

# Analysis of Service Quality Towards Patient Satisfaction (Comparative Study of Patients Using Telemedicine Application and Face to Face Consultation in Healthcare)

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**Abstract** — The world today knows the use of technology in more areas of life than ever. The invention of health technology enables health workers to utilize telecommunication devices in delivering care, easing access to healthcare anywhere, anytime. Telemedicine Application is one of the rapidly developing health applications in Indonesia. This study aimed to analyze the association between quality of services, including tangibility, reliability, responsiveness, assurance, and empathy, and patient satisfaction in Telemedicine Application users compared to conventional health services (face-to-face). Primary data were obtained from 100 respondents who had received healthcare either from Telemedicine Application or face-to-face (conventional) throughout 2019. Data analysis used path analysis and the Wilcoxon test. This study found that service quality, both in Telemedicine Application and conventional care, influenced patient satisfaction. In subjects using Telemedicine Application, reliability and responsiveness did not significantly influence patient satisfaction. Whereas in patients receiving conventional care, tangibility, responsiveness, and empathy were not significantly influential to patient satisfaction. Conventional patient satisfaction is significantly higher compared to Telemedicine Application patient satisfaction.

**Index Terms**— service quality, patient satisfaction, Telemedicine Application, conventional.

## I. INTRODUCTION AND RESEARCH OBJECTIVES

### A. Introduction

Today's world is filled with the widespread use of technology in various areas of life. In this fast-paced digital era, technological innovation also touches the field of health services, which ultimately presents the existence of non-formal health institutions that grow upon the advances in information technology.

In the 21st century, doctors can use mobile devices to download lab results, medical records, medical images, and drug information. In addition, the exchange of information between doctors and patients can also be done only by using mobile devices [1]. A 2011 Canadian study in medical students found that 85% used mobile devices for information exchange as well as health-related communication due to their flexibility and ability to access information quickly [2]. Meanwhile, according to statistical data in the United States, 75% of patient-doctor consultation happens remotely using

telephone and video call [3].

In Indonesia, the development of telemedicine began in the 90s through a simple device namely the telephone. This development could be considered quite late due to constraints coming from Indonesia's geographical condition of being an archipelago, topped with inadequate infrastructure in remote areas and lack of legal aspects and data security [4].

The legal aspects regarding telemedicine have only been regulated in the Minister of Health of the Republic of Indonesia Regulation number 20 in 2019.

According to the ministerial regulation, telemedicine is the provision of long-distance health services by health professionals using information and communication technology, including sharing information on diagnosis, treatment, prevention of illness and injury, research and evaluation, and continuing education of health service providers for the benefit of improving the health of individuals and the community. Telemedicine services in Indonesia consist of teleradiology, teleelectrocardiography, teleultrasonography, clinical teleconsultation services and other consulting services [5].

On the international scene, several studies have been conducted. In 2001, a Norwegian study compared the satisfaction levels of dermatology patients who had a face-to-face consultation with those who did so through telemedicine. The results stated no significant difference in satisfaction because each had its advantages and disadvantages. Telemedicine services provide benefits such as quick diagnosis, shorter overall time, saving money, and reducing stress. However, telemedicine was considered weak in terms of feeling shame when consulting throughout telephone, discomfort, and difficulty in hearing the doctors [6].

A study in the United States compared telemedicine service at home with conventional hospital care and followed both groups for 6 and 12 months. From 369 respondents that fit the criteria, it can be concluded that there is a significant difference in patients' satisfaction between the two groups [7]. Another study conducted in the United States with 1,734 respondents concluded that 94-99% of the study population were highly satisfied with telemedicine service. A third of the respondents preferred telemedicine than face-to-face consultation. Hospitable service and service quality are essential for patients in health service via telemedicine [8].

In 2017, according to the Indonesian Medical Council, the

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ratio of specialist doctors per 100 thousand Indonesians is still at 14.6, while the target is 10.6. On the other hand, the ratio of general practitioners per 100,000 population is 47.6, while the target is 43. The issue of health workers in Indonesia that is still a problem today is the insufficient number and type of health workers, uneven distribution of health personnel, and inadequate quality of health workers. Evenly distributed [9]. Telemedicine is predicted to develop well because it can be accessed anytime and anywhere so that remote areas are reached by health service facilities with the limited distribution of health workers.

