

Satisfaction Level of the Oral Medicine Patients Using Teledentistry During the COVID-19 Pandemic: A Factor Analysis

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ABSTRACT

Objectives: The aim of this article is to describe oral medicine patients' satisfaction level with teledentistry services during COVID-19 pandemic by a factor analysis. **Materials and Methods:** An observational cross-sectional study was conducted in the Oral Medicine Clinic in 31 patients who used teledentistry services at the beginning of the COVID-19 pandemic under informed consent. Questionnaire modification was validated with the Rasch model analysis and components that contribute to satisfaction were analyzed by the factor analysis. A total of satisfaction scores were then categorized into five levels (very dissatisfied; not satisfied; moderate; satisfied and very satisfied). **Results:** The questionnaire shows Cronbach's alpha of 0.83 and a reliability item of 0.95 with a separation of 4.49. The factor analysis shows two components that contribute to satisfaction, namely, components convenience and communication. One hundred percent of the subjects were in the satisfied and very satisfied categories. **Discussion:** The Rasch model can determine the validity and reliability of the questionnaire used more accurately. The components of convenience and communication are the main things that are considered when patients choose teledentistry services. **Conclusion:** Oral medicine patients' satisfaction level with teledentistry services during the COVID-19 pandemic was 100% in the satisfied and very satisfied categories, with contributing factors being convenience and communication.

KEYWORDS: COVID-19, factor analysis, patient satisfaction, teledentistry

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INTRODUCTION

SARS CoV-2, which was first identified in December 2019 in Wuhan, Hubei province, China, has subsequently been determined to be the cause of COVID-19.^[1,2] The World Health Organization (WHO) declared the COVID-19 outbreak as a global pandemic.^[3] This disease has implications for crisis in the field of public health, politics, and social and economic perspectives in various countries.^[4]

Since being declared a global pandemic, every country with COVID-19 cases has implemented various policies to break the chain of transmission to reduce the number of cases. The policies implemented include physical distancing, prohibiting people from gathering, closing schools, offices, restaurants, places of

worship, shopping centers, restricting public facilities, public transportation, etc. In the health sector, the government urges to avoid coming to hospitals, dental clinics, and other health service offices as much as possible, except in an emergency. In dentistry, the potential for transmission of the SARS CoV-2 virus through droplets, splatters, and aerosols is very high.^[5] This results in patients delaying treatment, resulting in increased morbidity of dental and oral diseases. Therefore, one solution is to carry out remote health

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services known as telemedicine. Teledentistry can facilitate access for people living in remote areas to get dental and oral health services from specialist dentists. Oral medicine specialists who diagnose and treat oral lesions can also prevent transmission of the virus by conducting teledentistry. The role of teledentistry in oral medicine and diagnosis has been carried out at the dental health service in Belfast, Northern Ireland, using a prototype teledentistry system.^[6] Torres-Pereira *et al.*^[7] describe remote diagnosis as an effective alternative in diagnosing oral lesions by sending digital images via email. Summerfelt^[8] reports that teledentistry, developed by the Northern Arizona University Dental Hygiene Department, enables healthcare professionals to provide oral health services to underserved communities by digitally linking them with remote oral healthcare teams. Greenhalgh *et al.*^[9] also recommend that online video-based consultations avoid close contact with patients and healthcare professionals.

Even though telemedicine is an option, it still cannot replace the actual examination in which the patient is present in the same room as the health worker. Satisfaction is a person's feeling of pleasure, which comes from a comparison between pleasure in an activity and a product with expectations.^[10] This satisfaction is seen from the general condition, not specifically for dental treatment services. Meanwhile, the patient is a bio-psycho-socio-economic-culture creature. It means the needs, desires, and expectations fulfillment from biological aspects (health), psychological aspects (satisfaction), socio-economic aspects (shelter, clothing, food, social affiliation, etc.), as well as cultural aspects.^[11] Patient satisfaction has many definitions from various literatures. However, from all these definitions, it can be concluded that several factors play a role in patient satisfaction, namely, the perception of satisfaction, health service performance, comparison with expectations, experience, education, psychology, and environment, and based on truth and objective reality. The satisfaction of health service users can also be concluded as the difference between health service institutions' performance and patient expectations.^[12] In assessing patient satisfaction, several factors must be considered, namely, 28 communications between doctors and patients, maintaining high standards of health services, and being quick to get feedback.^[11] Patient satisfaction has many definitions from various literatures. However, from all these definitions, it can be concluded that several factors play a role in patient satisfaction, namely, the perception of satisfaction, health service performance, comparison with

expectations, experience, education, psychology, and the environment, and based on truth and objective reality.

