Original Article

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Correlation between Health Service Quality, TB Patient Behavior, and Treatment Compliance

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Abstract

Background: Tuberculosis (TB) remains a major public health problem in Indonesia, where treatment adherence is essential for preventing drug resistance, treatment failure, and continued transmission. The quality of health services and patient behavior are key determinants influencing adherence, particularly at the primary healthcare level.

Objective: To analyze the effect of health services and tuberculosis (TB) patients' behavior on adherence to TB treatment in Palu City.

Methods: A cross-sectional study was conducted among 100 TB patients attending 14 community health centers (Puskesmas) in Palu City, Indonesia, selected through cluster random sampling. Data were collected from August to September 2024 using structured questionnaires. Univariate and bivariate analyses were performed, with statistical testing conducted using the Spearman rank correlation at a 95% confidence level (α=0.05).

Results: Most respondents were from Talise Health Center (12%), aged 21–29 years (24%), self-employed (50%), and had completed high school education (45%). Overall, 84% were treatment-compliant, and 97% demonstrated a positive attitude. All respondents with a less favorable attitude were non-compliant, while 86.6% of those with a good attitude were compliant. Regarding health services, 96% reported good services, and 86.5% of them were compliant, compared to 25% among those with poor services. Significant associations were found between attitude (ρ=0.000, r=0.417), health service quality (ρ=0.000, r=0.455), and treatment adherence.

Conclusion: There is a significant association between the quality of healthcare services, patient attitudes, and adherence to TB treatment. Strengthening patient-centered services and ongoing counseling at Puskesmas are essential to sustain treatment success and reduce transmission.

Keywords: Attitude, compliance, service, treatment, tuberculosis.

Introduction

Tuberculosis (TB) is recorded as the leading cause of death in the category of infectious diseases.[1] World Health Organization (WHO), in the Global TB Report 2021, reported that in 2020, there were 9.9 million cases of TB in the world, equivalent to 127/100,000 population. There were three countries with the highest incidence of cases, namely India (2,590,000), China (842,000), and Indonesia (824,000). In 2020, WHO reported that the highest incidence of TB cases was in Southeast Asia at 43%, Africa at 25%, and the Western Pacific at 18%, while the lowest areas were in the Eastern Mediterranean at 8.3%, America at 3.0%, and Europe at 2.3%. Indonesia is a developing country with the third highest TB burden in the world. The country reported 824,000 cases in 2020, equivalent to 301/100,000

population with Treatment Coverage (TC) of 47%.[2] Meanwhile, there were 568,987 cases in 2019 with TC of 67%.[3]

The TC in Central Sulawesi in 2021 were relatively low compared to other provinces, namely 41.1%.[4] "The treatment success rate in Central Sulawesi decreased consistently from 94% in 2020 to 88% in 2021 and 2022, and further declined to 86% in 2023.[5] Palu was one of the areas where tuberculosis treatment coverage remained below the target (<90%), with 37% in 2020, 46% in 2021, 61% in 2022, and 88% in 2023.[5,6] Palu City recorded the second lowest treatment success rate among districts/cities in Central Sulawesi in 2024, at 78%, only slightly higher than Poso at 69.9%, which was below the target of 90%.[7]

During 2020–2023, TB treatment coverage consistently failed to meet national targets due to undetected cases in high-risk areas, suboptimal active case finding (including contact investigation and screening in high-risk settings), and insufficient follow-up of detected cases. Treatment-notified but untreated cases may stem from programmatic challenges, inadequate health service performance, or patient-related behavioral and attitudinal factors. Understanding the extent of TB-related challenges in Palu is essential for appropriate program management and timely interventions to achieve the 2030 TB elimination target. Therefore, this study aimed to identify factors associated with treatment compliance among TB patients in Palu City.

Methods

This study used a quantitative method of observational epidemiological analysis, namely a cross-sectional design. The experiment was performed to determine the relationship between health services and TB patient behavior on adherence to treatment in Palu City from August to September 2024. The study population consisted of 488 TB patients registered in 2024 across 14 Community Health Centers (Puskesmas) in Palu City. A total of 100 respondents were selected using a cluster random sampling method. Data were collected using a structured questionnaire. Data analysis consisted of univariate and bivariate methods. Univariate analysis was used to describe the characteristics of respondents, presented in frequency distribution tables. Bivariate analysis was performed using the Spearman rank correlation test with a 95% confidence interval (α=0.05) to assess the relationship between independent and dependent variables. Results were presented in tables summarizing both descriptive findings and statistical associations. This study received ethical approval from the Commission for Bioethics of Medical/Health Research, Faculty of Medicine, Sultan Agung Islamic University, Semarang (No. 28/1/2025/ Komisi Bioetik; January 30, 2025).

Results

Table 1 presents the frequency distribution of respondents based on their Community Health Center (Puskesmas) work area. The highest proportion of respondents was from Talise Health Center (12%), while the lowest proportion was from Mamboro Health Center (3%).

