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Duration of Illness and Stress Levels Among Pulmonary TB

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ABSTRACT

Pulmonary tuberculosis is a communicable infectious disease caused by Mycobacterium tuberculosis. The prolonged and complex treatment, disease complications, and various other concerns can induce psychological stress in patients. This study aimed to determine the relationship between the duration of illness and stress levels among pulmonary tuberculosis patients at the Kota Utara Community Health Center. This was a quantitative study utilizing a cross-sectional approach. The study population consisted of 57 pulmonary tuberculosis patients within the working area of the Kota Utara Community Health Center. A sample of 50 respondents was selected using purposive sampling. Research instruments included demographic data collection and the Perceived Stress Scale-10 (PSS-10) questionnaire. Data analysis was performed using the Spearman rank test. The majority of the sample (33 individuals, or approximately 66%) fell into the category of having suffered from the disease for more than two months. Most respondents (23 individuals, or 46%) fell into the severe stress category. Spearman's rho correlation analysis revealed a relationship between the duration of illness and stress levels among pulmonary tuberculosis patients, with a correlation coefficient of 0.714, indicating a strong positive relationship. Furthermore, a p-value of < 0.001 indicated that this relationship was statistically highly significant. The findings suggest that the longer an individual suffers from pulmonary tuberculosis, the higher their stress level tends to be. These results are expected to provide valuable input for improving the quality of healthcare services, particularly by addressing the psychological aspects of pulmonary tuberculosis patients through stress level screening.

1. INTRODUCTION

Pulmonary tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis. Although pulmonary TB is not a new disease and has existed since ancient times, it remains a major global public health concern due to its persistently high incidence. In response to this continuing burden, the World Health Organization (WHO), through the Sustainable Development Goals (SDGs), has promoted the End TB Strategy, which aims to end the global TB epidemic (Nabilla et al., 2024).

Indonesia has the second highest TB burden globally after India, with approximately 969,000 TB cases reported in 2022 (WHO, 2022). The Indonesian government has committed to achieving TB elimination by 2030 in alignment with the WHO End TB Strategy. However, despite various efforts to control the disease, substantial challenges remain in achieving the national TB elimination targets. Data from the 2022 Annual Report of the Pulmonary TB Control Program indicated that the notification coverage for new pulmonary TB cases reached 75% of the estimated incidence, suggesting that approximately 25% of cases remained undetected or unreported (Ministry of Health of the Republic of Indonesia, 2023). In addition, treatment coverage among patients with drug resistant TB (DR TB) remains inadequate, with only 51% of patients with multidrug resistant or rifampicin resistant TB (MDR/RR TB) receiving treatment (Septiani Findi et al., 2025).

Pulmonary TB can have substantial psychological consequences for patients, particularly in the form of stress. Stress may arise from various internal and external factors, including the

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prolonged duration of illness, difficulties adhering to medication regimens, the requirement to take multiple medications according to body weight, adverse effects of anti tuberculosis drugs, limited family support, and difficulties in performing daily activities (Nurjihan et al., 2024). According to Stuart's stress adaptation model, an individual's response to stress is influenced by predisposing factors and precipitating stressors involving biological, psychological, and sociocultural dimensions. Biological stressors are associated with physical and neurological conditions, whereas psychosocial stressors may be related to personality characteristics, life experiences, parenting patterns, and experiences of loss or failure (Hasanah, 2018).

Stress can be defined as the body's physiological and psychological response to pressure, threats, or significant changes in an individual's circumstances (Ramadhani et al., 2025). Among patients with pulmonary TB, stress may be reflected in difficulties managing life situations, emotional responses to pressure, reduced confidence in dealing with personal problems, diminished perceptions of positive control over life, perceptions of excessive stress burden, difficulties managing and controlling stress, feelings of loss of self control, reduced perceptions of control over life outcomes, pressure resulting from multiple demands and responsibilities, and difficulties adapting to changes in life (Handayani, 2020). Nabilla et al. (2024) reported that a substantial proportion of patients with pulmonary TB experienced stress. The study further indicated that stress was associated with several factors, including female sex, lower educational attainment, being the head of the household, longer disease duration, and treatment non adherence. However, research examining stress among patients with pulmonary TB in Gorontalo, particularly at Kota Utara Community Health Center, remains limited. Therefore, the present study was conducted to investigate this issue in this specific population and setting.

