

The Use of the Teledentistry Application *Drgbeta.Com* to Increase Access to Oral Health Services

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Abstract

The Covid-19 pandemic has worsened public access to oral health services and has become a challenge for dentists in providing services to the community. Restricting contact with patients has resulted in access to oral health services decreasing drastically, many dental clinics have closed to avoid transmission of Covid-19. Using a teledentistry application is an alternative that can be used to increase access to health services and as a medium for education/ consultation without having to have direct contact with a dentist.

This study aims to determine the benefits of using teledentistry in an effort to increase access to oral health services, obtain information about the cases most frequently consulted and the public's response to the use of teledentistry applications.

This research method is cross sectional which is intended to determine the benefits of using the teledentistry application *drgbeta.com* in increasing access to oral health services in the community. Data about the cases consulted by respondents was obtained through an application where the doctor was asked to determine the applied diagnosis after completing the consultation.

Respondents' responses to the benefits of the application and demographic data were obtained by filling out surveys by respondents in the application after consulting with a dentist.

The research results showed that 66.32 percent of respondents were accessing a dentist for the first time and that was through the *drgbeta.com* application. As many as 76.94 percent of respondents knew the solution to their oral health problems after consulting via *drgbeta.com*. The cases most frequently consulted on the *drgbeta.com* application are chronic pulpitis (31 percent) and gingivitis (28 percent). As many as 75.90 percent of respondents agreed that the consultation fees charged to patients of IDR 25,000/15 minutes were affordable. As many as 90.42 percent Respondent need the *drgbeta.com* application as a medium for consultation with dentists and education about oral health.

The research conclusion is that the *drgbeta.com* application increases access to health services and as a medium for education/consultation. The *drgbeta.com* teledentistry application is generally used by people with low incomes. Cases of pulpitis and gingivitis are oral health problems that are often consulted by respondents via the application. Respondents need the *drgbeta.com* application for consultation and education regarding oral health problems.

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Introduction

The COVID-19 pandemic is a new problem for the community specifically in accessing oral health services. During the pandemic, oral health services are generally

closed to avoid transmission of COVID-19. Aerosols and droplets produced during dental procedures can trigger the spread of COVID-19 so close contact between dentists and patients must be limited^{1,2}. Restrictions on direct contact between dentists and patients have had a negative impact on people's oral health. People are encouraged to self-medicate. Buying antibiotics without a doctor's prescription is a method that people often use, both before the pandemic, especially and during the COVID-19 pandemic to overcome the oral health problems they³. Taking antibiotics without a doctor's

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prescription can be a risk factor for antibiotic resistance and during the COVID-19 pandemic it was found that there was an increase in antibiotic resistance related to self-medication⁴⁻⁶ Treating your own teeth also has the potential to worsen people's oral health conditions where diseases are not detected early, misdiagnoses, delays in appropriate initial treatment and this has an impact on expensive health costs^{7,8}.

Using teledentistry applications can help people access dentists online without having to meet face to face. The public can communicate/consult with dentists via the teledentistry application. They can convey the symptoms experienced, the clinical picture of teeth through intra-oral photos using a cellphone.

Responding to the problem of limited public access to dentists related to COVID-19, several countries are maximizing the use of teledentistry applications. Through the use of teledentistry, now there is interactive access to a dentist that is not limited by time or space limitations and treatment time is shorter where initial information for diagnosis and treatment planning can be obtained via teledentistry^{9,10} Even in dealing with dental emergencies, teledentistry applications still play an important role where the application is useful for arranging patient visit schedules and consultations with dentists before emergency procedures are carried out. However, there are no regulations governing the use of teledentistry in Indonesia, especially regarding financing, how much the patient has to pay for teledentistry services. This research is important as research on the use of teledentistry applications has never been conducted in Indonesia.