In Indonesia, health-based applications are widely available. Telemedicine applications in Indonesia that provide teleconsultation service include:

TABLE 1: TELEMEDICINE APPLICATION IN INDONESIA  
(STUDY BY AUTHOR, 2019)

Numb	Application Name	Year Founded	Founder	Valuation (Reference: tracxn)
1	Klikdokter	2008	Doddy Partomihardjo	-
2	MeetDoctor	2011		480 thousand US \$
3	Temenin	2014	Indonesia Health Ministry	-
4	Alodokter	2014	Nathanael Faibis	19 million US \$
5	Telemedicine Application	2016	Jonathan Sudharta	100 million US \$
6	Medika App	2016	Danang Firdaus	-

Telemedicine Application is an application with highest value even though it is the most recently founded, compared to its competitor. The author chose Telemedicine Application as a health-based application to be researched because it has “Chat with a doctor feature” and also “Buy Medicine feature”, so the drugs prescribed/recommended by the doctor can be directly obtained by the patients. These features are similar to face-to-face consultation experienced by the patients if they go to healthcare facilities, which include consultation, drug prescription by the doctor, and patient obtain the drugs. For that reason, the author sees Telemedicine Application comparable with face-to-face consultation.

In Indonesia, the lack, or even the absence, of research comparing service quality between face-to-face consultation and via telemedicine, increases the author’s interest in doing this research. The novelty of this research, compared to other studies, is the author intends to compare patients’ satisfaction between face-to-face consultation to Telemedicine Application experience. The study population is respondents that have experienced both face-to-face consultation and Telemedicine Application service in the same year.

### B. Research Objectives

The purpose of this study is to determine the quality of service and satisfaction of patients using the Telemedicine Application and patients who consult face-to-face, and to analyze the effect of service quality which includes tangible, reliability, responsiveness, assurance, and empathy on patient satisfaction using the Telemedicine Application, and also analyze the differences in satisfaction of patients who

consult face to face using the Telemedicine Application.

## II. LITERATURE REVIEW

### A. Service Quality

Service quality contributes significantly to creating differentiation, positioning, and competitive strategies to each organization [10]. Service quality is generally defined as customer’s assessment that serves as their perception of the services provided [11]. In the health sector, the quality of health service is related to ensuring high-quality service thereby increasing people’s expectation in obtaining health services [12].

In assessing service quality, there are five dimensions that are immensely important: reliability, assurance, tangibility, responsiveness, and empathy [13].

#### 1) Tangibility

This dimension directly shows physical evidence of the service provided by the service provider. In this case, it is usually in the form of physical facilities (hospital/clinic building), physical appearance (of the employees or the application), or equipment (technology used)

#### 2) Reliability

This dimension shows the service provider’s ability to deliver services as promised accurately and reliably. Performance should meet customer’s expectation means timeliness, equal services for all customers without mistake, sympathetic manner, and excellent accuracy.

#### 3) Responsiveness

This dimension shows the willingness of the service provider to help and deliver responsive and accurate service to the customer by giving clear information. Leaving customers waiting without an apparent reason causes negative perception in service quality.

#### 4) Assurance

The assurance given by the service provider is usually in the form of excellent knowledge, mannerism, security and credibility of employees to foster the trust of the customers to the company.

#### 5) Empathy

This dimension shows the service provider’s ability to give sincere and personalized attention to customers in order to understanding customers’ desires. Where a company is expected to have an understanding and have knowledge about customers specifically.

### B. Patient Satisfaction

Customer satisfaction can be used as a thought in an overall assessment of the product, with value measurement obtained through experience and feelings that have been tested by the customers to the product [14]. Another opinion stated customer satisfaction is a way of evaluating thoroughly of customer’s perspective on the product, in the form of goods or services, every time [15].