Stress associated with pulmonary TB can affect various aspects of patients' lives, including their quality of life. Persistent and inadequately managed stress may contribute to psychological problems such as anxiety and depression, causing patients to feel overwhelmed by their illness and potentially impairing their overall quality of life, including interpersonal and social relationships (Anari, 2024). Several factors may contribute to stress among patients with pulmonary TB. The prolonged course of illness and extended treatment duration, combined with adverse effects of anti tuberculosis drugs such as fatigue and nausea, may exacerbate psychological distress. In addition, occupational demands and concerns about transmitting the disease to others may further increase psychological pressure. These factors are interrelated and may collectively contribute to higher levels of stress among patients with pulmonary TB (Ramadhani et al., 2025).

The prolonged course of pulmonary TB can significantly interfere with patients' daily lives because treatment generally requires a relatively long period, with a standard duration of at least six months. During this period, patients may experience physical, psychological, and social difficulties that affect their ability to perform daily activities. The lengthy treatment process may also lead to boredom and reduce treatment adherence, particularly when patients perceive themselves as having recovered before completing the prescribed regimen. This problem may be further exacerbated by adverse effects of anti tuberculosis drugs, including nausea, vomiting, fatigue, dizziness, pruritus, joint pain, paresthesia, and reddish discoloration of the urine. The prolonged treatment period and associated adverse effects may consequently increase psychological stress among patients with pulmonary TB (Djabutafuan et al., 2023).

Stress can also activate the hypothalamic pituitary adrenal axis, resulting in increased cortisol secretion. Excessive and prolonged cortisol exposure may impair immune function, increase blood pressure, contribute to cardiovascular risk, and disrupt glucose metabolism (Nursadrina et al., 2025). Nurjihan et al. (2024) reported that patients with a longer duration of pulmonary TB tended to experience higher levels of stress. The diagnosis of TB may initially cause psychological shock, followed by a prolonged period of adjustment as patients undergo months of treatment and cope with the demands associated with the disease. The duration of illness is therefore an important factor that may influence stress among patients with pulmonary TB. Previous findings indicate that the longer an individual has lived with pulmonary TB, the higher the level of stress experienced (Nabilla et al., 2024). Nurjihan et al. (2024) categorized disease duration into two groups, namely two months or less and more than two months. Stress may be

understood as a state of tension, psychological pressure, or internal conflict that can arise from external demands. It reflects an interaction between an individual and their environment in which perceived demands may exceed the individual's biological, psychological, and social resources for adaptation. Based on the aforementioned considerations, the present study aimed to investigate the relationship between disease duration and stress levels among patients with pulmonary TB at Kota Utara Community Health Center, Gorontalo City.

2. METHOD

This study employed a quantitative research design with a cross-sectional approach. The study population consisted of 57 patients with pulmonary tuberculosis (TB) within the working area of the Kota Utara Community Health Center (Puskesmas). A sample of 50 respondents was selected using purposive sampling based on the following inclusion criteria: pulmonary TB patients undergoing anti-tuberculosis drug (OAT) treatment (for at least one week) at the Kota Utara Community Health Center, residents of the center's service area, and willingness to participate. Exclusion criteria included pulmonary TB patients with comorbidities and those not present at the location during the study period. The research instruments consisted of a demographic data form and the Perceived Stress Scale-10 (PSS-10) questionnaire. The instrument demonstrated a Cronbach's alpha validity value of 0.960 and a reliability value of 0.804; thus, all questionnaire items were deemed suitable for use. Scores were aggregated and categorized into stress levels as follows: mild stress (total score 0–13), moderate stress (total score 14–26), and severe stress (total score 27–40). The duration of the illness was calculated from the time of initial diagnosis to the time of the study. Data analysis was performed using the ordinal-scale Spearman rank test via SPSS version 31. All respondents provided informed consent prior to participating in the study.

3. RESULT AND DISCUSSION

Results

Table 4.1 Distribution of Respondents by Age

No	Age (years)	N	%
1	Early Adolescence (12–16 years)	2	4
2	Late Adolescence (17–25 years)	13	26
3	Early Adulthood (26–35 years)	9	18
4	Late Adulthood (36–45 years)	7	14
5	Early Elderly (46–55 years)	6	12
6	Late Elderly (56–65 years)	6	12
7	Senior Citizens (>65 years)	7	14
	Amount	50	100

Source: Primary data, 2026

Based on Table 4.1, which presents the distribution of respondents by age according to the Indonesian Ministry of Health (2009), it is evident that out of the total 50 respondents, the largest group falls into the late adolescence category (17–25 years), comprising 13 respondents (26%). Conversely, the smallest number of respondents falls into the early adolescence category (12–16 years), with only 2 respondents (4%).