Teledentistry

Teledentistry is a form telehealth which uses a combination of telecommunications in the field of dentistry, involving the exchange of relevant clinical information over a distance for consultation and treatment planning^{11,12}. Teledentistry is used in a variety of technologies to provide virtual medical, health and educational services. Telehealth is not a specialty service, but a means to improve community care and education¹³

Benefits of Teledentistry

Using teledentistry applications can help people, especially those living in remote areas, where they can access dentists online without having to meet face to face with dentists. Apart

from that, patients can also send intra-oral photos to make it easier for dentists to diagnose the disease¹⁴. Through the teledentistry application, patients can gain basic knowledge about health care and improve the patient's quality of life. Teledentistry applications can also shorten the duration of treatment and drastically reduce waiting times^{15,16}. Teledentistry applications are useful for early diagnosis of diseases such as oral cancer and enable faster treatment and increase the effectiveness and safety of therapy. Treatment is less expensive than face-to-face treatment and provides high quality service. Patients do not need to visit the clinic too often, patients do not need to attend follow-up visits after receiving treatment because they can consult via the teledentistry application¹⁷. Another advantage of using the teledentistry application is that people can convey the symptoms they are experiencing, send intra-oral photos or clinical images of teeth via cell phone. Teledentistry applications can also reduce service costs and improve the quality of care, making access easier, increasing communication between dentists and patients, use of e-prescriptions and data storage^{12,18}.

Disadvantages of Teledentistry

The use of teledentistry also has disadvantages, namely requiring a smooth internet connection, discussing cases on social networking sites is also risky because opinions are subjective and must rely on assessments from other practitioners' examinations, billing and collection of fees for dental care services provided through teledentistry is very limited and it remains largely untested legally, and with significant variations between countries because licensure to practice teledentistry is highly dependent on that country's definition of teledentistry.

Online consultations have limitations in diagnosing disease and evaluating patient problems, especially in the field of dentistry. Difficulty assessing teeth and soft tissues, especially in the posterior oral cavity, will be a limitation of online consultations in this area. The ability to assess extraoral and intraoral swelling, tooth decay, soft tissue lesions, mobile teeth, prosthodontic fractures and orthodontic emergencies is not very practical through online consultations¹⁹.

In addition, special investigations that require direct contact with the patient and would aid in an

accurate diagnosis are difficult to obtain in online teledentistry consultations ²⁰

Considerations for Using Teledentistry

Not all patient cases can be treated with online meetings, especially patients with emergency conditions. According to the American Dental Association, dental emergencies are “potentially life-threatening and require immediate treatment to stop ongoing tissue bleeding or to relieve severe pain or infection.” If the teeth, mouth, or jaw are very painful or bleed excessively, they require emergency dental treatment ²¹

Materials and methods

This research is an implementation of the teledentistry application drgbeta.com which has been designed and developed by the researchers. This research was conducted in a health campus area where respondents were generally students. Respondents were asked to fill out informed consent. Respondents were given a gift in the form of data credit as compensation, with the consultation fee being free. Researchers facilitate respondents on how to use the drgbeta.com application, including how to create an account, fill out surveys and how to consult a doctor via the application. The drgbeta.com application has a chat menu where respondents can consult about oral health problems they are experiencing and can send intra-oral photos via cellphone and send them directly to the dentist via the application.

There were 12 dentists who joined the application, of which 3 were active in the application during the trial (a specialist dentist and two general dentists). Respondents can choose the doctor they want to consult according to their oral health problem needs. When consulting, respondents were free to ask questions and respond to the doctor about the oral health problems they had been suffering from. After 15 minutes have passed the consultation session will stop automatically. At the end of the session a survey will appear on the Respondent's display screen to obtain demographic data, Respondent's oral health care, the public's response to the drgbeta.com teledentistry application and the cases most frequently consulted by patients.

The research assistant who serves as an administrator plays a role in monitoring services

to respondents. If there is a new patient who wants to consult, the manager is responsible for informing the dentist that there is a patient waiting. Data collection was obtained from the survey recapitulation results in the researcher application taking data directly from the admin account. This research is a second phase research conducted in February-September 2023 in the East Nusa Tenggara region. The informants/subjects of this research are the people of Kupang City in particular health student. Data collection uses a survey on the drgbeta.com teledentistry application.

Results

Table 1 shows that Respondents in this study were generally aged 18-24 years. Respondents' work is dominated by students. Most of the respondents in this study had low incomes. Almost all respondents with educational backgrounds are health students.

