

# **The Effect of Tuberculosis Treatment Service Quality on Patient Medication Adherence in Kartini General Hospital with Patient Satisfaction as Mediation Variable**

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## **ABSTRACT**

Satisfied patients are more likely to reuse health services, comply with medical care, and continue treatment with a healthcare provider. Limited information about the quality of tuberculosis (TB) service delivery in private health facilities and its association with patient adherence to TB treatment is known. Much of the current research focuses on assessing adherence by looking at personal factors (patients) and still lacks looking at the challenges faced by health workers and healthcare providers. At the Kalirejo Kartini Kalirejo Hospital in 2021, there are still 13 TB patients who have dropped out of treatment, and the patient satisfaction rate did not meet the standards in 2021 by 55%. Therefore, this study aims to assess the effect of the quality of tuberculosis treatment services on patient medication adherence at Kartini Kalirejo Hospital with patient satisfaction as a mediation variable. This study used a quantitative-based cross-sectional design, the population reached was patients who used the services of the tuberculosis department at Kartini General Hospital in September 2022. The sampling technique was non-probability sampling, 40 samples were selected using the purposive sampling method. To determine the direct and indirect relationship between these variables, then the data were analyzed using regression analysis with the Sobel test through SPSS. The results showed that the quality of TB treatment services had a positive effect on patient adherence and patient satisfaction. While patient satisfaction has a positive effect on patient adherence. The indirect effect of the quality of TB treatment services on patients' adherence through patient satisfaction is mediated absolutely.

**Keywords:** Service Quality, Patient Satisfaction, Adherence, Tuberculosis Treatment

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## **1. Introduction**

Tuberculosis is an infectious disease that is one of the leading causes of death worldwide. Every year about 9 million people suffer from TB and of them about 2 million people die. Indonesia is ranked 2<sup>nd</sup> with the highest TB sufferers in the world after India. In 2019, it is estimated that 10 million people worldwide suffer from TB. From 2015 – 2019 the cumulative decrease in TB cases was 9%, but despite the decline in new TB cases, it was not fast enough to achieve the target of the END TB strategy in 2020.<sup>3</sup> The number of deaths due to TB in 2019 was 1.4 million. Globally,

deaths from TB per year are decreasing. The number of TB cases that were treated and reported in 2020 was 41.7%, which was a relative decline when compared to the previous three years (WHO, 2021).

Referring to the target set by the Indonesia Ministry of Health for the indicator of the success rate of TB treatment in 2020 is 90% and the WHO recommended strategy known as 'DOTS' (Directly Observed Treatment Short-course) but nationally the success rate of tuberculosis treatment in Indonesia has not been achieved (82.7%), even this success rate has decreased since four years ago (Kemenkes RI, 2021). The DOTS strategy also demands effective management of the TB control program, including continuous supply, training and supervision of health providers, and program monitoring and evaluation. However, the relative importance of these managerial inputs on treatment outcomes has never been properly investigated. Poor adherence to treatment arises from the interaction of various factors that influence the quality of TB care, but there is little research that looks beyond patient factors into the holistic organization and process of TB service delivery (Enarson et al. 2000). Ensuring the provision of good quality tuberculosis (TB) care, particularly in for-profit private health facilities, is an important component of a TB control strategy to reduce poor medical practices that result in multidrug-resistant TB (MDR-TB) (WHO, 2017). Patient satisfaction, which refers to the conclusions reached by patients and their families after comparing their feelings during medical services with their previous expectations, is a criterion for the quality of medical services (WHO, 2022). Treatment adherence of PTB patients directly affects the effectiveness of treatment, and discontinuation of treatment can lead to an increased risk of drug resistance in TB patients (WHO, 2014).

The poor relationship between health care providers and patients regarding communication gaps is a major factor influencing non-adherence to TB treatment. Good communication and positive attitudes from health care providers toward patients were found to be supportive of medication adherence (Gebreweld, et al. 2018). A study conducted by Mekonnen and Azagew in Ethiopia (2018) stated that participants who had a poor provider-patient relationship were 4.6 times more likely to not adhere compared to those who have a good relationship. A study developed in Indonesia (2021) succeeded in analyzing the role of inactive officers as a risk factor for non-adherence to the treatment of TB patients, it was stated that this was related to the emotional needs of patients who were not met (Asriwati, et al. 2021). In line with the results of a study in Nepal found that participants who have friendly relations with health workers tend to adhere to TB treatment compared to participants who are not friendly with health workers, where patients report that communication and positive attitudes toward health workers are a source of motivation for patients to continue undergoing treatment (Yadav, R. K., 2021).