The Rasch model analysis can accurately measure the validity and reliability of questionnaire items, compared with Pearson's analysis, which can only show the combined value of the subject and item. In the qualitative analysis, factor analysis can be used to find the similarity of the factors that play a role in the questionnaire on a condition to be assessed. Because the factors that affect patients vary widely, it is necessary to know the level of satisfaction of oral medicine patients who use teledentistry services during the COVID-19 pandemic, along with the factors that affect the satisfaction level of oral medicine patients.

MATERIALS AND METHODS

An analytical observational study with a cross-sectional design was conducted in Oral Medicine Clinic Dental Hospital, Faculty of Dentistry Universitas Trisakti, Jakarta on 31 oral medicine patients who used teledentistry services at the start of the COVID-19 pandemic (July–October 2020). After teledentistry service, all subjects filled the satisfaction questionnaire online. Inclusion criteria were oral medicine patients who registered teledentistry services in the study center and have agreed to used online-based application under informed consent. Ethics approval has been approved by FKG Usakti Ethics Commission No. 048/S3/KEPK/FKG/9/2020. Statistical analysis used the Rasch model and analysis factor. The Rasch model was used to validate the questionnaire, and an analysis factor was used to determine the component that contributes to the level of satisfaction. The questionnaire's validity and reliability were tested on 500 student respondents by online administration, and the revision of questionnaire items was carried out on items that had logits beyond the value limits of the Rasch model.^[13,14] The similarity of factors was tested using factor analysis with a loading factor (eigenvalue) of more than 0.4, which is considered to have the ability to contribute to determining the characteristics of its components. The higher the eigenvalue, the more significant contribution of the item's role to its components' characteristics.

The satisfaction level was measured using a modified questionnaire from Gustke *et al.*^[15] Questionnaires consisting of 18 questions with a Likert scale with score 5=strongly agree; 4=agree; 3=doubt; 2=disagree; and 1=strongly disagree. The level of satisfaction is measured by the total score of the answer choices on the questionnaire and divided into five groups equally.

Score 18–32.4 showed the level of very dissatisfied; >32.4–46.8 not satisfied; >46.8–61.2 moderate; >61.2–75.6 satisfied; and >75.6–90 very satisfied.

RESULTS

The response rate for questionnaire validation was 100%. Validation on 500 subjects used a modified questionnaire from Gustke *et al.*,^[15] showing a Cronbach alpha's value of 0.83 and a reliability item of 0.95 with a separation of 4.49.

Meanwhile, the response rate for oral medicine patients was 100% ($n = 31$). The factor analysis test result shows KMO 0.611 (KMO/Keizer–Meyer–Olkin measure of sampling adequacy close to 1) and Bartlett's test of sphericity 0.00 (less than 0.05), which indicates that the data are adequate to be tested by the factor analysis. Schematically, the mapping of each factor based on the eigenvalue can be presented in Table 1, showing each item's classification in the factor components (components 1 and 2). In this study, the level of subject satisfaction was influenced by component 1, which refers to the subject's perception of the patient's comfort and convenience in using teledentistry services, whereas component 2 assumes the importance of communication between doctors and patients during teledentistry.