Respondent Characteristics		n	%
Age (years)	12-17	75	19.43
	18-24	275	71.24
	25-40	16	4.14
	41-60	20	5.18
Gender	Male	99	25.64
	Female	287	74.35
Work	Students	317	82.12
	Civil servants	39	10.10
	Private employees	17	10.36
	Self-employed	3	0.77
	Other	10	2.59
Educational background	Health	296	76.68
	Non-health	90	23.31
Last education	High school or below	26	6.73
	Currently studying Diploma/bachelor	311	80.56
	Diploma/bachelor	35	9.06
	Master	14	3.62
Income	< Rp.1,000,000.-	317	82.12
	Rp.1,000,000.- to Rp.3,500,000.-	63	16.32
	Rp.3,500,000.- to Rp.5,000,000.-	3	0.77

Table 1. Demographic Data of Respondents Using Teledentistry Applications drgbeta.com.

Table 2 indicates that generally respondents had consulted a dentist for the first time and that was through via the drgbeta.com application, in other words they had never visited or consulted about dental health problems with a dentist before. Generally, respondents have

active BPJS insurance but do not use it for oral health services. Almost half of the total respondents often experience toothache and they choose to treat themselves by taking medication including antibiotics without a doctor's prescription. The reason respondents did not visit oral health facilities was the belief that their pain could be managed by self-medication and the pain could still be tolerated.

No	Oral Health Care	n	%
1	Experience of consultation /check up with a dentist	First time through the app drgbeta.com	256 66.32
		2 times	93 24.09
		3 times	37 9.59
2	Toothache experience	Never	62 16.06
		Seldom	135 34.97
		Often	189 48.96
3	Actions taken by respondents to treat toothache	Self medication including consuming antibiotics without a doctor's prescription	259 67.09
		Ignore	74 19.17
		Visit a dental health facility	53 13.73
4	BPJS insurance membership	Active	339 87.82
5	The Use BPJS insurance for oral health services	Never	307 79.53
		Seldom	43 11.13
		Often	36 9.33
6	Reasons for not visiting oral health facilities:	The pain is bearable	124 32.12
		Believe that the pain can be solved by self-medication	246 63.73
		Financial problems	16 4.14

Table 2. Respondents' use teledentistry application and access to oral health services.

Table 3 shows that almost all respondents stated that the drgbeta.com teledentistry application made it easier them in consultation with a dentist. Generally, they understand the solution to the oral health problems they experience after consulting via the drgbeta.com application. Consultation services and data packages needed to consult with dentists on the application are not a problem for Respondents. They will recommend the drgbeta.com application to family/friends as a medium for education and consultation.

No	Oral Health Care	Response	n	%
1	The drgbeta.com application answers the need to consult regarding oral health problems	Strongly agree	216	55.96
		Agree	133	34.46
		Don't agree	37	9.59
2	Only understand the solution to the oral health problems you experience after consulting via the application	Agree	297	76.94
		Don't agree	89	23.0
3	The money internet data package required to access the application is a problem	Agree	92	49.74
		Don't agree	294	76.16
4	Consultation services of Rp.25,000/15 minutes for general dentists and Rp.50,000 for specialist dentists are affordable	Agree	293	75.90
		Don't agree	93	24.09
5	The drgbeta.com application is easy to use	Strongly agree	386	100
6	Respondents would recommend using this application to friends/family	Strongly agree	386	100

Table 3. Respondents' responses to the use of teledentistry applications drgbeta.com in increasing access to oral health services.

Diagram 1 shows that cases of chronic pulpitis, gum inflammation and remaining tooth roots are the dominant cases experienced by respondents, accounting for 75 percent of all cases and the rest are impacted teeth, malocclusion and other oral diseases.

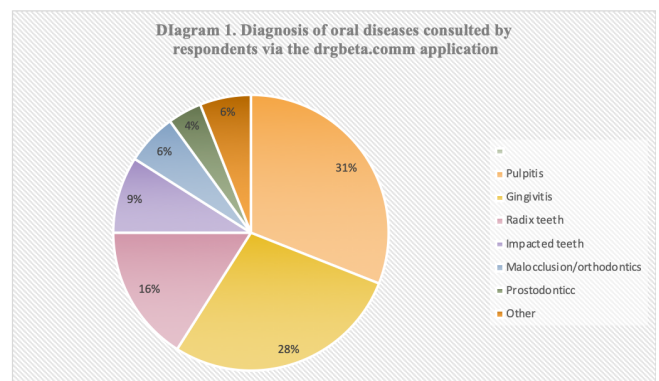


Diagram 1. Diagnosis of oral diseases by respondents via the drgbeta.com application.

