needs during the COVID-19 pandemic. The original questionnaire was constructed in English, later translated into Bahasa Indonesia and modified to conform with Indonesian.

In this questionnaire, each question provided has an "Agree", "Don't know", and "Disagree" answer choice. The scoring value of the answers is based on a Likert scale, with "Agree" = 3 points, "Don't know" = 2 points, and "Disagree" = 1 point. The maximum total score for knowledge is 24, the total score for attitudes is 33, the total for belief is 30, the total for technology is 27, the total score for benefits is 21, and the total score for needs is 4.

The factors of using teledentistry studied in this study were knowledge, attitudes, beliefs, technology, benefits, and needs that have abnormal data distribution so that the knowledge factor is categorized into good (76%-100%) and sufficient (<76%), with the formula:

$$\text{Percentage (\%)} = \frac{\text{Total score of respondents}}{\text{Total question score}} \times 100\%$$

Meanwhile, the factors of attitude, belief, technology, benefits, and needs were categorized based on the median, which was categorized into supportive and less supportive attitudes, supportive and less supportive beliefs, available and less available technology, supportive and less supportive benefits, need and less need, and categorization of teledentistry users and non-teledentistry users.

Data Analysis

The data were analyzed using the SPSS software version 20 (IBM Corp. Armonk, NY, USA). The Chi-square test was used for the analyses, adopting a significance level of 5%.

Results

A percentage of 92% of the participants were students, 6.7% were workers, 0.6% had not worked, and 0.6% were housewives. Most respondents were 20 years old (44.2%). Respondents who have used teledentistry were 23.3%, while respondents who have never used teledentistry were 76.7% (Table 1).

Table 1. Frequency distribution of teledentistry users by age.

Age	Teledentistry		Total
	Not a User N (%)	User N (%)	N (%)
17	1 (0.8)	0 (0.0)	1 (0.6)
18	8 (6.4)	3 (7.9)	11 (6.7)
19	26 (20.8)	7 (18.4)	33 (20.2)
20	55 (44.0)	17 (44.7)	72 (44.2)
21	26 (20.8)	8 (21.1)	34 (20.9)
22	4 (3.2)	2 (5.3)	6 (3.7)
27	1 (0.8)	0 (0.0)	1 (0.6)
30	1 (0.8)	0 (0.0)	1 (0.6)
33	1 (0.8)	0 (0.0)	1 (0.6)
34	1 (0.8)	0 (0.0)	1 (0.6)

36	0 (0.0)	1 (2.6)	1 (0.6)
41	1 (0.8)	0 (0.0)	1 (0.6)
Total	125 (100.0)	38 (100.0)	163 (100.0)

It was found that 80.4% of the participants had good knowledge (Table 2). As for attitudes and beliefs, the percentages were 53.4% and 51.0%, respectively.

Table 2. Frequency distribution of knowledge, attitudes, beliefs, technology, benefits and needs of teledentistry.

Variables	N	%
Knowledge		
Good (76-100%)	131	80.4
Sufficient (<76%)	32	19.6
Attitudes		
Support	87	53.4
Less support	76	46.6
Beliefs		
Support	83	51.0
Less support	80	49
Technology		
Support	90	55.2
Less support	73	44.8
Benefits		
Support	84	51.5
Less support	79	48.5
Needs		
Support	104	63.8
Less support	59	36.2

There was no relationship between knowledge about teledentistry and its use. Similarly, no association was verified between the use of teledentistry and attitudes (p>0.05) and beliefs (p>0.05). (Table 3)

Table 3. Results of bivariate analysis of the relationship between predisposing factors and the use of teledentistry.

Variables	Teledentistry				p-value
	User		Not a user		
	N	%	N	%	
Knowledge					0.83
Good	31	23.6	100	76.4	
Sufficient	7	21.8	25	78.2	
Attitudes					0.91
Support	20	23	67	77	
Less support	18	23.7	58	76.3	
Beliefs					
Support	20	24	63	76	0.81
Less support	18	22.5	62	77.5	

There is no significant relationship between technology availability and teledentistry use in society (p>0.05). Additionally, no statistically significant association was found between the benefits and the use of teledentistry (p>0.05) (Table 4).

The results showed that there were 23% fewer people who needed teledentistry during the pandemic compared to 77% of people who did not use teledentistry (p>0.05) (Table 5).

Table 4. Bivariate analysis of the relationship between supporting factors and the use of teledentistry.

Variables	Teledentistry				p-value
	User		Not a user		
	N	%	N	%	
Technology					
Support	24	26.7	66	73.3	0.26
Less support	14	19.2	59	80.8	
Benefits					
Support	24	28.6	60	71.4	
Less support	14	17.7	65	82.3	0.10

Table 5. Bivariate analysis of the relationship between driving factors and the use of teledentistry.

Variables	Teledentistry				p-value
	User		Not a user		
	N	%	N	%	
Needs					
Need	24	23.0	80	77.0	0.92
Less need	14	23.7	45	76.3	

Discussion

The results of this study, namely the knowledge and attitude factors, align with the results of Jahanpour's research, which found that knowledge and attitudes do not provide significant results [9]. Changes in society are largely due to how information is transmitted, with people who are always connected and constantly informed about what is being said. Happens in someone's life or what happens worldwide [10]. This information increases public knowledge, especially regarding teledentistry. Barriers or limitations in educating the public in the form of socio-cultural and lack of literacy are the main factors hampering the distribution of information.