DISCUSSION

The subjects' sociodemographic profile showed that patients with oral diseases who used teledentistry services had very varied types of cases in this study, including normal conditions or lesions, emergencies, and suspected oral cancer. During the COVID-19 pandemic, cases of oral disease related to psychosomatics appear to be increasing. The number

is almost equal to cases of oral diseases classified as emergencies such as precancerous lesions, cancer, autoimmune, neurological manifestations, or lesions that cause sharp pain. Dziedzic and Varoni^[16] reported that during the COVID-19 pandemic, oral medicine specialists were able to treat oral lesions divided into two priority categories: low and high (Royal College of Surgeons of England RCSE,^[17] modified). The low priority category consists of ulcerated or swollen lesions of the oral mucosa occurring less than 2 weeks, lesions associated with acute odontogenic lesions, dry mouth, or burning mouth.

Meanwhile, the high priority category consists of ulcerated lesions or swelling that persists for more than 2 weeks, symptomatic and asymptomatic, orofacial pain, and paresthesia related to the trigeminal nerve.^[16] The application of teledentistry in the field of oral medicine is highly recommended as in this field the primary competence is establishing a diagnosis through complex history taking, which can still be done with audiovisual technology, such as mobile phones, computers, and others. Submission of clinical data and other supporting data (laboratory results) can be provided to operators so that diagnosis using teledentistry is a very appropriate solution, especially during the COVID-19 pandemic. Teledentistry also has the potential to prevent the increased morbidity of various dental and oral diseases due to delayed treatment due to concerns over the transmission of COVID-19. Teledentistry in oral medicine requires qualified skills and confidence in enforcing the history and determining appropriate therapy.

Based on Table 2, those who used teledentistry services the most during this pandemic were the age group 31–60 years (51.61%) and over 60 years (32.25%). It is because the 31–60 years age group is of productive age and is more active in seeking treatment, but during the COVID-19 pandemic, concerns about the manifestation of SARS CoV-2 virus infection in the oral cavity have increased rapidly, so that the number of patients at this age those who require teledentistry services also increases. It is different from the results of the teledentistry study of oral diseases in Northern Ireland, in which oral disease patients who mostly used these services were >60 years old (75.67%).^[6]

Validation and reliability of the questionnaire using the Rasch model will show each item's logits that help researchers to measure each question accurately and thus can be further revised.^[13,14] In addition to the Rasch model, the factor analysis can help select which items do not contribute to the components affecting the satisfaction of oral disease patients using teledentistry.

Table 1: The loading factor value of each questionnaire item in two factor components (loading factor > 0.4; varimax rotation)

Factor component 1 (convenience)		Factor component 2 (communication)	
Questionnaire items	Loading factor	Questionnaire items	Loading factor
1	0.822	7	0.904
2	0.739	8	0.848
3	0.530	9	0.812
4	0.503	10	0.788
5	0.450	11	0.725
6	0.426	12	0.695
		13	0.620
		14	0.597
		15	0.594
		16	0.576

Table 2: Characteristics of oral medicine patients using teledentistry

No.	Gender	Age	Profession	Teledentistry history	Clinical diagnosis suspect
1	Female	22	College student	No	Ranula
2	Female	28	General employees	No	Apthous like ulcer
3	Male	13	Student	No	Eosinophilic ulcer
4	Female	28	Doctor/dentist	No	Herpes labialis
5	Female	63	Other	Yes	Atypical glossodynia
6	Male	81	Doctor/dentist	No	OSCC tongue
7	Male	70	Other	Yes	OSCC tongue
8	Male	56	General employees	Yes	Post tongue OSCC therapy
9	Male	19	Student	No	Pyogenic granuloma
10	Female	43	Does not work	No	Cancerphobia
11	Female	75	Does not work	No	Oral lichen planus
12	Female	55	Entrepreneur	No	Leukoplakia in suspected OSCC
13	Male	46	General employees	No	OSCC tongue
14	Male	67	Entrepreneur	Yes	Cancerphobia
15	Female	61	Does not work	Yes	Pemphigus vulgaris
16	Female	53	Does not work	No	Cancerphobia
17	Female	70	Does not work	No	Candidiasis and normal variants
18	Male	45	General employees	No	Suppurative sialadenitis
19	Male	36	General employees	No	Cancerphobia
20	Female	49	Does not work	No	Cancerphobia
21	Male	37	General employees	Yes	Herpes labialis
22	Female	52	Does not work	No	Oral warts
23	Male	69	Does not work	No	OSCC tongue
24	Female	47	Entrepreneur	No	Oral lichen planus
25	Female	93	Other	No	Major recurrent apthous stomatitis
26	Female	48	General employees	Yes	OSCC tongue
27	Male	74	Other	No	Eosinophilic ulcer
28	Female	52	Housewife	No	Cancerphobia
29	Male	45	Does not work	No	Impacted upper canine
30	Male	35	Entrepreneur	No	Symptomatic geographic tongue
31	Female	78	Other	No	Trigeminal neuralgia