Table 4.2 Distribution of Respondents by Gender

No	Gender	N	%
1	Male	24	48
2	Female	26	52
	Amount	50	100

Source: Primary data, 2026

Table 4.3 Distribution of Respondents by Marital Status

No	Marital status	N	%
1	Not Married	17	34
2	Married	33	66
Amount		50	100

Source: Primary data, 2026

Based on Table 4.3, the distribution of respondents by marital status shows that the majority are married (33 individuals, or 66%), while the remaining 17 individuals (34%) are unmarried.

Table 4.4 Distribution of Respondents by Education

No	Education	N	%
1	Elementary School	13	26
2	Junior High School	4	8
3	Senior High School	23	46
4	Higher Education	10	20
Amount		50	100

Source: Primary data, 2026

Based on Table 4.4, the distribution of respondents by education level shows that the majority of respondents completed high school (SMA), totaling 23 individuals (46%), while a small proportion completed junior high school (SMP), totaling 4 individuals (8%).

Table 4.5 Distribution of Respondents by Occupation

No	Work	N	%
1	Homemaker	15	30
2	Unemployed	10	20
3	Contract Worker	1	2
4	Civil Servant	4	8
5	Farmer	7	14
6	Pensioner	2	4
7	University Student	2	4
8	Government Contract Employee (P3K)	1	2
9	Laborer	3	6
10	Student	3	6
11	Entrepreneur/Self-employed	2	4
Amount		50	100

Source: Primary data, 2026

Based on Table 4.5, the distribution of respondents by occupation shows that the majority were housewives (15 individuals or 30%), while a small minority were contract workers (honorer) and government employees with work agreements (P3K), comprising only one individual (2%) each.

Table 4.6 Distribution of Respondents by Duration of Illness

No	Long-term Suffering	N	%
1	≤2 months	17	34
2	>2 months	33	66
Amount		50	100

Source: Primary data, 2026

Table 4.6 shows the distribution of respondents based on the duration of the condition. Of the 50 respondents, the majority fell into the category of having suffered from the condition for more than two months—specifically 33 individuals, or approximately 66% of the total.

Table 4.7 Distribution of Respondents Based on Stress Level

No	Stress Level	N	%
1	Mild stress	5	10
2	Moderate stress	22	44
3	Severe stress	23	46
	Amount	50	100

Source: Primary data, 2026

Table 4.7 presents the distribution of respondents based on their experienced stress levels. Of the 50 total respondents, the majority fell into the severe stress category (23 individuals or 46%), while a small minority fell into the mild stress category (only 5 individuals or 10%).

Discussion

Duration of Pulmonary TB Illness

The study results indicate that the duration of pulmonary TB illness was categorized into two groups: ≤2 months and >2 months. The findings show that the majority of respondents fell into the >2-month category (33 individuals or 66%), while 17 individuals (34%) fell into the ≤2-month category. These results indicate that the majority of patients had been undergoing treatment for a considerable period and were in the continuation phase of therapy. This suggests that most respondents had experience with pulmonary TB treatment, including aspects such as medication adherence, experienced side effects, and changes in health status during therapy.

Pulmonary TB treatment lasts a minimum of six months, comprising an intensive phase of two months and a continuation phase of four months. This treatment duration may be extended depending on the patient's condition, reflecting a relatively long period of illness that requires high adherence to therapy (Ministry of Health, 2025). These findings align with research by Dwiningrum et al. (2021), which reported a higher number of pulmonary TB patients in the >2-month illness duration category compared to the ≤2-month category. This is further supported by research conducted by Putri & Herdiningrat (2025), who found more patients undergoing continuation-phase treatment (illness duration >2 months) than intensive-phase treatment (illness duration ≤2 months).

Regarding the remaining results, 17 respondents (34%) had an illness duration of ≤2 months. This indicates that these respondents were still in the early stages of treatment and likely in the process of adapting to their diagnosis and the prescribed therapy. At this stage, patients generally have not yet fully experienced the long-term impacts of treatment, whether physical or psychological. The Theory of Planned Behavior explains that individual behavior is influenced by attitudes, subjective norms, and perceived behavioral control. In the context of respondents with an illness duration of ≤2 months, the patients were still in the initial phase of treatment and the process of adapting to the diagnosis and therapy. During this phase, attitudes toward treatment are still evolving, as patients have not yet fully experienced the long-term impact of the disease. Furthermore, perceptions of behavioral control tend to remain positive because patients feel capable of adhering to the treatment regimen; consequently, adherence behavior is driven more by the hope of recovery, even though the adaptation process has not yet fully stabilized (Argista et al., 2024). These findings align with research by Syamsuddin et al. (2025), which observed a higher number of patients in the intensive treatment phase (illness duration ≤2 months) compared to the continuation phase (illness duration >2 months). This is further supported by Kinanti et al. (2025), who identified pulmonary TB patients falling into the category of having been ill for ≤2 months. The study results indicate that the majority of respondents had been ill for >2 months, while a smaller proportion had been ill for ≤2 months.