A prospect in the medical field stated that patient satisfaction is an overall assessment given by the patient during the period of care that makes the basis of increasing competitiveness value. Patient satisfaction itself has a positive impact in directing the active role of patients to other customers [16].

Hence, it can be concluded that patient satisfaction can improve a health service provider's competitiveness compared to its competitors and provide irreplaceable value to patients, namely satisfaction value. Indicators of patient satisfaction are [17]:

- 1) Overall patient satisfaction.
- 2) Desire to repeat purchase.
- 3) Willingness to recommend.

C. Framework

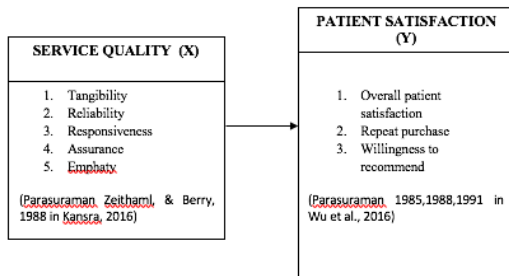


Fig. 1. Study Framework (Study by author, 2019)

D. Study Hypotheses

The hypotheses in this study are as follows:

1. There is an influence of service quality on Telemedicine Application's patient satisfaction.
  - a. There is an influence of tangibility on patient satisfaction.
  - b. There is an influence of reliability on patient satisfaction.
  - c. There is an influence of responsiveness on to patient satisfaction.
  - d. There is an influence of assurance on patient satisfaction.
  - e. There is an influence of empathy on patient satisfaction.
2. There is an influence of service quality on face-to-face consultation patient satisfaction.
  - a. There is an influence of tangibility on patient satisfaction.
  - b. There is an influence of reliability on patient satisfaction.
  - c. There is an influence of responsiveness on patient satisfaction.
  - d. There is an influence of assurance on patient satisfaction.
  - e. There is an influence of empathy on patient satisfaction.
3. There is a significant difference between Telemedicine Application and face-to-face consultation patient satisfaction.

III. RESEARCH METHODOLOGY

This study uses a quantitative method with a survey approach. In this study, the survey approach taken was distributing questionnaires. To determine the influence of each variable, this study uses a verification method. This study is also a comparative study because it compares patient satisfaction in both groups of respondents.

This study includes 100 respondents that meet inclusion criteria, which are patients that use both Telemedicine Application and face-to-face consultation in healthcare facility between January – October 2019, aged >18 years old.

Respondents fill in 2 types of questionnaires for Telemedicine Application and conventional service consisting of 20 statements each. Respondents fill out the questionnaire using Likert scale with details as follows: 5 to strongly agree, 4 to agree, 3 to neutral, 2 to disagree, 1 to strongly disagree.

The independent variable (X) in this study is service quality that includes tangibility (X1), reliability (X2), responsiveness (X3), assurance (X4), and empathy (X5). The dependent variable in this study is patient satisfaction.

The instrument used in this study by the author is questionnaires that passed through validity and reliability test. Data from Likert scale are transformed into interval data using 100 Scare formula. Data was then processed using SPSS software version 25.0.

IV. RESULTS AND DISCUSSION

Of the 100 respondents, the following are the characteristics of the respondents involved in the study:

TABLE 2: CHARACTERISTICS OF RESEARCH RESPONDENTS

No.	Characteristics	Number (n)
1.	<b>Age</b>	
	• 20- 30 years	98 respondents
	• >50 years	2 respondents
	$\bar{x}$ (SD) Range	25,48 (4,03) 20 – 52 years
2.	<b>Last education</b>	
	• SMA	3 respondents
	• Diploma	11 respondents
	• S1	72 respondents
	• S2	12 respondents
3.	<b>Occupation</b>	
	• Student	17 people
	• Private sector worker	28 people
	• Government employee	9 people
	• Housewife	10 people
	• Doctor/healthcare worker	23 people
	• Entrepreneur	5 people
• Others	6 people	
4.	<b>Domicile</b>	
	• Bandung	41 people
• Outside of Bandung	59 people	
5.	<b>Health Insurance Ownership</b>	
	• BPJS	57 people
	• Private insurance	9 people
	• BPJS & Private insurance	27 people
• None	7 people	

Based on the data above, from age characteristic, the respondents involved in the study is dominantly aged 20-30 years old (98%). However, there were still respondents above 50 years old as many as two people that filled out the questionnaires. Based on last education, most respondents were undergraduates (72%). The most dominant occupation of the respondents was private employee (28%), but doctors and other health workers also comprise many respondents (23%). Most respondents reside outside of Bandung city, as much as 59%. Most respondents have health insurance, be it BPJS or private insurance. Only 7% of respondents did not have health insurance.