Discussion

Respondents in this study were generally health students, aged 18-24 years with an income of under one million rupiah/month and domiciled in East Nusa Tenggara (NTT), which is a remote and underdeveloped area. In other words, they are a young and low-income group of people who tend to have difficulty accessing oral health services. This is in line with previous research which found that people from lower economic groups tend to have limited access to

health services and this is closely related to poor oral health conditions^{14,22}.

As many as 66.32 percent of respondents had consulted a dentist for the first time and that too via the drgbeta.com application. This shows that respondents need to be facilitated in accessing affordable oral health services. Teledentistry applications such as drgbeta.com can help people who have limited access to oral health services, especially those with financial problems. The use of teledentistry applications can reduce transportation costs to oral health facilities, affordable consultation services and more effective visits to dental health facilities where communication/consultation via the application has saved visits that can be done online²³⁻²⁷.

The low number of respondents' visits to dentists is also related to the area of residence where respondents in this study are residents of NTT (outermost and underdeveloped areas) with a total of 322 dentists serving 5,326,000 residents or 16,540 people served by one dentist. Apart from that, the unequal distribution of dentists is also a problem where dentists generally practice in urban areas, in other words, residents in underdeveloped and outermost sub-districts and villages have very limited access to dentists. The teledentistry application is especially useful for people who live in underdeveloped and outermost areas. The use of teledentistry applications can be used as a means of effective/efficient health services and reduce the gap in public health services in urban and rural areas²⁸⁻³⁵.

A total of 76.94 respondents did not know the solution to the oral health problems they were experiencing before consulting via the drgbeta.com application. For example, respondents with cavities (chronic pulpitis) understand that this case can only be treated with extraction. They don't know that this case can be treated with root canal treatment (PSA). Through the application, respondents get an explanation of PSA actions including its financing which can be covered by Indonesian government social insurance (BPJS). This is in line with previous research where the teledentistry application can be used as a media for consultation and education with audiovisual videos in it which are useful in preparing patients before visiting oral health facilities^{25-28,36}.

Almost all respondents have an active BPJS insurance card, but 71.76 percent of respondents have never used it for dental health services. This is in contrast to previous research which found that government insurance users in developed countries such as Japan where almost all participants, especially children, use government oral health insurance. Elementary, Middle and High Schools have dentists where every year children get an oral health check and when the dentist finds oral health problems in children, they are referred and follow up on the referral to an oral health service facility at a cost borne by the government²¹. In Indonesia, referrals from schools to health facilities do not work as they should, the utilization of BPJS insurance is very low and this in turn has a negative impact on oral health. The use of teledentistry applications needs to be developed to educate the public about the importance of oral health by utilizing oral health insurance facilities and the dangers of practicing self-medication^{30,31}.

From diagram 1 it can be seen that pulpitis and gum inflammation are the cases most frequently consulted by respondents. This shows that the oral health of respondents in this study can be said to be neglected or there is very little access to oral health services. Pulpitis describes caries in the enamel and dentin that is not treated, causing inflammation of the tooth nerve. At the time of the consultation, respondents had an understanding that extraction was the only solution to treat cases of cavities (pulpitis) and they did not understand that root canal treatment (RCT) was one of the main solutions to treat cases of pulpitis which the BPJS government health insurance covers RCT cost. When respondents were asked about their willingness to undergo RCT, they stated that they would consider it. Likewise with the handling of gingivitis cases where when respondents were advised to have tartar cleaning (scaling), they only asked about the cost and were reluctant to follow up by visiting the clinic. In other words, teledentistry applications such as drgbeta.com are very useful in providing an understanding of the solution of the oral health cases experienced by respondents, but in this study, almost all respondents postponed resolving the oral health problems they experienced. This is in line with previous research which states that the teledentistry application is very useful in terms of

connecting patients with doctors, helping patients find out about the oral health problems they face and solutions to treat them and planning treatment actions that will be carried out. In terms of handling cases experienced after consultation, patients do not immediately visit an oral health facility. Economic/financial problems are the dominant factor that influences whether a patient visits or not visits an oral health facility^{32,33}. In terms of handling cases experienced after consultation, patients do not immediately visit oral health facilities. Economic/financial problems are the dominant factor that influences whether a patient visits or not visits an oral health facility.