## **2. Literature Review**

In health care service quality is defined as the gap between patient expectations and perceptions (Woodside, 1998). Expectations are considered as patient expectations of what health services are offered, while perception is considered as an evaluation of the services received compared to their expectations, so the quality of service depends on the balance between patient expectations and perceptions. The SERVQUAL model is widely used by researchers in measuring service quality, including in government hospitals (Georgiadou & Maditinos, 2017), and outpatients (Hercos & Berezovsky, 2017). Endeshaw, 2021 describes that the Servqual model has been tested for validity and reliability. The five dimensions used by customers and adapted in evaluating services that affect the quality of health service are:

- Reliability, is the ability of the hospital to provide services by what is offered without making any mistakes and satisfying (Chakravarty, 2011).
- Responsiveness, is the willingness and ability of employees to provide quick assistance to customers.
- Assurance, this includes knowledge and service skills of employees to provide confidence to customers, courtesy, and freedom from danger and risk to foster patient trust.
- Empathy is a patient's perception that is judged based on the courtesy and friendliness of providing individual services with full attention and understanding of the patient's needs as a customer and acting in the patient's interest and always helping the patient even if not asked.
- Tangibles, direct evidence that includes the appearance and completeness of physical facilities, equipment, and personnel used by the hospital and the appearance of existing employees. According to (Suresh & Dcunha, 2015) physical facilities can be seen from the convenience of accessibility, spacious and functional rooms, and cleanliness.

Patient satisfaction is seen as a function of the assessment of the gap between expectations and the service provided (Monica et al., 2017). In Donabedian's quality measurement model, patient satisfaction is defined as a patient-reported outcome measure where the structure (facility) and process of care can be measured by patient-reported experience (Bjertnaes et al., 2012). So patient satisfaction is associated with the extent to which patient expectations are met by health services. Health care providers such as hospitals must meet patient expectations because satisfied patients will increase the likelihood of returning to use services, follow the care and treatment provided, maintain relationships with health care providers and recommend hospitals to others (Lee, 2010). The patient satisfaction rate did not meet the standards in 2021 by 55% in Kartini General Hospital. According to Arifin and Prasetya (2006) and Lupiyoadi (2001) assessing patient satisfaction in health services can be seen from:

- Quality of Service: quality services at hospitals can be judged by the ability of doctors, nurses, pharmacists, other medical personnel, and non-medical personnel that can affect satisfaction.
- Quality of Service: professional service quality, cleanliness, and completeness of medical and non-medical equipment affect patient satisfaction.
- Emotional Factors: the patient's feelings of pleasure or disappointment with the health services provided can affect satisfaction.
- Price: prices can affect patient satisfaction such as prices that are considered cheap by patients but the quality of service obtained matches or exceeds patient expectations, which will affect patient satisfaction.

Adherence is the patient's action in participating in a program made together with health care providers, the patient plays an active role and agrees to what is recommended by health workers. Based on Sandford et al., (2008), adherence is the behavior of patients who follow every prescription or instruction given by a doctor or health worker. WHO (2003) recommends five dimensions of adherence, namely factors related to the system, conditions, therapy, socioeconomic, and factors related to patients. According to (Sandford et al., 2008) there are 200 documented factors related to adherence such as patient characteristics, treatment methods, the relationship between health workers and patients, and clinical settings. Dimensions that can be seen in the relationship between patients and health workers are long waiting times, empathy, and distance from health facilities.

The study shows that the poor quality of TB services and the suboptimal implementation of district control activities in health facilities are the main determinants of low adherence to treatment. Increased overall patient satisfaction with TB treatment services has a positive effect on patient adherence to TB treatment. The study was conducted in Tanzania, where good patient care provider relationships are an important reason for satisfaction with TB treatment services (Kilalel M, 2008), and a previous study was conducted on outpatient satisfaction, where the frequency of visits to health facilities was significantly associated with patient satisfaction (Birhanu Z, 2010). In addition, perceived waiting time was significantly related to patient satisfaction. This is consistent with a study conducted in Eastern Ethiopia, where the level of satisfaction decreased with increasing perceived waiting time (Abdosh B, 2006). Increased overall patient satisfaction with TB treatment services has a positive effect on patient adherence to TB treatment. This is consistent with a study conducted in South Africa, where higher patient satisfaction with hospital services was significantly associated with higher adherence rates (Govender AS, MBBS (Pat), DipObst(SA), et al, 2009). Similarly, a study conducted in India stated that dissatisfaction with the services provided was a predictor of default (Vijay S, Kumar P, et al, 2010).