Table 2 shows that the frequency distribution of respondents based on the highest age group in the 21-29 age group was 24%, and the lowest in the 66-74 age group was 3%. The frequency distribution of respondents based on the type of work was highest for self-employed employees at 50% and the lowest was for farmers at 1%. Furthermore, the frequency distribution of respondents based on the highest education was high school, which was 45%, and the lowest was in those who had not attended

Table 1 Distribution of Respondents Based on Work Area of Puskesmas

Work Area of Puskesmas	Frequency (n=100)	%
Pantoloan	8	8
Tipo	4	4
Lere	5	5
Nosarara	6	6
Talise	12	12
Birobuli	6	6
Tawaeli	4	4
Mamboro	3	3
Kamonji	11	11
Mabelopura	8	8
Singgani	9	9
Bulili	7	7
Sangurara	11	11
Kawatuna	6	6

Table 2 Characteristics of Respondent

Characteristics	n=100	%
Age		
12-20	10	10
21-29	24	24
30-38	12	12
39-47	13	13
48-56	17	17
57-65	17	17
66-74	3	3
75-84	4	4
Occupation		
Unemployed	17	17
Housewife	23	23
Self-Employed	50	50
civil servant	5	5
Farmer	1	1
Laborer	4	4
Highest education		
Never	3	3
Elementary School	19	19
Junior High School	25	25
Senior High School	45	45
College	8	8

school at 3%.

Table 3 shows the frequency distribution of respondents based on their medication-taking history. The highest proportion was among respondents who obtained medication from the nearest Puskesmas (63%), while the lowest proportion was among those who received home visits from health workers (15%).

Table 4 presents the frequency distribution

Table 3 Distribution of Respondents Based on Drug-Taking History

Medication History	n=100	%
Visited by Health Officers	15	15
Represented by family/Drug Swallowing Supervisors	22	22
Patients pick independently at the nearest Puskesmas	63	63

of respondents based on treatment compliance. Most respondents were compliant with treatment (84%), whereas 16% were non-compliant. Regarding respondent attitudes, the majority demonstrated a good attitude (97%), while only 3% had a poor attitude. All respondents with a poor attitude were non-compliant with medication, whereas 86.6% of those with a good attitude were compliant.

Based on the analysis using the Spearman rank test, a p-value of 0.000 was obtained, indicating a correlation between respondents' attitudes and medication compliance ($p<0.05$). The correlation coefficient value obtained was 0.417, indicating that the two variables had a weak correlation. Based on this value, the correlation value was positive, suggesting that the relationship between the two variables was in the same direction. Therefore, good attitude of respondents correlated to higher level of medication compliance.

Table 5 shows the frequency distribution of respondents based on health service quality. Most respondents reported receiving good health services (96%), while 4% reported poor service quality. Among respondents who received poor health services, 75% were non-compliant with treatment and 25% were compliant. Conversely, among those who received good health services, 86.5% were

Table 4 Influence of Attitudes on Compliance with Treatment of TB Patients in Palu City

Attitude	Medication Compliance				Total	%	p-value	Correlation Coefficient
	Non-Compliant		Compliant					
	n	%	n	%				
Less good	3	100	0	0	3	3		
Good	13	13.4	84	86.6	97	97	0.000	0.417
Total	16	16	84	84	100			

Table 5 The Influence of Health Services on Treatment Compliance of TB Patients in Palu City

Health services	Medication Compliance				Total	%	p-value	Correlation Coefficient
	Non-Compliant		Compliant					
	n	%	n	%				
Not good	3	75	1	25	4	4		
Good	13	13.5	83	86.5	96	96	0.000	0.455
Total	16	16	84	84	100			

compliant and 13.5% were non-compliant

Based on the analysis results using the Spearman rank test, the p-value=0.000 indicated a correlation between health services and treatment compliance. The correlation coefficient value was 0.455, showing that the two variables had a weak correlation. Based on the positive correlation value, the relationship between the two variables was in the same direction. This suggests that a better respondent attitude corresponds to higher level of treatment compliance.

Discussion

Recent study shows a correlation between respondents' attitude and treatment compliance. Attitude is one of the individual factors that play a role in the success of treatment compliance. This is because attitude is a predisposition that shapes an individual's behavior. When an individual disagrees with treatment, it will motivate patients to behave non-compliantly in treatment. The study by Qiwam in 2024 showed p = 0.003, indicating a significant relationship between attitude of TB patients and compliance with taking medication. When the attitude of patients forms good motivation about pulmonary TB treatment, there will be motivation to take medication regularly[8]. Maulana in 2024 also showed a significance value of p = 0.001, suggesting that there was a significant relationship between attitude and compliance with taking anti-TB drugs. This adds to the evidence that attitude influences individual behavior and decision-making in the recovery process.[9]

The study revealed that all participants with a less good attitude were non-compliant in adhering to TB treatment. This is because long-term pulmonary TB treatment often makes patients feel bored, leading to non-compliance in taking medication. Patients often comply with official recommendations or instructions against their intention at first to avoid punishment. Modifications occurring in this stage are temporary, suggesting that operations are carried out under police supervision. However, the behavior disappears when the control subsides or disappears.[10]

Non-compliance of pulmonary TB patients is the most important cause of treatment failure, which is an obstacle to achieving recovery. Efforts that can be made to improve compliance with taking medication in TB patients are by maintaining a commitment to treatment, having family support in the form of emotional support, time, and money, using aids to improve compliance with treatment, and a 'peer educator' method or peer education (providing motivation and education from patient to patient).

