



Analysis of Respondents' Characteristics with Tuberculosis and Adherence Using Morisky Medication Adherence Scale

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Abstract

Tuberculosis (TB), an infectious disease caused by *Mycobacterium tuberculosis*, results in approximately 10 million new cases and 1,5 million deaths annually worldwide. This research method is an observational analytic study using a cross-sectional design. The target population of this study was all patients with Pulmonary TB who completed the intensive stage of treatment and participated in the DOTS program at selected health centers during the three months, namely patients diagnosed with Tuberculosis and registered as outpatients at the Hospital Nacional Guido Valadares (HNGV) Dili, Klibur Domin Tibar, Liquiça and at the Hospital Sentru Saúde Bairro Pite, Dili, Timor-Leste. The inclusion criteria in this study involved tuberculosis patients who were receiving anti-tuberculosis drug therapy for at least four weeks since the initial stage of treatment, aged more or equal to 17 years, and were able to understand oral and written instructions. Data collection took place between September and November 2023, involving a sample of 69 respondents. These results provide an overview of respondent characteristics that are significant in analyzing treatment adherence in patients with pulmonary TB. Tuberculosis is a contagious disease caused by infection with the *Mycobacterium tuberculosis* germ, usually affecting not only the lungs but also other organs.

INTRODUCTION

Tuberculosis (TB), an infectious disease caused by *Mycobacterium tuberculosis*, results in approximately 10 million new cases and 1,5 million deaths annually worldwide. The incidence of TB varies widely across regions. In most high-income countries, TB cases are around 10 per 100,000 people, whereas in low- and middle-income countries, the number of cases reaches 500 per 100,000 people (Smith et al., 2022). In developing countries, 75% of TB cases are found in the productive age between 15 and 50 years (Ratnasari, Marni, and Husna 2019). According to WHO (2018), Indonesia

ranks third globally in the number of TB cases among the top 10 countries. These countries with the highest TB cases are India (2,7 million), China (889 thousand), Indonesia (581 thousand), Pakistan (525 thousand), Nigeria (418 thousand), Bangladesh (364 thousand), South Africa (322 thousand), Republic of Congo (262 thousand), and Myanmar (191 thousand). Meanwhile, Timor-Leste has demonstrated a decline in the incidence of tuberculosis (TB) in 2021, according to the World Health Organization's newly released Global TB Report. The TB incidence rate in the country has been stagnant at 498 per 100,000

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population for several years, but in 2021, the incidence rate decreased by 2,4% to 486 per 100,000 population (TB-Global Report, WHO, 2022). According to data from SSM (Servisu Saude Municipiu) Dili's incidence of pulmonary TB for the Dili district from 2014 to 2017 was 915 patients. Additionally, data at Centru Saude Comoro from January to July 2018 mentioned 167 patients with pulmonary TB, with the number increasing to 178 patients by the end of 2018 (Owa & Rochmawati, 2020).

One of the factors affecting the recovery of TB disease is treatment compliance. This treatment is influenced by several things, including age, occupation, supervision of taking medication, type of drug, drug dose, counseling from officers, knowledge, and attitudes (Ratnasari et al., 2020). To ensure the medication regularity, a PMO (Pengawas Minum Obat/Supervisor of Taking Medicine) is required. The best PMOs come from health workers, nurses, or village midwives. However, if they are unavailable, they can come from other parties, such as community leaders, health cadres, or family members. Considering TB control, treatment compliance is defined as the level of adherence of patients with a history of taking therapeutic drugs to treatment prescriptions (Ratnasari, 2018). The incidence of drug side effects in TB patients can be one of the factors of treatment failure as it has an impact on the non-compliance of TB patients in taking medication. Non-compliance caused by the side effects of TB drugs can lead to treatment resistance, which results in low treatment success rates (Musfirah et al., 2022). The problem faced today is the high rate of morbidity and mortality caused by side effects of Anti-Tuberculosis Drugs (OAT), and one of the serious side effects is hepatotoxic. It is certainly an obstacle in the eradication of TB disease. Furthermore, discontinuation of therapy due to drug side effects will lead to TB germ resistance, which will ultimately aggravate the patient's condition (Sari et al., 2011). With the low rate of drug adherence and the impact of drug withdrawal in TB patients, the researchers are interested in analyzing this matter.