### **3. Research Methodology**

#### *3.1 Methods*

This type of research is a quantitative survey with a cross-sectional design study in the tuberculosis department in September 2022. The population reached was patients who used the services of the tuberculosis department at Kartini General Hospital in September 2022. A pilot study was conducted previously to test the validity and reliability of the questionnaire. Respondents completed an online questionnaire consisting of demographic profiles, information on types of drugs taken, the month of diagnosis, the month of starting treatment, frequency of visits, 23 questions about service quality, four questions about patient satisfaction, and eight questions about patient adherence. This study was conducted only in September, thus causing a small number of patients (population). The sampling technique was non-probability sampling, and the sample is determined by the purposive sampling method, namely by considering: patients diagnosed with TB at Kartini General Hospital, TB patients undergoing treatment at Kartini General Hospital  $\geq 2$  months in September 2022, patients can read and write, patients are willing to be respondents in the study until the research is done. The 40 samples were selected using the purposive sampling method.

#### *3.2 Measurement*

Service quality is measured using 5 indicators from Endeshaw (2021). The satisfaction variable was measured using 3 indicators from research conducted by (Hush et al., 2011), and adherence was measured using the Morisky Medication Adherence Scale (MMAS) (Morisky, 2008). Service

quality and satisfaction were measured using a 5 Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree), and patient adherence with MMAS is to give a number 1 if "no" and 0 if "yes" on question items number 1 to 7 except for number 5. In question item number 5, a value of 1 if "yes" and 0 if "no". The result of validity and reliability of each question and variable are twenty-three questions under the quality of service variable were valid and reliable. All the score was  $\rho < 0.05$  (0.01), while Cronbach's alpha was 0.982 ( $\geq 0.600$ ). Four questions under the patient satisfaction variable were valid and reliable. All the score was  $\rho < 0.05$  (0.01), while Cronbach's alpha was 0.957 ( $\geq 0.600$ ). Eight questions under patient adherence were valid and reliable. The score was  $\rho < 0.05$  (0.01 and 0.05), while Cronbach's alpha was 0.951 ( $\geq 0.600$ ).

### 3.3 Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistic 28. Researchers conducted validity and reliability tests on the questionnaires that had been made researchers which were distributed to respondents to measure the validity of the questionnaires used. Validity and reliability tests were carried out on respondents who had the same characteristics as determined by the researcher. The validity test using the Pearson correlation (one-tailed) with valid criteria if the value  $\rho > 0.05$  and the reliability test using Cronbach's Alpha, is said to be reliable if each statement has a valid value criterion of  $\geq 0.600$ . Descriptive data is presented in the form of numbers (percentages) for categorical data. Then the effect of quality of service and patient satisfaction variables on patient adherence was analyzed by linear regression Sobel test.

## 4. Result

### 4.1 Descriptive of Demographics Variables

The distribution of the types of TB drugs consumed included 2 categories, namely RHZE (4 FDC) Intensive phase 7 (17.5%), RH (2 FDC) Advanced phase 33 (82.5%).

Table 1.

No	Gender	Frequency (n)	(%)
1	Male	22	55
2	Female	18	45
<b>Age</b>			
1	<17	1	2.5
2	17-25	4	10
3	26-35	2	5
4	36-45	8	20
5	46-55	4	10
6	>55	3	7.5
<b>Level of Education</b>			
1	Primary school	5	12.5
2	Junior high school	10	25
3	Senior high school	13	32.5
4	D1/D2/D3	4	10

5	S1/S2/S3	5	12.5
6	Others	3	7.5
<b>Occupation</b>			
1	Civil servant/Government staff	1	2.5
2	Private sector employee	11	27.5
3	Self employee	17	42.5
4	Students	1	2.5
5	Not working / others	10	25
<b>Income (IDR)</b>			
1	<500.000	1	2.5
2	500.000 – 1.000.000	7	17.5
3	1.000.000 – 2.000.000	13	32.5
4	2.000.000 – 5.000.000	14	35
5	>5.000.000	5	12.5
<b>Number of Visits</b>			
1	2	7	17,5
2	3	14	35
3	>3	19	47.5

#### 4.2 Effects of Quality of TB Treatment Services on Patient Adherence

Table 2  
Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	-4.667	1.693		-2.757	.009
	Quality of Tuberculosis Treatment Service	.114	.017	.739	6.765	<.001

Dependent Variable: Patient\_Adherence

To prove the first hypothesis, the quality of TB treatment services was tested on patient adherence using the regression, the test results obtained that the value of  $r = 0.114$  with  $\text{sig} = <0.001$   $p < 0,05$  the effect of the quality of TB treatment services on patient adherence was significant, then the test can be continued to the next stage.