OSCC = oral squamous cell carcinoma

In this study, out of the 18 items of the questionnaire, two items did not contribute to the components of the factors that affect the level of satisfaction, namely, items 17 and 18, because the factor loading was <0.4. The two items (about face-to-face consultation) are not items that contribute to the satisfaction level of oral disease patients using teledentistry services during this pandemic. The two main components that appear in the factor analysis are then given a name for each component, which depends entirely on the items' contextual similarity. The naming of component 1 is convenience, and component 2 is communication [Table 2].

Questionnaire item 5 [Table 3], which asks about "I don't like being in a location far from the doctor, so I can't directly examine me" (direct physical examination), shows that half of the respondents disagree. The COVID-19 pandemic condition is that direct examination can pose a high risk of transmission so that it becomes a consideration for patients to come

to the hospital or clinic. This study supports the results of Allen and Hayes^[18] research on cancer patients who use telemedicine in remote areas where distance and time constraints are the primary consideration. In questionnaire item no 3 ("From a financial point of view that must be issued, if you have to come to a practice place, so I feel that online consultation is more economical"), it appears that only some respondents agree and strongly agree that the use of teledentistry is considered more economical. It may be because the subject thinks that because there is no direct physical examination, face-to-face with the doctor is only a consultation, so the costs incurred can be lower. It is in line with Birnbach's^[19] opinion that telemedicine costs can be reduced as technology is usually used when examining patients directly (e.g., using intraoral cameras, digital cameras, computers, etc.).

In contrast, Lykke^[20] states that it makes sense to charge a fee; telemedicine health services are the same as the number of direct (face-to-face) services.

Table 3: Questionnaire items and response responses in percent (modified from Gustke et al.^[15])

No.	Questionnaire	Strongly agree	Agree	Doubt	Disagree	Strongly disagree
Factor component 1 (convenience)						
1	I feel satisfied with the session that I have with the doctor	70.97	22.58	3.23	3.23	0.00
2	I feel comfortable filing complaints about my illness to the doctor	80.65	16.13	0.00	0.00	3.23
3	From a financial point of view, if you have to come to a practice place, then I feel that online consultation is more economical	32.26	16.13	38.71	9.68	3.23
4	My illness was getting worse with this online consultation method during the pandemic	29.03	32.26	19.35	12.90	6.45
5	I did not like being in a location far from the doctor, so I could not immediately examine myself	12.90	29.03	12.90	32.26	12.90
6	Online oral disease consultations can save you travel and waiting time and avoid canceling doctor appointments	64.52	22.58	12.90	0.00	0.00
Factor component 2 (communication)						
7	I feel comfortable asking the doctor questions	74.19	22.58	3.23	0.00	0.00
8	Doctors communicate with me effectively	67.74	29.03	3.23	0.00	0.00
9	I like seeing doctors online like seeing him in the normal way	32.26	32.26	25.81	9.68	0.00
10	The doctor provided the treatment solution that I needed to do	74.19	22.58	3.23	0.00	0.00
11	The doctor gave a good description of my disease diagnosis	74.19	22.58	3.23	0.00	0.00
12	The time given for 40 minutes for consultation, I feel it is enough	61.29	32.26	6.45	0.00	0.00
13	The registration procedure and service administration are easy and the admin helps it run smoothly	54.84	35.48	6.45	3.23	0.00
14	Not being in the same room as the doctor is a problem for me	19.35	29.03	25.81	12.90	12.90
15	I feel safer avoiding transmission of COVID-19, by seeking treatment in an online consultation rather than coming to a doctor's office	74.19	16.13	9.68	0.00	0.00
16	I am satisfied with the information that the doctor gave me about my complaint	64.52	35.48	0.00	0.00	0.00
Other items not included in the factor component						
17	I will feel much more comfortable with face-to-face (not online) meetings during this pandemic	16.13	19.35	25.81	19.35	19.35
18	I think doctors can do their job well as if I were in the practice room	41.94	45.16	12.90	0.00	0.00

