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ANALYSIS OF STIGMA AND MYTHS ON MEDICATION ADHERENCE IN PULMONARY TUBERCULOSIS PATIENTS

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ABSTRACT
Pulmonary Tuberculosis (TB) remains a global and national health problem, including in Indonesia as the country with the second-highest TB burden in the world. TB control efforts are strongly influenced by patient adherence to long-term treatment. Various social and psychological factors, including stigma and myths about TB, have the potential to affect patient adherence, but empirical evidence at the community level is still limited. This research aims to analyze the relationship between stigma and myths and medication adherence in pulmonary tuberculosis patients. The research design used a quantitative correlational approach. A sample of 40 respondents was obtained through a total sampling technique. The instruments used included the ISTB-12 to measure stigma and the M-TBQ for myths, that have undergone content validity testing and were declared valid by two experts and construct validity test yielded a Cronbach's alpha > 0.6 (reliable). The third instrument measuring medication adherence was the MARS-5, which has been validated and proven reliable. Correlation analysis was performed using the Theta (θ) test because the data was not normally distributed with an ordinal-numeric scale. The Theta test results showed a relationship between stigma and medication adherence (θ = 0.219; low correlation), while myths were not related to adherence (θ = 0.038). Stigma is proven to be associated with medication adherence, although with a low strength of relationship, while myths do not affect adherence in pulmonary TB patients.

Keywords: adherence; myth; perception; pulmonary; stigma; tuberculosis

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INTRODUCTION

Despite advancements in diagnosis and management, Pulmonary Tuberculosis (TB) remains a significant global health threat. According to World Health Organization (WHO) data, pulmonary TB was the second leading cause of death from a single infectious agent after COVID-19 in 2022, resulting in 10.6 million new cases and 1.3 million deaths (WHO, 2023). Indonesia faces the second-largest burden of pulmonary TB globally, after India, making the goal of TB elimination by 2030 highly challenging (Kementerian Kesehatan RI, 2024). One crucial obstacle in the pulmonary TB control program is ensuring patient adherence to the treatment regimen. TB therapy requires a long-term commitment, typically 6 to 9 months, involving various types of medications (WHO, 2022). Failure to adhere to this schedule can be fatal, not only for the patient, who risks relapse, treatment failure, or the development of Multi-Drug Resistant TB (MDR-TB), but it also increases the spread of the disease within the community (Alishjabana, 2017; WHO, 2022).

Beyond the biological aspects, social and cultural dimensions, which are often overlooked, also influence TB treatment adherence. Stigma toward pulmonary TB is a detrimental social phenomenon, characterized by prejudice, exclusion, and negative labeling of diagnosed individuals. This stigma can manifest as social isolation, rejection by family or the community, or loss of employment or educational opportunities (Macq et al., 2017; Sommerfeld, 2017). Patients who perceive stigma tend to hide their health status, hesitate to seek medical help, or even secretly discontinue treatment to maintain their self-image and avoid negative judgment. Research indicates

that stigma is a major barrier for patients in low-income and middle-income countries in accessing diagnosis and continuing treatment (Craig et al., 2017). In Indonesia, several studies also suggest that social stigma is a significant factor affecting TB treatment adherence, especially in environments that still regard pulmonary TB as a shameful disease or a curse (Aditama et al., 2020).

Furthermore, the spread of myths about pulmonary TB in the community also plays a role in shaping patients' attitudes toward therapy. These myths are generally not based on scientific evidence but are widely believed or disseminated through misinformation. Popular myths include the belief that pulmonary TB is caused by supernatural forces or curses, that TB medication can damage vital organs like the kidneys or liver, or that the disease can be cured without intervention from healthcare providers (Djuari et al., 2019; Pratiwi et al., 2021). Such beliefs can erode patient confidence in the effectiveness of modern medicine, encourage them to seek unproven alternative therapies, or lead to premature termination of treatment once they feel better, believing the disease has been cured or that the medication is harmful. Reliance on these myths is directly related to a low understanding of the disease and the importance of completing treatment, ultimately impacting adherence (Ansori et al., 2020).