#### 4.3 Effect of Quality of TB Treatment Services on Patient Satisfaction

Table 3  
Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	-2.273	1.156		-1.967	.057
	Quality of Tuberculosis Treatment Service	.197	.011	.941	17.133	<.001

Dependent Variable: Patient\_Satisfaction

The second step is continued to prove the second hypothesis by testing the quality of TB treatment services on patient satisfaction with the regression, then the test results show that the value of  $r =$

0.197,  $sa=0.011$  with  $sig= <0.001$  the effect of the quality of TB treatment services on patient satisfaction is significant, then testing can be continued at the next stage.

#### 4.4 Effects of Quality of TB Treatment Services and Patient Satisfaction on Patient Adherence

Table 3

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	-3.084	1.584		-1.947	.059
	Quality of Tuberculosis Treatment Service	-.023	.044	-.151	-.524	.603
	Patient_Satisfaction	.696	.212	.946	3.287	.002

Dependent Variable: Patient\_Adherence

The last step of regression is to prove the third hypothesis by testing the variable quality of TB treatment services and patient satisfaction with patient adherence with the regression, the test results obtained that the value of  $r= 0.696$ ,  $sb = 0.212$  with  $sig = 0.002$  the effect of quality of TB treatment services and patient satisfaction on patient adherence is significant, then a final test can be performed.

When investigating the effect of independent variables and mediators on the dependent variable, the influence of the mediator should be significant, and the effect of the dependent variable should be weaker than the previous condition. From the results of testing the first hypothesis, it was found that the quality of TB treatment services had a significant effect on service quality with results ( $c = 0.114$  with  $sig = <0.001$   $p < 0.05$ ), then the second hypothesis found that service quality was significantly related to patient satisfaction ( of  $a= 0.197$ ,  $sa=0.011$  with  $sig= <0.001$ ). In the third hypothesis, it was found that service quality and patient satisfaction had a positive and significant effect on patient adherence ( $b = 0.696$ ,  $sb = 0.212$  with  $sig = 0.002$ ). Because  $c$ ,  $a$ ,  $b$  are significant and the value of  $c$  to  $c'$  has decreased significantly, so it can be concluded that patient satisfaction mediates the absolute relationship between service quality and patient adherence. In the final stage of testing with the Sobel test used to confirm these findings, it was found that  $z$  count =  $3.229 > z$  table with a significance level of  $0.05$  which is  $1.96$ , so it can be concluded that patient satisfaction mediates the causal relationship between service quality and patient adherence.

## 5. Discussion

The results of this study prove that the quality of TB treatment services can have a positive effect on patient adherence. In the results of research conducted at Kartini General Hospital Lampung, it was found that the quality of service had a direct effect on adherence to treatment for TB patients, mediated by absolute and significant patient satisfaction. TB treatment adherence is the extent to which the accuracy of TB patients in taking prescribed TB drugs. Referring to the WHO guidelines, the factors that cause non-adherence to take TB drugs are multifactorial. Based on the results of statistical analysis in this study, it was found that the quality of service has an indirect influence on patient compliance which is mediated by patient satisfaction. In this study, it was found that 9 (22.5%) respondents did not comply with TB treatment even though the satisfaction

level reached 85%. Adherence to TB treatment in the long term is a complex and dynamic phenomenon with various factors impacting treatment behavior. In this study, the indicator of service quality that had the most unfavorable effect on adherence to treatment of TB patients at Kartini General Hospital Lampung was reliability with a value of only 82% of the items being the lowest value of this indicator. The results of this study are in line with research conducted by Gube (2018) that waiting time in health facilities > 1 hour and distance to health facilities > 5 km are significant determinants of non-adherence to TB treatment.