Consultation fees via the drgbeta.com teledentistry application of IDR 25,000/15 minutes for general dentists and IDR 50,000/15 minutes for specialist dentists were affordable for the majority of respondents in this study. This shows that cost for oral health services through the drgbeta.com teledentistry application can be accepted by doctors providing services on the drgbeta.com application and respondents in this study. Respondents in this study will also recommend using the drgbeta.com application to family/relatives. In other words, the use of the drgbeta.com application can be accepted by respondents^{37,38}.

Conclusions

Most of the respondents were consulting a dentist for the first time and that was through the drgbeta.com application. Pulpitis, gingivitis and radix were the cases most frequently consulted by respondents. The drgbeta.com application answers respondents' needs to consult regarding oral health problems.

Declaration of Interest

The authors report no conflict of interest.

References

- Liasari I, Priyambodo RA, Wahyuni N. Impact Of Covid on Patient Visits at Private Dental Clinic. *Public Health Polytechnic*. 2022; 21(1): 11-17.
- Czumbel LM. *et al*. Saliva as a Candidate for COVID-19 Diagnostic Testing: A Meta-Analysis. 2020; 7. 1-10.
- Masud M, Mohamed ZA, Azman NF, Rahim MAA. The Practice, Perception, and Awareness of Self-Medication for Dental Pain in Malaysian Dental Students: *Jornal Of International Dental and Medical Research*. 2020; 13(2): 697-703.
- Sulayyim HJAS, Ismail R, Hamid AA, Ghafar NA. Antibiotic Resistance during COVID-19: A Systematic Review. *National Library Of Medicine*. 2022;19(19): 11931.
- Langford BJ, *et al*. Antibiotic resistance associated with the COVID-19 pandemic: a systematic review and meta-analysis. *National Library of Medicine*. 2023; 29(3): 302-309.
- Ghosh S, Bornman C, Zafer MM. Amenazas de resistencia a los antimicrobianos en la pandemia emergente de COVID-19: ¿Dónde nos encontramos? *J. Infect. Public Health*. 2020; 14: 555-560.
- Zareef U, Najam A, Shahid A, Qureshi NR, Adnan AS. Practice of Self Medication for Dental Ailments among Patients Attending Dental OPDs in Karachi, Pakistan. *Jurnal of Oral Hygiene & Health*. 2018; 6(2):237.
- Chouhan K, Prasad SB. Self-medication and their consequences: A challenge to health professional. *Asian Journal Of Pharmaceutical and Clinical Research*. 2016; 9(2): 314-317.
- Sadio AJ, *et al*. Assessment of self-medication practices in the context of the COVID-19 outbreak in Togo. *BMC Public Health*. 2021;21 (1):58.
- Telles-Araujo G, *et all*. Teledentistry support in covid-19 oral care. *Clinics*. 2020;75: 1-2.
- Achmad H, Tanumihardja M, Ramadhany YF. Teledentistry as a solution in dentistry during the covid-19 pandemic period: A systematic review. *Int. J. Pharm. Res*. 2020; 12: 272-278.
- Agarwal A, Saha S, Reddy LVK, Shukla N. Teledentistry: A Review on its Present Status and Future Perspectives. *Acta Sci. Dent. Sci*. 2019; 3: 2581-4893.
- Niazi MIK, Ghafoor S. Teledentistry and COVID-19: Today and Tomorrow. *BioMedica*. 2020; 36: 81-83.
- Talla PK, Levin L, Glogauer M, Cable, C, Allison, PJ. Delivering dental care as we emerge from the initial phase of the COVID-19 pandemic: teledentistry and face-to-face consultations in a new clinical world. *National Library Of Medicine*. 2020; 5(1): 672-677.
- Amtha R, Gunardi I, Astoeti TE, Roeslan MO. Satisfaction Level of the Oral Medicine Patients Using Teledentistry During the COVID-19 Pandemic: A Factor Analysis. *Journal International Prev Comunity Dental*. 2021; 11(4): 414-420.
- Fricton J, Chen H. Using teledentistry to improve access to dental care for the underserved. *Dent. Clin. North Am*. 2009; 53(3): 537-48.
- Pervin MT, Sarker BK. Benefits and challenges in adopting social media for SMEs: A Case From Bangladesh. 2021; 2(3): 171-185.
- Deshpande S, *et all*. Teledentistry: A Boon Amidst COVID-19 Lockdown - A Narrative Review. *National Library of Medicine*. 2021; 16.
- Suetenkov DE, Popkova OV, Kiselev AR. Possibilities and limitations of Teledentistry. *Saratov State Med. Univ. Rusia* . 2020;57(1): 1.
- Patel T, Wong J. The role of real-time interactive video consultations in dental practice during the recovery and restoration phase of the COVID-19 outbreak. *National Library of Medicine*. 2020; 229 (3): 196-200.
- Iyer P, Aziz K, Ojcius DM. Impact of COVID-19 on dental education in the United States. *National Library of Medicine* 2020; 84(6): 718-722.
- Amtha R, Gunardi I, Astoeti TE, Roeslan MO. Satisfaction Level of the Oral Medicine Patients Using Teledentistry During the COVID-19 Pandemic: A Factor Analysis. *Journal International Prev Comunity Dental*. 2021; 11(4): 414-420.
- Estai M, Bunt S, Kanagasingam Y, Tennant M. Cost savings from a teledentistry model for school dental screening: an Australian health system perspective. *Natl. Libr. Med*. 2018; 42(5): 482-490.
- Tynan A, *et all*. Integrated approach to oral health in aged care facilities using oral health practitioners and teledentistry in rural Queensland. *Aust. J. Rural Health*. 2018; 26(4): 290-294.
- Xiao, D. *et al*. Development and Practice of Store-and-Forward Telehealth Systems in Ophthalmology Dental and Emergency. *Stud. Health Technol. Inform*. 2015; 214: 167-173.
- Teoh J, Hsueh A, Marino R, Manton D, Hallet K. Economic Evaluation of Teledentistry in Cleft Lip and Palate Patients. *Journall Med. Ext. Real*. 2018; 24(6): 449-456.