According to Law Number 17 of 2023, health services coordinate government efforts at both basic and advanced levels, where the services provided are promotive, preventive, and rehabilitative.[11] Patient-Centered Care is another method to reciprocal relationships between service providers and patients. This is expected to reduce conflicts between service providers and patients due to a lack of communication and information.

This study indicated correlation between health services and treatment compliance. The role of health workers as advocates, educators, motivators, and facilitators greatly influences changes in community behavior. Specifically, educators will help patients improve their health by providing knowledge about medical care and actions to patients or families. According to Tukayo *et al*., statistical test results p = 0.002 <α = 0.05 indicates a relationship between access to health services and adherence to taking Oxygen Adherence Therapy (OAT) at Waena Health Center[12]. The role of health workers is to provide a support system for patients in the form of information or advice, genuine assistance, or actions that have emotional benefits or influence the recipient's behavior. TB counseling can be

carried out by providing important messages directly or using the media.

Health services are considered good after fulfilling five dimensions, namely physical appearance (tangibles), responsiveness, reliability, assurance, and empathy. Suppose the service provider offers services well and with adequate results, it will also create a good impression.[13] According to Marbun in 2023, 96.6% of respondents report that health workers support and care for TB patients.[14] This suggests that good communication will make treatment more comfortable and positively impact their psyche. Several theories explain that the provision of good quality services causes a high level of compliance with treatment in TB patients.

This study shows that respondents have received good health services of 86.5% but are not compliant with treatment. The non-compliance can indirectly cause TB patients not to recover. The effectiveness of treatment will be achieved when patients are compliant with OAT. This is the cause of the high incidence of TB in Indonesia. However, when observed from health services provided, the number of cases is still high in prevalence.

Patients' medication compliance is an effort to increase the cure rate and reduce the incidence of MDR-TB.[5] However, in the implementation of this study, respondents were still found to be non-compliant in taking medication for various reasons. The most common was forgetting to take medication and feeling bored when required to consume large amounts of medication every day for months. If not followed up immediately, this will have long-term impacts in the form of complications for patients and worsen the condition.

Though this study indicated that there was relationship between attitude and health services to medication compliance, the correlation coefficient showed that the two variables had a weak correlation. The weak association between both variable and medication compliance observed in this study may be attributed to the fact that compliance is not solely determined by a patient's positive attitude and health services. Other influencing factors include knowledge, belief, family support, transportation access to health facilities, long distance to the treatment center, workload, financial burden, treatment side effects, and physical limitations experienced by patients. These barriers often affect individual behavior, meaning that even with a favorable attitude toward treatment, patients may still struggle to comply. Moreover, not all attitudes held by respondents are strong or consistent; some may be hesitant, fluctuating, or situational (ambivalent). Such attitudes are less likely to translate into concrete actions, and therefore may not be reflected in actual compliance behavior.[15–23] Additionally, the instrument used in this study measured general attitudes without assessing the strength of belief or commitment behind those attitudes. Response bias may also have occurred due to the self-reported nature of the questionnaire, which can lead to socially desirable answers. This bias may obscure the true relationship between the variables, making the association appear weaker than it actually is.[24–28]

These results emphasize the importance of both individual attitudes and the provision of high-quality healthcare services in ensuring successful TB treatment adherence. This study is expected to serve as a reference for policymakers in designing and implementing strategies related to the detection and management of TB cases in Palu City, thereby supporting effective and comprehensive TB control efforts. However, several limitations should be considered. First, the cross-sectional design does not allow for causal inference between health service quality, patient behavior, and treatment adherence. Second, the use of self-reported questionnaires may introduce recall bias or social desirability bias, potentially affecting the accuracy of the data. Third, the sample consisted solely of patients attending Puskesmas, which may lead to selection bias and limit the generalizability of the findings to the broader population. Fourth, the relatively small sample size compared with the total TB population in Palu City may reduce statistical power. Lastly, the absence of multivariate analysis restricts the ability to adjust for potential confounding variables that may influence the observed associations.

This study recommends that all Puskesmas in Palu City maintain the quality of their healthcare services for TB and other patients. TB program officers and health cadres are motivated to collaborate with health promotion units to conduct socialization and public education campaigns in their respective areas to reduce TB cases. Furthermore, awareness-raising activities should target TB patients and treatment supervisors (PMOs) to emphasize the importance of recovery and provide education on effective strategies. Finally, further studies are essential to explore other factors influencing TB recovery rates in Palu City using additional variables.

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