Responsiveness is related to the willingness and ability of service providers to help patients and respond to their requests promptly. In the results of this study, it was found that the lowest item on the responsiveness indicator was the patient felt that the officers at the hospital TB poly had mastered the information that needed to be conveyed to the patient. In line with the findings of Gebreweld (2018) and Tekie (2018) that the poor relationship between health care providers and patients regarding communication gaps is the main factor influencing non-adherence to TB treatment. Good communication and positive attitude of health care providers towards patients were found to support medication adherence. A study conducted by Mekonnen and Azagew in Ethiopia (2018) states that participants who have a poor patient-provider relationship are 4.6 times more likely to be non-adherent than those who have a good relationship. In line with research in Indonesia (Triarningsih, 2019) found a significant relationship between communication with health care providers and TB treatment adherence in children, where this is associated with the basis that the most dominant factor in determining the level of TB treatment adherence in children is the belief variable. In this context, nurses play a role in sharing opinions with patients and their families about things that are felt/worried (share anxieties) and being empathetic in dealing with patients (empathy and relationships), so that nurses as part of the provider are able to encourage the emergence of a sense of security for patients. in interacting with other people which will ultimately affect TB treatment adherence. The findings of Triarningsih (2019) are in line with the results of this study, in this study, 85.5% of respondents agreed that officers at Kartini General Hospital Lampung gave good empathy to patients, but in this empathy indicator, there were items that were very low in value compared to other items, namely about the accuracy of the timing that is arranged and given to TB patients at Kartini General Hospital Lampung. In terms of tangible indicators in this study, it has a positive value on patient compliance. The results of the research on the tangible item indicators with the lowest value were items regarding clean and comfortable waiting room facilities, toilets, and examination rooms.

Satisfaction is a feeling that arises from comparing the perceived performance of the product (or result) against their expectations. (Kotler & Keller, 2009). In Donabedian's quality measurement model, patient satisfaction is defined as a patient-reported outcome measure where the structure (facility) and process of care can be measured by patient-reported experience (Bjertnaes et al., 2012). A study developed in Indonesia (2021) succeeded in analyzing the role of inactive officers as a risk factor for non-adherence to the treatment of TB patients, it was stated that this was related to the emotional needs of patients who were not met. If the officer is less involved, the respondent is at risk of not complying with taking medication compared to if the officer plays an active role. In line with the results of a study in Nepal, it was found that participants who had friendly relations with health workers tended to adhere to TB treatment compared to participants who were not friendly with health workers, where patients reported that communication and positive attitudes of health workers were a source of motivation for patients to continue taking treatment because they are satisfied with the service they receive.



Higher service quality will lead to higher patient satisfaction, thus improving service quality is an effective strategy to increase patient satisfaction. The quality of health services and patient satisfaction greatly improve patient adherence. The patient-health professionals are often recommended as the bottom line in promoting adherence. However, if patients feel they are not being served professionally, insufficient service time, long waiting times, and lack of information or education will result in non-adherence. The communication gaps and provider empathy are the most widely reported reasons for patient non-adherence. For example, patients feel unappreciated, or health professionals do not serve them professionally. In addition, unclear instructions or failure to explain the treatment plan may lead to unintentional non-adherence. In the case of TB treatment, it was reported that treatment sessions, competence, communication, and empathy were the determinants of patient adherence. In addition, the physical environment including equipment and facilities is an important factor in increasing family trust and adherence. In addition, low satisfaction during the healing process is the main obstacle that causes non-adherence to patients. Therefore, health care providers need to assess patient satisfaction to evaluate the services provided and the effectiveness of treatment so that patients avoid complications due to treatment that is not adhered to. Furthermore, the relationship between adherence and patient characteristics is unclear and uncertain. Therefore, further analysis should be considered as confounding or parameter estimation.

## **6. Conclusion**

This study has evaluated the effect of service quality and patient satisfaction on patient adherence in the tuberculosis department of a private hospital in Lampung. The results can help healthcare providers better understand the relationship between service quality, patient satisfaction, patient adherence, and mechanisms to improve patient adherence. According to the findings, most of the patients had positive experiences in TB treatment services; service quality is good and satisfying. In addition, the patient adhered to the treatment program. The results of the study recommend that improving service quality and patient satisfaction can be an effective strategy for Kartini General Hospital or the Ministry of Health of the Republic of Indonesia to improve TB patient adherence in undergoing treatment to reduce morbidity in Indonesia.

## **Indication for Further Research**

This research is quantitative research limited to an in-depth exploration of three variables. Mixed-method research is recommended for further research. Further analysis needs to be done to assess whether each dimension of service quality and patient satisfaction significantly affects patient adherence. Furthermore, the characteristics of the respondents need to be analyzed to find out whether these variables can cause distortion (confounding) in estimating parameters.

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