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Original Research

Factors Related to Tuberculosis Treatment Compliance: A Cross-Sectional Study on Pulmonary Tuberculosis Patients

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Abstract

Introduction: The success of pulmonary TB treatment is still low due to lack of patient compliance with treatment. This study aims to determine the factors associated with treatment compliance in TB patients at the Internal Medicine Polyclinic at Raja Ampat District Hospital.
Methods: Observational research design with a cross-sectional study approach involving 125 tuberculosis patients seeking treatment at the Internal Medicine Polyclinic at Raja Ampat District Hospital, the research sample used a total sampling technique. Data collection uses a structured questionnaire that has been prepared by researchers. Data were analyzed using univariate, bivariate (Chi-Square test), and multivariate (Binary Logistic Regression) analysis.
Results: The majority of TB patients adhered to treatment, out of 125 respondents, 74 people (59.2%) were included in the adherent category. There is a significant relationship between age, education, knowledge, attitudes, perceptions, motivation and staff support and the level of treatment compliance. Good knowledge (AOR: 2.18; CI: 1.05-1.56; p 0.003) and high staff support (AOR: 1.27; CI: 1.11-1.68; p 0.006) increase TB patient treatment compliance.
Conclusion: Treatment compliance for TB patients is still below established standards. Staff knowledge and support promote better treatment adherence, the research results emphasize the importance of education and improving access to services, such as visits by health workers to the homes of TB patients.

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INTRODUCTION

The global situation of Pulmonary Tuberculosis (TB) is worsening, marked by the escalating number of uncontrolled pulmonary TB cases and a significant proportion of patients who fail to achieve cure, especially in densely populated and developing countries such as Indonesia [1]. Indonesia ranks third globally in the number of pulmonary TB cases, following India and China, with a reported incidence of 321 cases per 100,000 population in 2018. Papua Barat province, nationally, stands among the top five provinces with the highest incidence of pulmonary TB, increasing from 0.4% in 2013 to 0.53% in 2018 [2]. The treatment success rate for TB in Papua Barat province is 65.32%, still below the national target of 88.0%

The success of pulmonary TB treatment relies heavily on patients' adherence to the treatment regimen. TB treatment requires a relatively lengthy duration, spanning four to six months consistently, ensuring completeness until recovery to prevent transmission to others [1]. Patient compliance with pulmonary TB treatment, as indicated by previous research findings, is reported at 56.4% being compliant and 43.6% non-compliant [3]. A study conducted at the Public Health Center in Kejaksaan Kota Cirebon in 2019 found that 51.6% of respondents were non-compliant in taking pulmonary TB medication [4]. Similarly, a study by Listiawaty & Prasetyo [5] reported a non-compliance rate of 38.1% in medication adherence. These findings collectively highlight the persistently low adherence of pulmonary TB patients to treatment, falling significantly short of the Ministry of Health's target of 88% [2].

The consequences of treatment failure due to non-compliance among pulmonary TB patients include increased risks of morbidity, mortality, drug resistance, and ongoing disease transmission [6][5][4]. Non-compliance in pulmonary TB patients undergoing treatment is influenced by various factors affecting individual health behavior, such as knowledge, attitude, perception, motivation, family support, as well as information and support from healthcare providers [7][3][8][9].

The compliance of pulmonary TB patients with treatment is influenced by numerous factors, with previous studies revealing varied and inconsistent findings. To thoroughly understand the root causes related to the adherence of pulmonary TB patients to treatment and the influencing factors, it is crucial to conduct research analyzing the factors associated with treatment compliance among pulmonary TB patients in the Internal Medicine Outpatient Clinic of the Raja Ampat Regional General Hospital.

METHODS

Study design

Quantitative observational research with a cross-sectional study approach is a study that emphasizes the time of measurement/observation of data on independent and dependent variables only once at a time (a point at time). Assessment of treatment compliance in pulmonary TB

patients as well as factors associated with compliance is carried out simultaneously at the same time.

Subject

The sample size was 125 patients with pulmonary tuberculosis at the Internal Medicine Polyclinic of Raja A Regional General Hospital with total sampling technique.