Given the vital role of nurses in the TB control program, particularly in health education, psychosocial support, and adherence monitoring, a deep understanding of the impact of stigma and myths on patients is essential. By specifically understanding how stigma and myths affect patient behavior, nurses can develop more effective interventions, provide more relevant education, and build the trusting relationship essential to ensuring patients complete the entire course of treatment. Therefore, research examining the relationship between stigma and myths and medication adherence in pulmonary tuberculosis patients is relevant and crucial for formulating comprehensive nursing strategies and supporting TB elimination efforts in Indonesia. The objective of this study is to determine the relationship between stigma and myths and medication adherence in pulmonary tuberculosis patients in Kelurahan Cibangkong, Kota Bandung.

METHOD

This research used a quantitative correlational design to analyze the relationship between stigma and myths and medication adherence in pulmonary TB patients. The study was conducted from May to August 2025 in Kelurahan Cibangkong, which is the working area of the Ibrahim Adjie Community Health Center (Puskesmas), Kota Bandung. A total sampling technique was used, resulting in a sample size of 40 respondents.

This study consisted of independent variables (stigma and myths) and a dependent variable (medication adherence). Three instruments were used. First instrument is the questionnaire measuring stigma was the Indonesian Stigma toward Tuberculosis-12 (ISTB-12), adapted from the Tuberculosis-Related Stigma Scale (TRSS) (van Rie et al., 2008; Soemarko et al., 2023) and the Internalized Stigma of Mental Illness (ISMI) Scale (Ritsher et al., 2003). This questionnaire consists of 12 statements with 4 response options (strongly disagree, disagree, agree, and strongly agree). It has undergone content validity testing and was declared valid by two experts, namely Setya Vahani, S.Kep., Ners, M.Kep, and E. Hanny Widyalaras, S.Kep., Ners., M.Kep. The construct validity test yielded a Cronbach's alpha of 0.917 or >0.6 (reliable). The second instrument measuring myths was the Myth about Tuberculosis Questionnaire (M-TBQ). This was also declared valid by the two experts mentioned above, and the construct validity test resulted in a Cronbach's alpha of 0.755 or >0.6 (reliable). The third instrument measuring medication adherence was the Indonesian version of the Medication Adherence Rating Scale (MARS-5), which has been validated and proven reliable (Chan et al., 2020; Wiyati et al., 2024).

The number of respondents in this study was <50, so the Shapiro-Wilk normality test was used. The normality test for stigma, myths, and adherence data was not normal ($p = 0.028$; $P = 0.000$; $p =$

0.000). Correlation analysis was performed using the Theta (θ) test because the data was not normally distributed with an ordinal-numeric scale.

RESULT

Table 1.
Respondent characteristics (n= 40)

Respondent characteristics	f	%
Age		
< 20 years old	1	2,5
20-29 years old	4	10
30-39 years old	5	12,5
40-49 years old	13	32,5
≥ 50 years old	17	42,5
Gender		
Male	15	37,5
Female	25	62,5
Educational Background		
No Formal Education	0	0
Elementary School	8	20
Junior High School	6	15
Senior High School	25	62,5
Diploma	1	2,5
Bachelor's Degree or Higher	0	0
Employment		
Unemployed	18	45
Laborer / Manual Worke	5	12,5
Farmer / Breeder	0	0
Trader Merchan	9	22,5
Privare Employee	5	12,5
Civil Servant	0	0
Entrepreneur	0	0
Others	3	7,5
Duration Since TB Diagnosis		
< 1 Month	0	0
1–3 Months	6	15
4–6 Months	32	80
> 6 Months	2	5

Based on Table 1, it is known that the age group with the largest number of respondents was ≥50 years (42.5%), dominated by women (62.5%), with the highest education being high school (62.5%), those who were not working (45%), and the length of diagnosis was between 4-6 months (80%).

