



Meta-Analysis: Relationship of Age, Sex, Time of Serving, and Consultation Modalitas with Patient Satisfaction on Telemedicine Use

Siti Habibah Zein*

Tanah Laut State Polytechnic,, South Kalimantan, Indonesia
& Faculty of Medicine, Lambung Mangkurat University,
South Kalimantan, Indonesia

Mufrida Zein

Politeknik Negeri Tanah laut,
South Kalimantan, Indonesia

Bahrul Ilmi

Politeknik Kesehatan, Indonesian Health
Ministry, South Kalimantan, Indonesia

Silvia Kristanti Tri Febriana

Magister Program of Public Health Study Program,
Faculty of Medicine, Lambung Mangkurat
University, South Kalimantan, Indonesia

Eko Suhartono

Magister Program of Public Health Study Program,
Faculty of Medicine, Lambung Mangkurat
University, South Kalimantan, Indonesia

Achmad Rofii

Ulin Hospital, Banjarmasin,
South Kalimantan, Indonesia

Abstract: Telemedicine has the potential to change the future of medicine by increasing access to medical care and providing a way to reach hard-to-reach areas so that health services in Indonesia can be more evenly distributed. In Indonesia, telemedicine has been covered by several regulations from the Ministry of Health. During the COVID-19 pandemic, the Indonesian Ministry of Health has also published a technical guidebook for health services during the adaptation period for new habits and a technical manual for telemedicine services. Telemedicine has the advantages of eliminating distance, increasing access to services, and reducing travel time, mortality, hospitalization, and the number of days of care. Telemedicine is also effective in mental health, chronic disease management, and elderly care. This meta-analysis aims to find out the strength of the relationship between age, gender, service time, and consultation modality with patient satisfaction with telemedicine. This study used a meta-analysis research design with a correlation meta-analysis design consisting of 11 studies that met the inclusion criteria. The results showed a relationship between age and patient satisfaction in the use of telemedicine by 2.74 times. There is a relationship between gender and patient satisfaction in telemedicine of 2.95 times. There is a relationship between service time and patient satisfaction in the use of telemedicine by 4.23 times. There is a relationship between the modality of consultation with patient satisfaction in the use of telemedicine of 7.83 times. It is hoped that this research can make telemedicine services applicable in many health facilities in Indonesia by paying attention to the age sector, gender, service time, and choice of consultation modality so that access to health services can be reached more easily.

Keywords: Age, sex, time of serving, consultation modalities, patient satisfaction

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*Correspondence concerning this article should be addressed to Siti Habibah Zein, Tanah Laut State Polytechnic,, South Kalimantan, Indonesia. E-mail: habibahzein@politala.ac.id

I. INTRODUCTION

Along with the development of the times that entered the industrial revolution 4.0, technological progress is growing faster, especially in digital-based information and communication. With the integration of physical, digital, and biological systems, the health sector is considered the biggest beneficiary of Revolution 4.0. All three components are realized in the form of telemedicine [1, 2].

[3] mentioned many advantages obtained from the implementation of telemedicine, namely: eliminating geographical boundaries and improving access to quality health services to populations living far from access centers, reducing travel time, reducing isolation for patients and families living in rural areas by upgrading their knowledge through tele-education. According to [4] research, there was a decrease in mortality, hospitalization, and the number of days of treatment. More than 20 systematic reviews have reported that telemedicine is effective in mental health and chronic disease management such as diabetes, heart failure, and elderly care [5, 6].

The use of health services with telemedicine certainly still has limitations compared to face-to-face services in person. Reporting to a survey conducted by the Kaiser Family Foundation, one of the obstacles to telemedicine is that only 7 out of 10 elderly people aged 65 years and over have a computer, smartphone, or tablet equipped with internet access [7].

Telemedicine can be an innovation in developing health care management in Indonesia based on technology. Telemedicine has the potential to change the future of medicine by improving access to medical care and providing ways that can reach difficult-to-reach areas so that health services in Indonesia can be more equitable. Telemedicine is also a form of pattern development of health services in remote and very remote area health care facilities. The demand for telemedicine will likely increase [8, 9]. In Indonesia, telemedicine has been covered by several regulations from the Ministry of Health; in addition to that, during the COVID-19 pandemic, the Ministry of Health has also published a technical guidebook for health services during the adaptation period of new habits and a technical manual for Telemedicine services. It is hoped that the study results can make telemedicine services can be applied in many health facilities in Indonesia. Services can be more optimal by looking at user segmentation, namely age, gender, service time, and availability of options and consulting modalities.