Trends in the estimated incidence of tuberculosis and the number of deaths from the disease remained consistent between 2015

and 2021. Findings from the 2019 and 2023 epidemiological reviews indicate that the high incidence of tuberculosis in Timor-Leste is primarily due to several factors: the high prevalence of TB-specific risk factors (such as malnutrition and smoking), a significant number of undiagnosed patients in the community, delays in diagnosis, and challenges within the health system regarding early and comprehensive TB diagnosis. These factors contribute to high rates of TB transmission within the community. Data from a previous study conducted in Timor-Leste in 2016 and 2017 revealed that nearly 84% of TB patients and their families incurred significant costs related to the disease (WHO 2023). The number of relapses has also increased, with 70 cases reported in 2020, 75 cases in 2021, and 121 cases in 2022. Additionally, there was a significant increase in TB patients, with 3,139 cases in 2021 (1,786 male and 1,407 female patients). This number surged to 5,249 patients in 2022, comprising 2,912 male and 2,337 female patients (WHO, 2023). This situation has prompted researchers to focus on TB cases in Timor-Leste for further analysis.

METHOD

This research method is an observational analytic study using a cross sectional design. The Cross Sectional method is conducted with a face-to-face meeting, or the patient filled out a questionnaire directly. The target population of this study were all patients with Pulmonary TB who completed the intensive stage of treatment and participated in the DOTS program at selected health centers during the three months, namely patients diagnosed with Tuberculosis and registered as outpatients at the Hospital Nacional Guido Valadares (HNGV) Dili, Klibur Domin Tibar, Liquiça and at the Hospital Sentru Saúde Bairro Pite, Dili, Timor-Leste. The inclusion criteria in this study involved tuberculosis patients receiving anti-tuberculosis drug therapy for at least four weeks since the initial stage of treatment, aged more or equal to 17 years and able to understand oral and written instructions. Samples unused were patients with tuberculosis who could not communicate or whose condition did not allow them to be interviewed.

Sampling was conducted at several treatment locations, namely at the Hospital Nacional Guido Valadares (HNGV) Dili, Timor-Leste with 25 patients; at Klibur Domin Tibar, Liquiça, Timor-Leste with 22 patients; at Sentru Saúde Bairro Pite, Dili, Timor-Leste with 22 patients. Thus, the total number of patients with pulmonary TB who sought treatment at the selected health facilities was 69 patients. The research was conducted from September to November 2023. The sampling method was consecutive sampling derived from subjects who came to the health center and met the inclusion and exclusion criteria. The independent variables of this study were treatment compliance and respondent characteristics. This study had passed a series of ethical tests and received a letter of recommendation from the Ethics Committee of Timor Leste with No. Ref: 43/INSP-TL/UEPD/X/23. The research instruments used 1) Morisky Medication Adherence Report Scale (MMAS) questionnaire, used to determine the level of patient adherence to treatment. The questionnaire used has been tested for validity and reliability by previous researchers which contains five questions with five statement answers and accompanied by an Informed

Consent sheet. 2) Medical Records used to determine medical data on laboratory results, treatment therapy, and the final results of patients. The steps of data processing were checking the completeness and clarity of the data, coding each variable data, entering data in a computer program, and checking again to ensure that the data was free from errors. Data analysis consisted of univariate and bivariate analysis. In bivariate analysis, the correlation between two variables was analyzed using the Chi-square formula. Data collection was carried out by researchers using the observation method and giving questionnaires to research respondents filled in directly, and data collection was carried out at the Public Health Center/Puskesmas according to the procedures created.

RESULTS AND DISCUSSIONS

Based on table 1 above, the research results on the description of treatment compliance for pulmonary TB patients show the following characteristics of respondents: 26 people (37%) are between 20 and 30 years old. Most respondents are male, as many as 35 people (51%). The level of education possessed by respondents is quite high,