The author made the questionnaire with positive statement items, so Agree and Strongly Agree responses show excellent

quality and satisfaction. Based on the questionnaire result, (62.5%) agree even (23.5%) strongly agree that Telemedicine Application service quality is excellent in terms of tangibility. In terms of reliability, (49%) agree and (13.67%) strongly agree that Telemedicine Application s reliability is excellent. In terms of responsiveness of Telemedicine Application, (48.67%) agree and (10.67%) strongly agree that Telemedicine Application is excellent. Telemedicine Application’s service assurance excellence was agreed by 54.75% and strongly agreed by 12.75% of the respondents. The empathy aspect of Telemedicine Application’s service was agreed by 52.33%, hence there are plenty of respondents who think that doctor’s empathy in Telemedicine Application was not excellent. In terms of overall satisfaction, only a little more than half of respondents (43.40% agree and 14.40% strongly agree) that they were satisfied with Telemedicine Application’s service. Thus, there were still many people who were not satisfied by Telemedicine Application’s service.

Meanwhile, the quality of face-to-face doctor in healthcare facility was agreed to have excellent tangibility because only 19% of respondents have a neutral opinion. In contrast, others agree that it was excellent. For the reliability aspect, 62.67% agree and 22.33% strongly agree that their doctor was excellent. Hence most respondents stated their healthcare service providers were reliable. In terms of responsiveness, only 21% stated their neutral and disagreeing opinions of conventional service excellence. In terms of assurance aspect, 59.25% agree and 25.5% strongly agree that conventional service provides excellent assurance. In terms of empathy, only 21% were neutral and disagreeing, and the rest thought their conventional service was excellent. In terms of overall satisfaction, only 15.60% stated they strongly disagree, disagree or neutral, of their conventional healthcare service experience.

**H1: There is an influence of service quality on Telemedicine Application’s patient satisfaction**

TABLE 3: TELEMEDICINE APPLICATION’S QUESTIONNAIRE DATA PROCESS RESULT

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.843 <sup>a</sup>	.711	.695	8.84810

Predictors: (Constant), Empathy, Tangibility, Responsiveness, Reliability, Assurance

ANOVA <sup>a</sup>					
Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression 18065.602	5	3613.120	46.151	.000 <sup>b</sup>
	Residual 7359.148	94	78.289		
	Total 25424.750	99			

a. Dependent Variable: Patient Satisfaction

b. Predictors: (Constant), Empathy, Tangibility, Responsiveness, Reliability, Assurance.

Based on the result above, with significance <0.005 and e value is 0.289, then Hypothesis 1 can be accepted. This result supports the article written by Garcia [18] that one of the telemedicine patient satisfaction factors was service quality. Aside from service quality, Garcia stated there are a lot of other factors supporting telemedicine patient satisfaction, such as price, information availability, scheduling,

consultation duration, accessibility, patient’s privacy assurance, technology advancement, management given and patient’s recovery.

TABLE 4: PARTIAL HYPOTHESIS DATA PROCESS

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-4.930	5.265		-.936	.351
Tangibility	.195	.085	.174	2.294	.024
Reliability	.131	.117	.122	1.115	.268
Responsiveness	-.005	.093	-.005	-.059	.953
Assurance	.422	.132	.401	3.188	.002
Empathy	.266	.116	.244	2.298	.024

a. Dependent Variable: Patient Satisfaction

Partially, independent variables that are significantly related to patient satisfaction were tangibility, assurance and empathy. Reliability and responsiveness did not affect Telemedicine Application’s patient satisfaction. With long-distance consultation, the patient could not see the doctor’s face [19]. Hence the patient felt the doctor was incompetent, irresponsible to their patients and unable to provide reliable consultation. This often results in patients to say their service quality of long-distance consultation was poor, because of their experience.