Instrument

The instruments used were questionnaires consisting of: 1) Adherence to Refills and Medications Scale (ARMS) questionnaire to assess medication adherence, 2) The questionnaire consisted of 12 statement items in the form of a Gutman scale with two answer options, namely True and False to assess knowledge, 3) The questionnaire was arranged on a Likert scale consisting of 10 statements each in the form of positive and negative statements with four alternative answers, namely: strongly agree, agree, disagree and strongly disagree to assess attitudes, perceptions, motivation, and health worker support. 4) The questionnaire consisted of 4 statement items in the form of a Gutman scale with two answer options, namely Yes and No to assess socioeconomics. The questionnaire underwent a pilot test, including face validity, wherein two experts in the field reviewed the questionnaire, and validity was tested by distributing it to 20 pulmonary tuberculosis patients

Data collection

Data collection was assisted by enumerators. Data collection was carried out on December 15, 2022 to February 20, 2023. the main researcher or enumerator approached the sample informally by explaining the purpose and objectives of the study. Prospective respondents who were willing to become respondents signed an informed consent sheet and then the respondents filled out the research questionnaire.

Data analysis

Data were analyzed using univariate, bivariate (Chi-Square Test), and multivariate analysis (binary logistic regression), with the measure of association being the Adjusted Odds Ratio (AOR), 95% Confidence Interval (CI), and p-values analyzed using SPSS version 23.

Ethical considerations

This research has obtained ethical clearance (Ethical Clearance) No: 04.0589/KEPITEKES-BALI/XI/2022 from the Bali ITEKES Ethics Commission.

RESULTS

Respondents in this study were all pulmonary TB patients at the Internal Medicine Outpatient Clinic of Raja Ampat Regional General Hospital, totaling 125 individuals. A summary of respondent characteristics from the 125 participants revealed that the majority of respondents, 95 individuals (76.0%), were in the age group ≤47 years. The most common gender among respondents was male, with 65 individuals (52.0%). In terms of education, the majority had

completed high school, accounting for 79 respondents (63.2%), and a significant portion of respondents, 61 individuals (48.8%), were unemployed.

TB Patient Treatment Compliance

Table 2 illustrates the treatment compliance of TB patients at the Internal Medicine Outpatient Clinic of Raja Ampat Regional General Hospital among 125 respondents. The majority fell into the compliant category, with 74 respondents (59.2%), while 51 individuals (40.8%) were non-compliant.

Table 3 presents the results of bivariate analysis to determine the relationship between characteristics and independent variables with TB patient treatment compliance. The research results indicate that age, education, knowledge level, attitude, perception, motivation, and healthcare professional support are significantly related to TB patient treatment compliance (p value < α 0.05), while gender, occupation, and economic status are not related to TB patient treatment compliance (p value ≥ α 0.05). The complete results of bivariate analysis can be seen in Table 2.

The results of multiple logistic regression analysis, aimed at identifying the most dominant factors related to TB patient treatment compliance, show that a good knowledge level and high healthcare professional support are associated with more compliant TB patient treatment. Good knowledge increases treatment compliance by 2.18 times compared to respondents with sufficient/insufficient knowledge (AOR: 2.18; CI: 1.05-1.56; p 0.003). High healthcare professional support increases treatment compliance by 1.27 times more compliant than low healthcare professional support (AOR: 1.27; CI: 1.11-1.68; p 0.006). The complete results of multivariate analysis can be seen in Table 4.

Table 1
Distribution of Respondent Characteristics at the Internal Medicine Outpatient Clinic of Raja Ampat Regional General Hospital in 2023 (n=125)

Respondent Characteristics	Frequency (%)
Age (years)	
≤47 years	95 (76,0%)
>47 years	30 (24,0%)
Gender	
Men	65 (52,0%)
Women	60 (48,0%)
Edecation Level	
Elementary School	21 (16,8%)
Junior High School	19 (15,2%)
Senior High School	79 (63,2%)
Higher Education	6 (4,8%)
Job	
Not Job	61 (48,8%)
Farmer	38 (30,4%)
Students	4 (3,2%)
Company Employees	2 (1,6%)
Self-employed	6 (4,8%)
Government Employees	14 (11,2%)