Table 2.
Distribution of the Frequency of Stigma, Myths, and Adherence in Taking Pulmonary Tuberculosis Medication (n= 40)

Variable	f	%
Stigma Level		
Low	0	0
Medium	16	40
High	24	6
Myth Level		
Low	1	2,5
Medium	39	97,5
High	0	0
Adherence Level		
Low	26	65
High	14	35

Based on table 2, it is known that the highest frequency of stigma is high level (60%), at medium level myth (97.5%), and low adherence (65%).

Table 3.
Level of Stigma and Myths Regarding Adherence in Pulmonary Tuberculosis Medication

Adherence	Low Stigma	Medium Stigma	High Stigma
Low	0	10	16
High	0	6	8
Adherence	Low Myth	Medium Myth	High Myth
Low	1	25	0
High	0	14	0

The stigma and myth variables use an ordinal scale, while the adherence variable uses a nominal scale, so the correlation test used is a non-parametric test, namely the Thetha test (θ) or Thetha coefficient. This test is used to examine non-linear data correlations involving absolute frequency differences (fa-fb) and the multiplication of the total frequencies of nominal subclasses (T2).
The Tetha Test Formula:

$$\theta = \frac{\sum Di = [fa-fb]}{T2}$$

Gullford criterions:

< 0,20 = no correlation
0,20 - <0,40 = low correlation
0,40 - <0,70 = medium correlation
0,70 - <0,90 = high correlation
0,90 - <1,00 = very high correlation
1,00 = perfect correlation

Based on the data in the table 3, the following are the results of the Theta test regarding the relationship between stigma and adherece in taking pulmonary tuberculosis medication:

$$\theta = \frac{\sum Di = [fa-fb]}{T2}$$

$$\theta = \frac{\sum Di = [96-80]}{24 \times 16}$$

$$\theta = \sum \frac{80}{364}$$

θ = 0,219 (low correlation)

The result of Thetha test measures the relationship between myths and adherence in taking pulmonary tuberculosis medication:

$$\theta = \frac{\sum Di = [fa-fb]}{T2}$$

$$\theta = \frac{\sum Di = [0-14]}{24 \times 16}$$

$$\theta = \sum \frac{14}{364}$$

θ = 0,038 (no correlation)

Based on the results of the Thetha test, it was found that there was a relationship between stigma and adherence in taking medication with a low relationship, and there was no relationship between myths and adherence in taking medication in pulmonary tuberculosis patients.

DISCUSSION

Respondent Characteristics

The most common age group among the study respondents was the >=50 years old category. This aligns with the research by Caraux-Paz (2021), which found that the highest number of pulmonary TB cases occur in the elderly, as there is a progressive increase with advancing age. Most TB cases in the elderly are related to the reactivation of previously dormant lesions. The resurgence of these

lesions can be caused by changes in the immune system related to aging. Consequently, the mortality rate due to pulmonary TB remains higher in elderly patients. Prihanti (2017) also reported in their article that the age group with the most pulmonary TB cases is the elderly, although the incidence of pulmonary TB in Indonesia is also high across all age groups, especially children. Nevertheless, the elderly are also at high risk of contracting the disease due to aging, leading to weakened organ and immune function, lower tolerance to medication, and low medication adherence.

Pulmonary TB cases in this study's respondents were also dominated by females, with the last education level being high school (SMA), and having an employment status of unemployed. This is consistent with Dewi's (2017) study, titled "Faktor Risiko yang Berhubungan dengan Kejadian Tuberkulosis Paru di Wilayah Kerja UPTD Puskesmas Purbaratu Kota Tasikmalaya Tahun 2023" which also found that the highest number of respondents were females, with high school as the last education level, and unemployed.

National Indonesian data from the Ministry of Health of the Republic of Indonesia (2023) indicates that the dominance of pulmonary TB cases occurs in males. However, local studies/Puskesmas/theses in several districts/provinces have found a higher proportion of pulmonary TB in females. This is often associated with social factors (access to services, education), age demographics, or the survey setting (services that better in reaching women). The higher number of females experiencing pulmonary TB may also be related to the larger female population in Indonesia, especially in Bandung.