27. Sharma H, Suprabha BS, Rao A. Teledentistry and its applications in paediatric dentistry: A literature review. *Pediatr. Dent. J.* 2021; 31(3): 203-215.
28. Singhal S, Mohapatra S, Quiñonez C. Reviewing teledentistry usage in Canada during COVID-19 to determine possible future opportunities. *National Library of Medicine.* 2021; 19(1): 31.
29. Poirier B, Jensen E, Sethi S. The evolution of the teledentistry landscape in Australia: A scoping review. *Aust. J. Rural Health.* 2022; 30(4): 434-441.
30. Estai M, et al. Challenges in the Uptake of Telemedicine in Dentistry. *National Library of Medicine.* 2016; 16(4): 3915.
31. Estai M, Kruger E, Tennant M. Optimizing patient referrals to dental consultants: Implication of teledentistry in rural settings. *Australas. Med. J.* 2016; 9(7): 249-252.
32. Estai M, et al. The efficacy of remote screening for dental caries by mid-level dental providers using a mobile teledentistry model. *Community Dent. Oral Epidemiol.* 2016; 44(5): 435-41.
33. Estai M, et al. Validity and reliability of remote dental screening by different oral health professionals using a store-and-forward telehealth model. *Br. Dent. J.* 2016; 221(7): 411-414.
34. Marino R, et al. Teleconsultation/telediagnosis using teledentistry technology: A pilot feasibility study. *Int. J. Adv. Life Sci.* 2014; 6 (3&4): 291-299.
35. Wolf TG, Schulze RKW, Gomez FR, Campus G. Effectiveness Of Telemedicine And Teledentistry After The Covid-19 Pandemic. *Journal Environ Res Public Health.* 2022: 1992); 13857.
36. Wahono AN, et al. Efficacy of using Audiovisual Videos in School-based Online Learning to Improve Parental Knowledge of Children Oral Health: A Lesson from COVID-19 Pandemic. *Journal of International Dental and Medical Research.* 2023; 16(3): 1141-1146.
37. Petcu R, et al. Assessing Patient's Perception Of Oral Teleconsultation. *International Jurnal Technol Assess Health Care.* 2017; 33(2): 147-154.
38. Estai M, et al. End-user acceptance of a cloud-based teledentistry system and Android phone app for remote screening for oral diseases. *Jurnal Telemed Telecare.* 2017; 23(1): 44-52.