Table 2
Proportion of Tuberculosis Patient Treatment Compliance at the Internal Medicine Outpatient Clinic of Raja Ampat Regional General Hospital in 2023 (n=125)

Proportion of Tuberculosis Patient Treatment Compliance	Frequency (%)
Compliant	74 (59,2%)
No compliant	51 (40,8%)

Table 3

Relationship between Characteristics, Knowledge, Attitude, Perception, Motivation, Economic Status, and Healthcare Professional Support with TB Patient Treatment Compliance at the Internal Medicine Outpatient Clinic of Raja Ampat Regional General Hospital in 2023 (n=125)

Variable	Treatment Compliance				X^2	*P value*
	Compliant		Not Compliant			
	n	%	N	%		
Age						
≤47 Year	61	64,2	34	35,8	4,114	0,043*
>47 Year	13	43,3	17	56,7		
Gender						
Men	40	61,5	25	38,5	0,307	0,580
Women	34	56,7	26	43,3		
Education						
Elementary Education	17	42,5	23	57,5	6,792	0,009*
Higher Education	57	67,1	28	32,9		
Job						
Not Work	38	58,5	27	41,5	0,031	0,861
On Work	36	60,0	24	40,0		
Education Level						
Good	65	75,6	21	24,4	30,624	<0,00
Enough/Less	9	23,1	30	76,9		1*
Attitude						
Positif	65	76,5	20	23,5	32,802	<0,00
Negatif	9	22,5	31	77,5		1*
Perception						
High	50	72,5	19	27,5	11,218	0,001*
Low	24	42,9	32	57,1		
Motivation						
High	52	70,3	22	29,7	9,203	0,002*
Low	22	43,1	29	56,9		
Economic Level						
High	44	65,7	23	34,3	2,504	0,114
Low	30	51,7	28	48,3		
Healthcare Support						
High	53	75,7	17	24,3	17,963	<0,00 1*
Low	21	38,2	34	61,8		

**Significant*

Table 4

Multivariate Analysis of Factors Related to TB Patient Treatment Compliance at the Internal Medicine Outpatient Clinic of Raja Ampat Regional General Hospital in 2023 (n=125)

Variable	Treatment Compliance				AOR	95% CI	*P value*
	Compliant		Not Compliant				
	n	%	n	%			
Education Level							
High	65	75,6	21	24,4	2,18	1,05-1,56	0,003
Low*	9	23,1	30	76,9			
Healthcare Support							
High	53	75,7	17	24,3	1,27	1,10-1,68	0,006
Low*	21	38,2	34	61,8			

**Reference group; AOR=Adjusted Odds Ratio; CI=Confidence Interval*

DISCUSSION

Treatment compliance among TB patients at the Internal Medicine Outpatient Clinic of the Raja Ampat Regional General Hospital revealed that out of 125 respondents, 74 (59.2%) were categorized as compliant, while 51 respondents (40.8%) were non-compliant. The research findings indicate that a significant portion of non-compliant respondents attributed their lack of adherence to occasional forgetfulness to take medication, deciding not to take medication, skipping doses when feeling better, and missing doses due to busy schedules. However, these findings fall short of the optimal target outlined in the Ministry of Health's strategic plan for pulmonary TB treatment compliance, which aims for an 85% adherence rate [2].

The results of this study align with previous research. For instance, a study at the Inpatient Health Center of Banjar Agung, Jati Agung Sub-district, South Lampung Regency, found that 75.0% of 36 respondents were compliant with anti-tuberculosis medication [10]. Another study conducted at RSU Bangkatan Binjai reported that 70.0% of 30 respondents exhibited good compliance with pulmonary TB treatment [11]. A systematic review and meta-analysis of 15 articles related to primary data on MDR-TB treatment compliance emphasized the critical nature of adherence, not only for achieving cure rates but also for reducing other health issues resulting from disease complications that require more extensive and costly treatment [12]. On the contrary, a study at the Public Health Center in Kejaksaan Kota Cirebon found that 51.6% of 31 respondents were non-compliant with pulmonary TB medication [4]. Additionally, a study in Anhui Province, eastern China, involving 339 TB patients, showed that the majority (66.4%) were non-compliant with treatment [13].