Unemployment has a close relationship with income poverty. Families without a source of income or with low income tend to have low purchasing power, making it difficult to meet adequate nutritional needs. This lack of nutritional intake can lead to malnutrition, which subsequently weakens the immune system and makes individuals more vulnerable to various diseases, particularly pulmonary TB, although transmission is also related to environmental conditions and household crowding (Suharjo, 2016).

Levels of Stigma, Myths, and Tuberculosis Medication Adherence

The results of this study indicate that the level of stigma experienced by respondents was high, the level of myths was moderate, and the level of adherence was low. This is supported by several literatures concerning moderate-to-high levels of stigma and myths, and low adherence. Stigma against pulmonary TB patients in Indonesia has increased significantly. This is evidenced by a multi-site study by Fuadi (2024), which showed that TB patients in Indonesia reported a high burden of stigma and depression, and a significantly decreased in quality of life. A study in eastern Indonesia (East Lombok) also mentioned that social stigma is one of the biggest barriers for TB patients to seek and adhere to treatment (Suprijandani, 2025).

Myths or inaccurate understandings about pulmonary TB (e.g., cause, duration of treatment, contagiousness, and perception of medication) are also widely reported. For instance, a KAP (Knowledge-Attitude-Perception) study in Indonesia found that the community does not always have sufficient knowledge and may have misconceptions about TB. A lack of correct knowledge/perception is one of the main factors influencing treatment failure. Despite this, many Indonesians still have high levels of knowledge and attitudes, even though their perceptions of TB are moderate (Kaaffah, 2023).

Adherence to TB medication is a critical aspect for successful medication and preventing resistance. Studies in Indonesia show that many patients do not adhere to their TB medication. A study conducted by Harahap (2024) in Indonesia also reported that more than 50% of Drug-Resistant TB (DR-TB) patients in one hospital had a low adherence level. Considering that the most common age

group among the study respondents was the elderly, it is not surprising that adherence is categorized as low, as this relates to immunity, memory capacity, and the long duration of treatment.

Relationship between Stigma and Tuberculosis Medication Adherence

The results of this study show that there is a relationship between stigma and pulmonary TB medication adherence, although the strength of the relationship is weak. This is supported by Pulungan et al. (2025), whose research also found a connection between stigma and adherence to pulmonary tuberculosis treatment in Lhokseumawe City: the higher the level of self-stigma experienced by the patient, the lower their medication adherence tends to be. Herawati et al. (2020) also reported research findings indicating a relationship between family support, health worker support, and perceived stigma on medication adherence in pulmonary TB sufferers.

Nabila (2023) suggests that stigma is one of the important determinants influencing patient adherence to taking anti-tuberculosis drugs, alongside other aspects like knowledge level, attitude towards the disease, family support, motivation, side effects of treatment, and the quality of interaction with healthcare workers. In this context, stigma is not only present as a negative judgment from the environment but can also become internalized within the patient. This self-stigma often leads to complex emotional reactions, ranging from feelings of worthlessness, guilt, to diminished self-esteem due to their health condition (Eaton et al., 2019). These emotional reactions frequently evolve into shame, fear, or psychological pressure that prompts the individual to withdraw from the social environment, hesitate to seek help, or even prematurely discontinue treatment.

Furthermore, internalized stigma can trigger defensive responses, such as anger, rejection of medical advice, or other maladaptive behaviors that further impede the healing process. In some cases, this behavior manifests as persistent non-adherence to medication (Togatorop & Suratmini, 2023). These reactions demonstrate that stigma impacts not only the psychological aspect but also behavior toward medication, which is crucial for the success of pulmonary TB therapy. Perceived stigma, or an individual's perception of the community's negative views towards them, often culminates in the formation of self-stigma. In this state, the patient believes they are viewed negatively or rejected by their environment, leading to negative self-judgment that erodes self-confidence. When self-stigma develops without intervention, patients can experience significant internal barriers to carrying out therapy, including reluctance to consistently follow the treatment schedule.