Table 4: Frequency distribution of subject satisfaction levels in using teledentistry

Satisfaction level	Male, n (%)	Female, n (%)	Total, n (%)
Score 18–32.4: very dissatisfied	0	0	0
Score >32.4–46.8: not satisfied	0	0	0
Score >46.8–61.2: moderate	0	0	0
Score >61.2–75.6: satisfied	7 (22.58%)	8 (25.80%)	15 (48.38%)
Score >75.6–90: very satisfied	7 (22.58%)	9 (29.03%)	16 (51.61%)

There is no regulation from the government regarding reimbursement of examination costs by telemedicine or teledentistry.^[21] The satisfaction score is determined based on the distribution of the lowest average score (18) to the highest score (90). One hundred percent of the respondents [Table 4] who used oral disease teledentistry at the beginning of the COVID-19 pandemic had a satisfaction level of being satisfied and very satisfied. This study follows the results of a systematic review that patient satisfaction in using telemedicine ranges from 71% to 100%.^[13] The satisfaction level of oral medicine patients using teledentistry services in this

study was satisfied and very satisfied. Due to their complaints and communication between patients and dentists, it is primarily fulfilled due to the convenience and ease of obtaining information and treatment plans. This result also follows a systematic review by Kruse et al.^[22] that both factors increase telemedicine services and meet the basic needs of the patient or the patient expectation.

The limitation of this study was that the number of subjects who participated was less because this preliminary study was the first teledentistry service

done in our country. Most of the study subjects had no prior use of teledentistry services. It shows that the number of subjects who have never used teledentistry services has increased during the pandemic. This condition corresponds with the benefits or implication of using teledentistry in people with various emergency conditions, especially during a pandemic, limiting the mobility of subjects to seek treatment directly from healthcare facilities. Likewise, patients who come from very far/remote areas, as Indonesia consists of 19,000 islands, may use teledentistry as one of the solutions to gain dental health service access to prevent worsening oral health conditions.^[8] This result supports the policy in our dental hospital to implement teledentistry service during and after the pandemic COVID-19.

Currently, this teledentistry service is considered very important to clinicians in dental practice as part of legal, technological, and ethical services in dentistry. Teledentistry can also be a way to gain access to care from various disciplines of dental specialization.^[23] Further research is needed with a larger number of patients to see variations in the level of satisfaction of teledentistry services in the field of oral medicine.

CONCLUSION

The satisfaction level of oral medicine patients with teledentistry services during the COVID-19 pandemic was 100% satisfied and very satisfied. Two components of the factor analysis that contribute to satisfaction based on subjects' perceptions in the study are the components of comfort and convenience and communication between patients and doctors.

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CONFLICTS OF INTEREST

There is no conflict of interest.

AUTHORS CONTRIBUTIONS

Rahmi Amtha has been contributed in providing concept and design, acquisition of data, interpretation data, drafted article, revised and approved version. Indrayadi Gunardi has been contributed in providing concept and design, data analysis, interpretation data, revised and approved version. Tri Erri Astoeti has been contributed in concept and design, revised and

approved version. Moehamad Orliando Roeslan has been contributed in acquisition of data, drafted article, revised and approved version.

ETHICAL POLICY AND INSTITUTIONAL REVIEW BOARD STATEMENT

Ethics approval has been approved by FKG Usakti Ethics Commission No. 048/S3/KEPK/FKG/9/2020.

PATIENT DECLARATION OF CONSENT

The authors certified that all the subjects had given their consent forms that attached on online survey.

DATA AVAILABILITY STATEMENT

The data set can be requested through corresponding author.

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