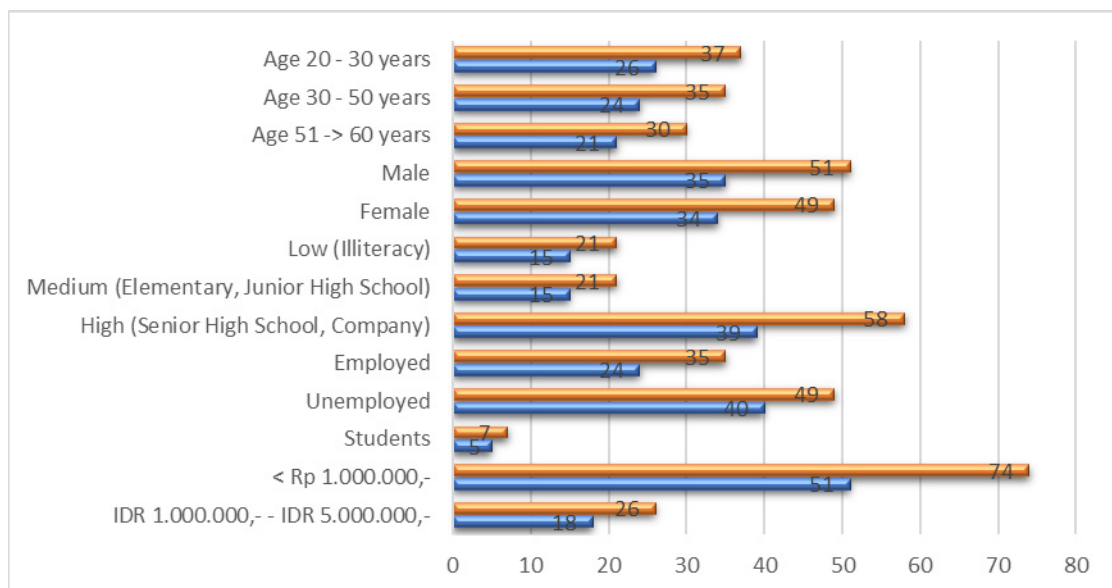


Figure 1: Respondents' Characteristics

with 39 people (58%) having a high school or college education. Regarding monthly income, most respondents, as many as 51 people (74%), have an income of less than 1 million rupiah. In addition, the respondents' occupation also showed that 33 people (49%) are unemployed. These results provide an overview of respondent characteristics that are significant in analyzing treatment adherence in patients with pulmonary TB. The results of the OAT adherence study shows the distribution of drug adherence assessment scores of adult pulmonary TB patients in the Timor Leste region, as presented in the following figure.

The results regarding the description of treatment compliance for patients with pulmonary TB indicate that of the 69 respondents, 67 patients (97%) have moderate compliance with medication. Meanwhile, only 2 respondents (3%) have a medication adherence score in the high category. This data indicates that most patients with pulmonary TB show moderate compliance, but still need improvement to achieve optimal levels of compliance. This study shows that the highest age level of tuberculosis patients is 23 people (33%) aged 21-30 years. It is in accordance with the results of a study that the highest age of tuberculosis patients was in the range of 20-30 years (Shrestha et al., 2023), while other results stated that the average age of patients was 29 years old (Adhikari et al., 2022). The high number of tuberculosis patients in the productive age range is due to high productivity and mobility, so this age group is very vulnerable to airborne transmission of tuberculosis germs (Resta et al., 2021). A rapid diagnosis will help patients

get the right treatment (Sundaram, Vajravelu, and Paulraj 2024). Other studies reveal that the characteristics of Tuberculosis patients include age, gender, education level, marital status, place of residence, and socioeconomic status (Musfirah et al., 2022)

Gender was almost equal between 35 male patients (51%) and 34 female patients (49%). It is in line with the results, which state that age and gender are predictor variables that are proven to be significant to the incidence of tuberculosis cases in Brazil (Fernandes et al., 2018). Besides age and gender, the high incidence of tuberculosis is also caused by immigration from TB-endemic countries. It occurs especially during the early stages of the migration process in the host country (Godoy et al., 2024). Other results suggest that TB treatment non-adherence is higher among female patients than male patients (Krishnamoorthy et al., 2024). The age of TB patients varies from country to country. For instance, in India, as many as 2/3 of cases are found in males, while in Ukraine, females are 2,5 times more likely to develop the disease (Adhikari et al. 2022).