In addition, communications increasingly rely on online communications to exchange information and support coordinating resources, including medical equipment, health management, health personnel, and information during the COVID-19 pandemic crisis. In disseminating information related to COVID-19, social media or other forms of technology from the form of education, as a social institution, its development is also influenced by the rapid growth of media. Media has always been a social institution. Many perceptions and norms in society are based on the information they receive, especially concerning COVID-19 [10]. However, information about teledentistry is still lacking, even though teledentistry is one of the media for dental and oral health consultations that can be applied during the pandemic to break the chain of the spread of COVID-19.

This pandemic brings disaster to the social and cultural life of the community, especially since the implementation of social distancing, which then changed its name to physical distancing. In its implementation, the public is advised to avoid physical contact with one another, always stay at home, avoid crowds, always wash their hands, and always wear masks. Even when COVID-19 is in full swing, the hashtag "at home" appears on digital media as an action to call for not leaving the house and avoiding the spread of the virus. All activities switch functions from being originally face-to-face to being online. Worship in places of worship is temporarily suspended, schools are temporarily closed and online learning through digital media, and office employees working from home; even the worst effect is that many people lose their source of income because many employees are laid off or traders who lose buyers because of the people should stay at home [11]. As a result, people must adapt to the policies that apply during this pandemic, such as physical distancing, which calls for

social distancing. These policies can change people's consumptive behavior towards health services, such as switching to telemedicine, such as teledentistry, to handle dental and oral health during this pandemic. Therefore, people's lifestyle changes are influenced by declining incomes, making people have to adapt and change their attitudes in fulfilling their health services, especially if there are dental and oral health problems. People can switch to the use of teledentistry, which is more efficient and does not require expensive costs.

In public dental health, teledentistry can be an alternative approach for areas that lack dental and oral health services. Its use is increasingly widespread because it can reduce costs and access to care, especially for populations and communities in rural or remote areas. The application of teledentistry aims to generate efficiency, provide access to underserved populations, improve the quality of care and reduce dental and oral health problems. Its application is very important in rural and remote areas of developing countries. Teledentistry is an important tool used in public health because it can have significant potential to make changes in populations that are difficult to access [12]. Therefore, public trust must be built through even more massive education during this pandemic and, of course, not forgetting education for dentists so that they can develop or integrate technology in dentistry. This obstacle can be used as a reference to further develop teledentistry in the community, especially in remote areas, by conducting socialization in areas so that it becomes a special concern to improve dental and oral health efficiently and increase public trust regarding teledentistry.

From this study, the community has the availability of communication technology, but most do not use teledentistry. This can be caused by dentists and the public do not have sufficient knowledge about the use of information technology professionally and are weak about the use of information technology in general. It can also be caused by most dentists never providing online counseling [13].

The emergence of the COVID-19 pandemic has also entered the economic structure of the community, so it affects the economic life of the community. The functional structural theory sees a structure in society that has its respective functions and roles and is interrelated with one another. The emergence of a problem in one area will affect other fields. COVID-19 is a problem in the medical field, but its impact extends to the community's economic system. Therefore, the economic structure begins to adapt to a problem that occurs, and the emergence of dysfunction makes people's economic life change. Influential indicators during the pandemic include a decline in income, employment, the ability of the community to meet their daily needs, spending, the community's economic life related to online shopping, meeting needs by looking at food purchases, and lastly, efficiency in spending. The rapid transmission and the number of fatalities that continue to fall have prompted the Indonesian government to implement policies that can reduce the number of positive figures and fatalities. Several policies, such as the PSBB, even to the area quarantine, have limited the community's space for movement and even hampered socio-economic activities. Few employees are laid off from their jobs because the economy is down [14]. These indicators can become obstacles in the application of telemedicine because of the current pandemic conditions that have caused a decline in the economy so that people experience a decrease in income in meeting their daily needs, including internet use.

The advantage of using telemedicine, apart from being a solution for patients to get treatment in the midst of the COVID-19 outbreak, is that it is cheap, easy to access and provides comfort for patients. Meanwhile, medical personnel can make services effective and efficient in monitoring, evaluating and educating [15]. This can encourage people to use teledentistry because many benefits, including efficiency, are obtained by looking at the current situation that supports its use.

In connection with the stipulation of the COVID-19 disease as a global pandemic and the increasingly widespread COVID-19 outbreak in Indonesia, it is necessary to prevent the transmission of COVID-19 to doctors

and health workers in hospitals and patients visiting hospitals. All hospitals are encouraged to develop remote services (telemedicine) or other online applications to provide services to patients and their families who need them. In dentistry, it is known that the potential for cross-infection in the dental clinic or clinic is very high because most dental procedures produce aerosols and droplets that can be contaminated with the SARS-CoV-2 virus [16,17]. According to the regulation from the Ministry of Health, many dental clinics are closed so that people who need dental and oral health services are not being met. Then, teledentistry can be used as a medium for fulfilling health services. The limitations of this study are that it does not examine the efficiency and cost-effectiveness of teledentistry to increase the level of public knowledge.

Conclusion

The use of teledentistry in society is still very little. The results of this study showed that there were no factors associated with the use of teledentistry. The most influencing factor is the benefit of teledentistry, which can affect the increase in teledentistry during the COVID-19 pandemic. Due to new conditions and the global spread of infectious diseases such as COVID-19, the need for telemedicine technology in all clinical fields, including dentistry, is becoming increasingly urgent. Therefore, related institutions should pay more attention to the necessary steps, such as holding educational classes and conducting research on the efficiency and cost-effectiveness of teledentistry to increase the level of knowledge and attitudes of the community and, make this technology operational and integrate it into the health sector.

Authors' Contributions

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NA	https://orcid.org/0009-0003-1027-0960	Validation and Writing - Review and Editing.

All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

Financial Support

None.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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