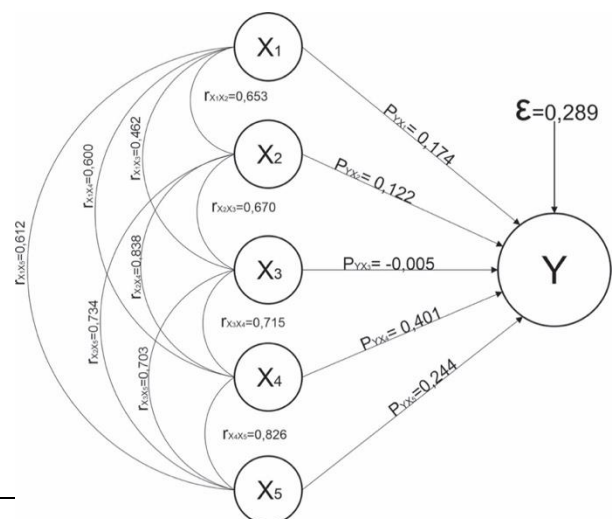


Fig. 2. Telemedicine Application’s Pathway Analysis.

**H2: There is an influence of service quality on face-to-face consultation (conventional) patient satisfaction**

TABLE 5: CONVENTIONAL’S QUESTIONNAIRE DATA PROCESS RESULT

Model Summary <sup>b</sup>				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.894 <sup>a</sup>	.799	.789	6.76089

a. Predictors: (Constant), Empathy, Tangibility, Reliability, Responsiveness, Assurance.

b. Dependent Variable: Patient Satisfaction.

ANOVA <sup>a</sup>					
Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression 17112.290	5	3422.458		.000 <sup>b</sup>
	Residual 4296.710	94	45.710		
	Total 21409.000	99			

a. Dependent Variable: Patient Satisfaction

b. Predictors: (Constant), Empathy, Tangibility, Reliability, Responsiveness, Assurance.

Based on data processing, with significance <0.05 and F calculation > F table then Hypothesis 2 can be accepted. There are other factors influencing patient satisfaction as much as 20.1%. This corresponds to a study in a hospital in Iran that stated excellent service quality results in a positive impact on patient satisfaction [20]. Another study concluded that the most crucial determinant in patient satisfaction was excellent service quality [21].

TABLE 6: PARTIAL HYPOTHESIS DATA PROCESS

Model	Coefficients <sup>a</sup>				t	Sig.
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta			
1 (Constant)	6.629	4.343			1.526	.130
Tangibility	.075	.076	.075		.990	.325
Reliability	.247	.090	.228		2.745	.007
Responsiveness	-.211	.099	-.177		-2.128	.036
Assurance	.613	.105	.607		5.824	.000
Empathy	.196	.103	.200		1.904	.060

a. Dependent Variable: Patient Satisfaction

Partially, service quality dimensions that significantly influence patient satisfaction were reliability and assurance. The other three variables (tangibility, responsiveness, and empathy) turn out to not be significantly related to patient satisfaction. This result does not correspond to Meesala & Paul [22] study that stated only reliability and responsiveness influence patient satisfaction, while the other three dimensions did not.

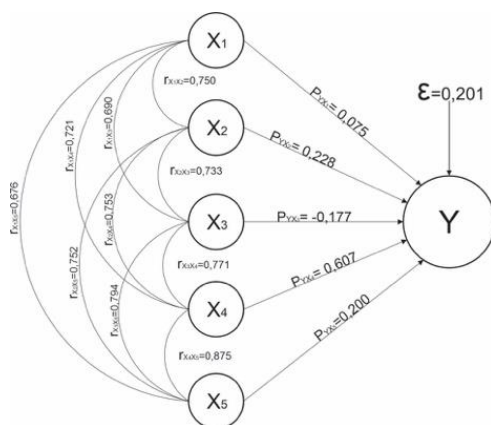


Fig. 3. Conventional Pathway Analysis.