Treatment compliance is interpreted as the regular and unchanged execution of prescribed rules, encompassing medication schedules, check-up schedules, drug doses, types of medication, and continuous

environmental management for six months, covering both the initial and advanced treatment phases until completion of the treatment program [14]. Specifically, treatment compliance is defined as an individual's adherence to instructions in accordance with prescribed medications, encompassing the intensity of drug use during the therapy period. Non-compliance includes delaying medication intake, reducing doses, and decreasing treatment frequency [15].

Examining treatment compliance in this study with regard to respondent characteristics, the majority of compliance was observed in TB patients aged ≤47 years (64.0%), male respondents (61.5%), and those with higher education levels (67.1%). Other studies have also suggested a strong correlation between age and preventative behavior and treatment adherence among patients with infectious diseases [16]. Generally, an individual's health behavior improves with age, as more experiences contribute to increased knowledge and health awareness. Older individuals tend to follow doctor's recommendations more diligently, exhibiting more responsibility, orderliness, diligence, and commitment compared to younger individuals [17]. Both males and females showed good compliance proportions, with no significant differences in therapy adherence based on gender [18]. Higher education levels increase patient knowledge about pulmonary TB, leading to a better understanding of the disease's dangers, ultimately promoting treatment compliance [9].

The study's statistical findings revealed a significant relationship between knowledge levels and treatment compliance among TB patients. Patients with good knowledge about pulmonary TB were 2.18 times more likely to be compliant with treatment compared to those with sufficient/insufficient knowledge. This aligns with previous research showing a significant association between knowledge and TB patient adherence to treatment, demonstrating a relatively strong correlation [11]. Similarly, a study at Puskesmas Peterongan found that pulmonary TB patients with good knowledge had high adherence rates [19]. Knowledge levels were significantly related to pulmonary TB patient compliance, where good knowledge about the disease, transmission, and treatment of pulmonary TB correlated with good treatment compliance, and vice versa [20].

The direct support of healthcare professionals can influence behavioral changes. In this study, a considerably higher proportion of treatment compliance was found among respondents who received high healthcare professional support (75.7%) compared to those with low leadership support (38.2%). Statistical analysis also revealed a significant relationship between healthcare professional support and treatment compliance in TB patients. High healthcare professional support increased treatment compliance by 1.27 times compared to patients with low healthcare professional support. This aligns with research in the Kejaksaan Kota Cirebon region, demonstrating a connection between healthcare professional roles and adherence to pulmonary TB medication. It emphasizes the need to enhance the roles of family support and healthcare professionals in

counseling and educating patients about the disease and the impact of pulmonary TB treatment, reducing perceived stigma among patients and improving TB medication compliance [4]. Several studies have found that irregular treatment and defaulting are caused by a lack of education from healthcare professionals, no home visits by healthcare professionals, and economic factors/unemployment [20]. The increase in non-compliance with TB treatment is attributed to the long duration of treatment and the side effects of TB drugs. In terms of healthcare services, suboptimal healthcare personnel in providing counseling to patients, considerable distances between patients' homes and healthcare services, inadequate transportation for treatment, and insufficient family or PMO support contribute to non-compliance [4].

This study has several limitations, including the fact that it only focused on one hospital and did not involve other types of hospitals (government and private). Therefore, the results cannot be generalized. Additionally, the study used a cross-sectional approach, preventing definitive conclusions about the cause-and-effect relationship between variables.

STUDY LIMITATION

The research location only took one hospital and has not involved other hospitals (government hospitals and non-government hospitals), so the results of the study cannot be generalized. This study used a cross-sectional approach, so it cannot be fully concluded about the causal relationship between variables

CONCLUSION

The treatment compliance of TB patients remains below the established standards. Knowledge and support from healthcare professionals enhance better treatment compliance, emphasizing the importance of increased education provision and improved service access, such as health worker visits to the homes of TB patients.

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AUTHOR CONTRIBUTION

All authors made significant contributions to the work reported, whether in the conception, study design, execution, data acquisition, analysis, and interpretation, or in all these areas; participated in drafting, revising, or critically reviewing the article; gave final approval for the version to be published; agreed to the journal where the article is submitted; and agreed to be accountable for all aspects of the work.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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