Therefore, effective and continuous communication among the patient, family, and health workers is critically important. Good interaction allows the patient to gain a more realistic understanding of their disease, helps correct mistaken perceptions, and reduces the psychological burden arising from stigma. Herawati et al. (2020) emphasize that this approach becomes even more crucial for patients exhibiting high levels of perceived stigma, as this condition can directly impact their adherence to long-term medication.

In the context of pulmonary TB management, the role of the family and health personnel as sources of emotional, informational, and motivational support cannot be ignored. Through patient-needs-oriented counseling and comprehensive education about the disease and its treatment, stigma can be minimized and patient self-confidence can be strengthened. This support not only helps patients understand the importance of the treatment regimen but also improves their ability to cope with the psychological pressure that emerges during the therapy process. Thus, the active role of family and health workers in creating a supportive and stigma-free environment is a key strategy for improving medication adherence in pulmonary TB patients.

Relationship between Myths and Tuberculosis Medication Adherence

Based on the questionnaire results, one specific item reflected an inaccurate knowledge point/myth,

which was item number 8: "If a patient starts taking anti-TB medication, the transmission of TB to others stops." Consistent with the initial preliminary study at the research location, most of the residents suffering from pulmonary TB believed that if they took anti-TB drugs, they would not transmit the disease to people around them. This means that pulmonary TB sufferers were willing to take anti-TB medication but had a mistaken perception regarding the purpose of taking the medication. However, the data obtained did not show an effect in establishing a relationship with adherence. The results of this study indicate that there is no relationship between myths and adherence to tuberculosis medication.

This finding suggests that even though myths or mistaken knowledge are often seen as barriers to TB treatment, their influence on adherence is not always linear or direct. Systematic studies indicate that non-cognitive factors such as social stigma, family support, and the relationship with health services often emerge as the primary predictors of adherence. Some patients believe that TB is a hereditary and fatal disease for which there is no cure. Some respondents did not know that the conventional treatment period is 6 months and the risks they face if they stop treatment (Maura et al., 2023). Yani et al. (2022) also found that some assumed influential variables (e.g., knowledge, stigma) do not always show a significant relationship with adherence after analysis. Conversely, variables related to health behavior/self-efficacy and clinical issues were more prominent as determinants of adherence.

The limited variability in the myth data could also be a reason why no relationship was found. If most respondents in the study have a very uniform level of myths (e.g., the moderate level mentioned previously), the myth variance becomes low. Consequently, the correlational analysis may fail to capture an association with adherence. This condition is known in statistics as the floor-ceiling effect, where respondents concentrate at one level of the independent variable, making it difficult to detect a relationship with the dependent variable. Furthermore, the dominance of non-cognitive factors (medication side effects, family support, access to services, stigma) practically plays a larger role in determining adherence behavior in many settings.

Overall, this finding reinforces that medication adherence in pulmonary TB patients cannot be explained solely through the patient's knowledge aspect or the existence of myths they hold. Although some respondents still exhibited mistaken perceptions regarding transmission and the goal of therapy, this factor was not proven to have a direct influence on adherence behavior. Therefore, interventions to improve adherence should not only focus on correcting myths but also on strengthening family support, improving the quality of communication with health workers, and addressing the psychological and environmental barriers that are more dominant in determining the success of long-term therapy.

CONCLUSION

This research indicates that the majority of respondents were elderly, female, had a mid-level education, and unemployed—a group that is both biologically and socially more vulnerable to pulmonary TB. The high level of stigma, the moderate level of myths, and the low medication adherence demonstrate that psychological and social barriers remain the main challenges in pulmonary TB management. A relationship was found between stigma and adherence, although with a low strength, while myths or mistaken knowledge were not proven to be related to adherence. This finding confirms that TB patient adherence is influenced more by psychosocial factors, family support, and interaction with health workers than by knowledge alone.

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