This meta-analysis aims to determine the strength of the relationship between age, gender, service time,

and consultation modalities with patient satisfaction in the use of telemedicine. Hopefully, research can make telemedicine services applicable in many health facilities in Indonesia. Services can be more optimal by looking at user segmentation, namely age, gender, service time, and availability of options and consulting modalities.

II. METHOD

This research has a meta-analysis research design with a correlation analysis meta-research design scheme. The study aimed to assess how much variable age, gender, service time, and consultation modalities would affect patient satisfaction in telemedicine use. Identifying research questions is a question used as a basis for conducting a review. The reference used to formulate the question in this study used "PICO": P (Population), the sample was patients using telemedicine, I (Intervention/Prognostic factor/exposure) the intervention/exposure is age, gender, service time, and consultation modalities, C (Comparison) in this study there is no comparison, and O (Outcome) the outcome was patient satisfaction in the use of telemedicine. The population in this study is a national and international journal related to the research title "Meta-Analysis: Relationship of Age, Gender, Service Time, and Modalities of Consultation with Patient Satisfaction on The Use of Telemedicine." The sample in this study is a national and international research article that meets the specified inclusion criteria and uses effect size in the form of an odds ratio. This type of effect size compares two binary variables representing groups in experimental studies or group differences (group 1 vs. group 2) and result variables (pass or fail, yes or no, and others). The main result was to find out the number of tendencies related to age, gender, service time, and modalities of consultation with patient satisfaction with telemedicine.

One simple statistic application that can help test statistics on meta-analysis journal review data is Revman version 5.4.

III. RESULTS AND DISCUSSIONS

A. *Research Data Synthesis Results and Article Characteristics*

The quality of studies from each journal is designated as a source of systematic review based on the quality analysis of the JBI Critical Appraisal Checklist. The results of the literature research analyzed in the systematic review using the Sample, Phenomenon of Interest, Design, Evaluation, and Research Type (SPIDER) format are outlined in the table as follows:

TABLE 1
ARTICLE CHARACTERISTICS

No	Study ID	Sample	Phenomenon of Interest	Design	Evaluation	Research type
1	Impact of Telemedicine on Patient Satisfaction and Perceptions of Care Quality in Radiation Oncology [10]	1077 patients (visit to office 726, telemedicine 351)	Assessing patients' experience with telemedicine of routine radiation oncology practice to know satisfaction, quality of caring, and opportunity for optimization	Cross-sectional	Age: OR 1.02 (CI 95% 0.99-1.04) $p = 0.16$, not related Sex (male): OR 1.54 (CI 95% 0.87-2.76) $p = 0.14$, not related Modalitas Audiovisual ref Audio OR 2.03 (CI 95% 0.72-5.73) $p = 0.17$, not related Time of serving OR 1.01 (CI 95% 0.99-1.02) $p = 0.52$, not related	Quantitative
2	Provider Communication and Telepresence Enhance Veteran Satisfaction with Telestroke Consultations [11]	186 veterans who accepted consultation of telestroke in national telestroke program by Department of Veteran, USA	Checking the feedback of patients from the national telestroke system in Veteran Health Administration	Cross-sectional	Age, OR 0.99 (CI 95% 0.97-1.03) $p = 0.822$ not related	Quantitative
3	Patient and Provider Satisfaction with Telemedicine in Otolaryngology [12]	325 patients who get telemedicine in the agreement of routine otolaryngology	Evaluate patients satisfaction and service provider with telemedicine in 3 locations of Ear-Nose-Throat's practice	Cross-sectional	Sex, male OR 0.63, CI 95% 0.38-1.04, $p = 0.07$, not related	Quantitative
4	Exploring Quality Differences in Telemedicine Between Hospital Outpatient Departments and Community Clinics: Cross-sectional Study [13]	426 patients who used telemedicine in the pandemic of Covid-19 in Abu Dhabi	Explore the differences between perception and patient satisfaction with telemedicine, in the outpatient installation of hospitals and clinics, during the Covid-19 pandemic. Identify characteristics of patients or visitors that contributed to patients' satisfaction with telemedicine	Cross-sectional	sex, male OR 1.06 CI 95% 0.7-1.61, $p = 0.78$, not related Modalitas (video vs audio) OR 2.57 CI 95% 1.04-6.33, $p = 0.04$, related	Quantitative
5	Multicenter evaluation of breast cancer patients' satisfaction and experience with oncology telemedicine visits during the COVID-19 pandemic [14]	1299 participants from 18 centers in Paris and Italy (breast cancer patients) who had at least one teleconsultation to be evaluated their satisfaction	Examine patient's satisfaction with breast cancer who already had teleconsultation in the first wave of the Covid-19 pandemic	Cross-sectional observational	Modalitas Video ref Audio OR 2.7 (CI 95% 1.5-4.9), $p = 0.01$, related	Quantitative
6	Telemedicine in management of genitourinary malignancies: Patient and physician perspectives [15]	115 patients who had telemedicine with urology, medical oncology, or oncology radiation in genitourinary carcinoma management	Examine patient's and doctor's perspectives on telemedicine for genitourinary cancer services	Cross-sectional	Sex, male OR 0.35 CI 95% 0.07-1.67, $p = 0.189$. not related	Quantitative
7	Patient satisfaction with Telephone versus video-televisits: a cross-sectional survey of an urban, multiethnic population [16]	269 patients who had televisit in urology practice	Assist differences between phone and video televisit and identify if visiting modalitas related to satisfaction in urban academic general urology practice.	Cross-sectional	Sex, Female OR 2.28 (CI 95% 1.03-5.03) $p = 0.04$, related Male ref Modalitas, Audio OR 1.17 CI 95% 0.52-2.64, $p = 0.71$ not related Video Ref	Quantitative
8	A cross-sectional online survey on patients' satisfaction using store-and-forward voice and text messaging teleconsultation service during the COVID-19 pandemic [17]	396 patients who used telemedicine	Evaluate patient satisfaction in using voicemail and store-and-forward text teleconsultation services in primary health along with the Covid-19 pandemic	Cross-sectional	Age, OR 1.01 CI 95% 0.99-1.03 Sex, Female ref Male OR 1.10 CI 95% 0.72-1.68	Quantitative
9	Telemedicine for ENT: Effect on quality of care during COVID-19 pandemic [18]	100 pasien yang melakukan konsultasi via telemedicine di poli THT	Examine the benefits of telemedicine in the Covid-19 pandemic	Cross-sectional	Sex Female ref Male univariat OR 0.669 CI 95% 0.3-1.5, multivariat OR 0.7 CI 95% 0.25-1.95, $p = 0.5$, not related Time of serving, OR 0.95 CI 95% 0.84-1.10, $p = 0.437$, not related	Quantitative
10	Patterns of Use and Correlate of Patient Satisfaction with a Large Nationwide Direct to Consumer Telemedicine Service [19]	28.222 participants consisted of 24.040 patients and 277 doctors	Characterize patients and doctors of telemedicine and relate with patients satisfaction	Cross-sectional	Sex, Male OR 1.03 CI 95% 0.96-1.11 Time of serving, OR 1.00 CI 95% 0.99-1.01	Quantitative
11	Real-time teleophthalmology video consultation: an analysis of patient satisfaction in rural Western Australia [20]	109 patients who consulted using video	Evaluate patient satisfaction with teleofthalmology, using patients who consulted using Lions Outback Vision video. For assessing satisfaction, it was used a questionnaire based on phone	Cross-sectional	Modalitas, video OR 1.82 CI 95% 0.88-3.76 Time of serving, OR 4.01 CI 95% 1.84-8.74	Quantitative

B. Critical Appraisal using JBI Tools

From articles that meet the inclusion criteria in this systematic review, 11 articles with cross-sectional research designs were obtained. The critical appraisal was

carried out using the JBI critical appraisal tool checklist for analytical cross-sectional studies, given a quality score of 7/8.

Here are the results of the questions in the JBI critical appraisal tool checklist.