**H3: There is a significant difference between Telemedicine Application and face-to-face consultation patient satisfaction**

Based on Wilcoxon test, Hypothesis 3 can be accepted because significance is <0.05. Based on the median of both satisfaction value, face-to-face consultation had higher satisfaction value than Telemedicine Application.

This result is certainly different from the previous study by Nordal et al [23], in Norway, that stated respondents were more satisfied with the video conferences because it reduced their waiting time. Another study conducted by Grant et al [24] in the United States also stated that research subjects were more satisfied with telemedicine. Also, research conducted by Polinski et al [25] in the United States showed 95% of patients were very satisfied with the quality of health services provided by telehealth and rated telehealth as better than or was good as conventional visits.

TABLE 7: PATIENT SATISFACTION DATA PROCESS

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
Telemedicine Application's Patient Satisfaction	100	65.0500	16.02547	20.00	100.00
Conventional's Patient Satisfaction	100	77.9000	14.70553	30.00	100.00

Wilcoxon Signed Ranks Test				
	N	Mean Rank	Sum of Ranks	
Conventional's Patient Satisfaction	22 <sup>a</sup>	36.64	806.00	
Telemedicine Application's Patient Satisfaction	67 <sup>b</sup>	47.75	3199.00	
Ties	11 <sup>c</sup>			
Total	100			

a. Conventional's Patient Satisfaction < Telemedicine Application's Patient Satisfaction.

b. Conventional's Patient Satisfaction > Telemedicine Application's Patient Satisfaction.

c. Conventional's Patient Satisfaction = Telemedicine Application's Patient Satisfaction.

Test Statistics <sup>a</sup>	
Z	Asymp. Sig. (2-tailed)
-4.910 <sup>b</sup>	.000

a. Wilcoxon Signed Ranks Test.

b. Based on negative ranks.

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This might be due to the fact that telemedicine application is relatively new in Indonesia, so there are still many respondents who preferred to come to healthcare facilities rather than through applications. In addition, many respondents felt that the consultation time in the application was less (because in this case, doctors and patients could do other things besides consultation) so that the respondents' experience using the application was felt to be less satisfied.

V. CONCLUSION AND SUGGESTION

A. Conclusion

Based on the questionnaires filled out by respondents, more respondents agree and strongly agree that conventional service is better than Telemedicine Application's. As well as conventional's patient satisfaction had a higher agree and strongly agree percentage than Telemedicine Application's.

Service quality significantly influenced patient satisfaction that had Telemedicine Application's consultation simultaneously. The reliability and responsiveness variables of Telemedicine Application did not influence patient satisfaction significantly. The most dominant variable that influenced Telemedicine Application's patient satisfaction was assurance with beta coefficient of 0.401 while the most uninfluential variable was responsiveness with beta coefficient -0.005.

Service quality significantly influenced patient satisfaction that had conventional consultation simultaneously. In conventional service, tangibility, responsiveness and empathy were not significant influence of patient satisfaction. The most dominant variable that influence patient satisfaction was assurance with beta coefficient of 0.607 while the most uninfluential variable was responsiveness with beta coefficient -0.177.

There is a significant difference between patient satisfaction who consulted through Telemedicine Application and face-to-face. The satisfaction of conventional consultation/face-to-face patients is higher than the satisfaction of Telemedicine Application patients.

### B. Suggestion

Due to the limitations of the study, the factors affecting patient satisfaction in this study was service quality, which included tangibility, reliability, assurance, responsiveness, and empathy. While there are many other factors that affect patient satisfaction. Also, the use of questionnaires in this study is one of the limitations because the answers given by respondents sometimes do not match the truth.

Author suggests further research needs to be done in describing this path analysis model because the author found new results, namely responsiveness that does not affect patient satisfaction both Telemedicine Application and conventional. If, in the future, there will be researchers who are interested in researching using this model, it is expected to explore other variables because this research only looks at the service quality factor, whereas many other factors will influence patient satisfaction.

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