A total of 39 respondents (58%) had a high educational level status, high school or college. The topic of tuberculosis knowledge continues to be the most compelling variable for researchers. A study found that knowledge was the most frequently addressed variable, followed by self-efficacy, health cadres, TB transmission, and social support (Ratnasari & Handayani, 2023). A study shows that sociodemographic data on education as many as 64.7% (66) of TB patients have a high education status (Kumari

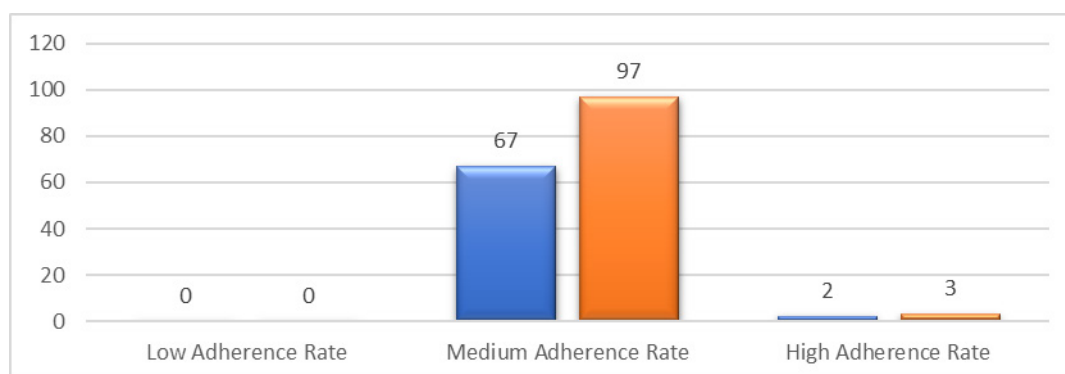


Figure 2 Medication adherence rate of TB patients

Indira & Mathew, 2023). Educational factors will affect the family's ability to modify the home environment suitable for people with TB, including lighting in the house, cleanliness, and ventilation, which are the most relevant factors related to the development of TB germs (Honorio and Zavaleta 2023). The results of this study revealed that in terms of monthly income, the majority of respondents, 51 people (74%), had an income of less than 1 million rupiah. This condition will indirectly affect the treatment process of TB patients. The cost of treatment is often a barrier to seeking health services, as WHO data states that 60% of deaths from TB are caused by low income (Davis et al., 2024). Adherence to treatment for TB patients is influenced by several factors, one of which is socioeconomic (Sapar et al., 2020). Although TB is treatable, preventable, and curable, it has emerged as the leading killer of infectious diseases, surpassing COVID-19 in 2022. This condition is supported by poor access to treatment facilities, usually experienced by people in low-income countries (Oppong, Lester, and Sadeghi Naieni Fard 2024).

Tuberculosis is a contagious disease caused by infection with the *Mycobacterium tuberculosis* germ, usually affecting not only the lungs but also other organs. Its incidence increases through the air when the patient coughs (Zainal S. et al., 2020). Adherence is closely related to failure. In the case of pulmonary TB treatment, both are closely related, where if the level of compliance is low, the risk of treatment failure is higher. A study stated that the failure of treatment of this disease was due to the lack of motivation of health workers in providing the services needed by patients with pulmonary TB. It happened because officers felt that if they wanted to recover, it should be the patient who was more active in seeking treatment, even though not all patients knew correctly about TB disease and existing treatment programs. Therefore, the officers' role is also needed to disseminate information related to TB disease and treatment management, as well as the impact of drugs on these disorders (Asriwati et al. 2021). In addition, the motivation from officers for TB patients to follow the treatment schedule was found to be significant for patient adherence to treatment (Zaidi et al. 2023).

Wrong treatment procedures, a relatively long treatment period, and infection cause patients to avoid medication (Manurung, 2023). To obtain maximum treatment results, several items must be considered, namely patient treatment compliance, side effects and drug interactions must receive appropriate treatment from the doctor (Gupta et al., 2020).

CONCLUSIONS

Tuberculosis is a contagious disease caused by infection with the *Mycobacterium tuberculosis* germ. Usually it affects not only the lungs but also other organs. Adherence is closely related to failure. In the case of pulmonary TB treatment, both are closely related. If the level of compliance is low, the risk of treatment failure is higher. The results indicated that 97% of respondents had a moderate level of compliance in taking medication. It shows that improvements are still necessary in handling. Thus, expected optimal level of compliance in medication is obtained.

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