TABLE 2
CRITICAL APPRAISAL

Study ID	Question to								Total JBI	Quality Evaluation
	1	2	3	4	5	6	7	8		
[10]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	7/8	Higher Quality
[11]	Yes	Yes	Yes	Yes	No	No	Yes	Yes	6/8	Higher Quality
[12]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/8	Higher Quality
[13]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/8	Higher Quality
[14]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/8	Higher Quality
[15]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/8	Higher Quality
[16]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8/8	Higher Quality
[17]	Yes	Yes	Yes	Yes	No	No	Yes	Yes	6/8	Higher Quality
[18]	Yes	Yes	Yes	No	Yes	No	Yes	Yes	6/8	Higher Quality
[19]	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	7/8	Higher Quality
[20]	Yes	Yes	Yes	Yes	No	No	Yes	Yes	6/8	Higher Quality

IV. DISCUSSION

A. Age Relationship with Patient Satisfaction on Telemedicine Use

In the heterogeneity test of 3 studies obtained a value of $I^2 = 88\%$ with p value = 0.0003 this indicates high heterogeneity between studies. Therefore, the test used is a random effect model. Heterogeneity tests are performed to prove the hypothesis of whether the average ES has an influence/relationship or not. Then obtained an OR score of 2.74 with CI 95% of 2.70-2.77 which states that the patient's age has a meaningful relationship of 2.74x with patient satisfaction in the use of telemedicine.

[19] stated that age has an association with patient satisfaction where the age of 30-39 years has a higher satisfaction in using telemedicine than patients under the age of 30 years. [21] in their study also mentioned that they have identified several factors in the telehealth experience that are associated with higher satisfaction, namely including patient comfort factors, female gender, younger age, non-white ethnicity and absence of a history of oropic heart transplantation. [20] in his study stated that older patients felt able to explain more easily their health problems in video consultations and stated that they felt more satisfied. [13] in his research mentioned that the satisfaction of patients who do telemedicine is related to age, modality, and employment status, but has no relationship with gender factors, educational status, and marital status.

On the plot funnel appears symmetrical which means no publication bias is found. The position of the point is centered at the top, it appears that the number of studies entered is small with a large sample number.

B. Sex Relationship with Patient Satisfaction on Telemedicine Use

The results of the analysis of 8 studies showed the relationship of sex with patient satisfaction in telemedicine. The result obtained is OR = 2.95 with a 95% confidence interval of 2.27-3.84. The test results showed high heterogeneity ($I^2 = 98\%$) thus using random effects to measure the combined effects of data in the data input model in the Revman 5.4 application. Female sex is significantly associated with a 2.95-fold increase in telemedicine use compared to male gender.

In their study, [21] mentioned that they have identified several factors in the telemedicine experience associated with higher satisfaction, namely including patient comfort factors, female gender, younger age, non-white ethnicity, and absence of a history of oropic heart transplantation. According to her, women are more satisfied and often use telemedicine services, especially during the COVID-19 pandemic, which makes it often at home so that they need to balance childcare activities, family care and work responsibilities. In another study conducted by [22] stated that female patients 1.75x prefer health services using telemedicine than men. The plot funnel shows no publication.

This research also similar with [23] that said age was related to satisfaction with p value = 0.030 and OR = 2.674.

C. Relationship of Service Time with Patient Satisfaction on the Use of Telemedicine

Meta-analysis of 4 studies showed that in looking for a relationship between service time and patient satisfaction in telemedicine use obtained an OR score of 4.23

with CI 95% 3.86 – 4.64. Which means that the service time has a relationship of 4.23 times with patient satisfaction in the use of telemedicine. Also obtained the value of $p < 0.00001$ and the value $I^2 = 100\%$, this shows that this relationship is meaningful, the heterogeneity value is high which means using random effect models.

[19] stated that patients who experienced longer waiting times reported lower levels of satisfaction in terms of telemedicine use. [20] also stated that there is a relationship between service time in the use of telemedicine and patient satisfaction where telemedicine can make patients more money and time saving. Research conducted by [16] states that patients experience substantial time and cost savings with telemedicine. A review written by [24] that telemedicine is beneficial for patients because it reduces travel time or costs, eliminates work breaks, and reduces waiting time so as to increase patient satisfaction. Based on research [25] in Bangladesh, reported that the time spent by patients accessing health services through telemedicine was reduced by 56% (226 minutes to 99 minutes) compared to similar traditional health services. Similarly, the average viewing cost was reduced by 94%. So it can be concluded that telemedicine services are more cost-effective and time efficient for rural communities in accessing their health services.

The results of this meta-analysis are in line with research conducted by [19] which stated that patients who experienced longer waiting times reported lower levels of satisfaction in terms of telemedicine use. [20] also stated that there is a relationship between service time in the use of telemedicine and patient satisfaction where telemedicine can make patients more money and time saving.

The plot funnel indicates there is a publication bias. This could be because the study used in this meta-analysis is a significant study without listing insignificant studies.

D. Relationship of Consultation Modalities with Patient Satisfaction on the Use of Telemedicine

The results of an analysis of 5 studies that showed the relationship of consulting modalities with patient satisfaction in the use of telemedicine. The result obtained is $OR = 7.83$ with a 95% confidence interval of 4.49-13.67. The test results showed high heterogeneity ($I^2 = 98\%$) thus using random effects in the measurement of the combined effects of data in the data input model in the Revman 5.4 application. Video consultation modalities have a meaningful relationship with patient satisfaction in telemedicine use by 7.83 times compared to audio.

[13] stated that patients who conducted video consultations had 2.57 times more satisfaction than patients who

conducted audio consultations. [13] revealed that video consultation was significantly associated with increased perceived benefits as well as higher satisfaction. It is not surprising that patients prefer video rather than audio consultations because this can break psychological barriers, facilitate guided remote physical examinations, facilitate clinical decision-making and make it easier for patients to express concerns. This is in line with [14] research that lower patient satisfaction was found in patients who teleconsulted by phone compared to consultations via video. [10] mentioned that audiovisual consultations between doctors and patients strengthen therapeutic alliances and lead to higher satisfaction of patient care quality.

Funnel plot results show symmetry which means there is no publication bias for studies examining the relationship between consulting modalities and telemedicine user satisfaction.

V. LIMITATIONS OF RESEARCH

1. Meta-analyses that include only published studies may not be able to describe the actual circumstances, as many studies whose results are negative or insignificant are not published or not proposed for publication.

2. The fundamental difference between meta-analysis and other types of research is that meta-analysis data has been collected, the choice of researchers is limited in including or getting rid of existing studies. Thus, the size of the sample in the meta analysis is severely limited by the relevant studies that exist.

3. In meta-analysis, researchers usually have to follow the method used by the first researcher to assess the results of the study. Other limitations of meta-analysis are the completeness and quality of available data and statistical methods used in the original article.

4. Researchers do not conduct analysis on disruptor variables. So that this can affect the results of the meta-analysis of the variables studied.

VI. CONCLUSION

From the results of this meta-analysis it can be concluded that:

1. There is a relationship between age and patient satisfaction in the use of telemedicine by 2.74 times.

2. There is a relationship between the sex and patient satisfaction in the use of telemedicine by 2.95 times.

3. There is a relationship between service time and patient satisfaction in the use of telemedicine by 4.23 times.

4. There is a relationship between consultation modalities and patient satisfaction in the use of telemedicine by 7.83 times.

A. Suggestions

Based on the results of research that has been done, suggestions that can be submitted, including:

1. For policy makers (health office, director of hospital or clinic, head of health center) in Indonesia can start applying telemedicine to expand the reach of health services in Indonesia by paying attention to the segmentation of age and gender of patients, shorter service time and choice of service modalities.

2. The government and health care providers are expected to be able to increase the use of telemedicine through improving network infrastructure, providing adequate facilities and infrastructure, and establishing telemedicine systems.

3. Doctors are expected to be able to utilize various technologies and resources in carrying out their duties as health workers and are able to provide health services through Telemedicine ranging from consultation to procedures and education, especially in conditions of not being able to meet patients directly as in the COVID-19 pandemic..

4. For Health Centers, Hospitals, Clinics and Health Offices can make policies regarding operational standards procedures regarding telemedicine services based on Permenpan No. 35 of 2012 concerning Guidelines for government agencies to compile SOPs.

5. For Health Centers, Hospitals, Clinics and Health Offices so that later they can create a mechanism for assessing patient satisfaction in receiving health services, especially using telemedicine.

6. The results of this study can be used as literacy materials for teaching and learning activities at the Public Health Study Program of Lambung Mangkurat University, especially about patient satisfaction in the use of telemedicine.

7. The results of this study can be used as student literacy material in developing the scientific field. So that they can hone intellectual skills that students can apply while working, especially in the application of health services through telemedicine.

8. Researchers can then conduct more specific searches for example on the type of disease suffered by patients in accessing telemedicine services.

ETHICAL CLEARANCE

There were no ethical test conducted because the study uses the general analysis method.

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