The researchers hypothesize that the predominance of respondents ill for >2 months reflects the nature of the pulmonary TB treatment program, which requires routine monitoring

over a specific period; patients undergoing longer treatment are more likely to be recorded and participate as respondents. Conversely, the low number of patients with an illness duration of ≤2 months may be attributed to delays in detecting new cases or a limited number of newly diagnosed patients during the data collection period. The majority of respondents were in the continuation phase of treatment. This indicates that patients had been undergoing therapy for a relatively long time, thereby frequently encountering various challenges throughout the treatment process. A prolonged therapy duration not only demands medication adherence but also increases the risk of "treatment fatigue"—a state where patients begin to feel weary of the protracted treatment routine. Additionally, side effects of anti-tuberculosis drugs (OAT), activity restrictions, social stigma, and uncertainty regarding treatment success can heighten the patient's psychological burden. Such conditions have the potential to impact mental well-being and elevate stress levels during the course of treatment.

Stress Levels of Pulmonary TB

Research on stress levels in pulmonary TB patients indicates that the majority of respondents experienced moderate to severe stress. Of the 50 respondents, 5 (10%) experienced mild stress, 22 (44%) experienced moderate stress, and 23 (46%) experienced severe stress. These results indicate that the majority of pulmonary TB patients experienced significant psychological distress during treatment. Twenty-three respondents experienced severe stress, indicated by an inability to control life situations, emotional reactions to pressure, a lack of confidence in dealing with personal problems, and a lack of self-control. These emotional reactions, including feelings of anxiety, fear, sadness, and irritability, emerged in response to the stress experienced. These conditions reflect a significant psychological burden that impacts an individual's ability to think clearly and make adaptive decisions.

Severe stress is stress that persists for weeks to years. Reactions to this level of stress include severe digestive disorders, increased heart rate, shortness of breath, tremors, increased feelings of anxiety and fear, and mild confusion and panic. Examples of stressors that can lead to severe stress include financial difficulties and long-term physical illness (Lestari, 2025). The results of this study align with research conducted by Agusthia et al. (2023), which stated that more patients experienced severe stress than mild stress. This is supported by another study conducted by Kurniyawan et al. (2022), which found that the higher the stress level, the lower the patient's ability to control themselves and manage their lives, resulting in an inability to control life situations and a low perception of positive control.

A total of 22 respondents experienced moderate stress, indicated by a lack of ability to manage and control stress, a lack of adaptability to life changes, and a lack of ability to cope with pressure due to numerous demands and responsibilities. This condition indicates that individuals are beginning to experience disturbances in psychological functioning, particularly in terms of emotional regulation and coping skills when faced with stressors. The inability to manage stress effectively can lead individuals to use less adaptive coping mechanisms, such as avoiding problems, withdrawing from social environments, or delaying problem-solving. This can worsen psychological conditions and increase the risk of developing more severe stress if not addressed promptly. Moderate stress can cause symptoms such as irritability, overreaction to situations, difficulty resting, feeling tired due to anxiety, impatience when delayed or interrupted, irritability, restlessness, and an inability to tolerate any obstacles while working. This condition indicates an increased emotional and physiological response to perceived pressure, leading individuals to experience a decline in self-control and difficulty maintaining concentration and emotional stability. Furthermore, moderate stress can also impact the quality of social interactions and daily productivity. Although individuals still have the ability to adapt, more effective coping strategies are needed to prevent severe stress from developing (Nasution, 2022).

These results align with research by Nofalia & Wibowo (2023), who found moderate stress to be the second highest compared to mild and severe stress. This is also supported by research by Dewi et al. (2024), who found that pulmonary TB patients experienced moderate stress. Five respondents experienced mild stress, as indicated by a perception of excessive stress burden, a perception of positive control over life, and a perception of control over life outcomes. This

indicates that although respondents felt stressed, they still had the ability to manage their emotions and situations effectively, so that the stress experienced did not significantly disrupt daily functioning. Furthermore, a positive perception of control over life also reflects respondents' confidence in their ability to overcome problems, which can be a protective factor against escalating levels of more severe stress.

Mild stress is a common condition experienced by every individual in everyday life, such as when facing criticism or facing specific activity demands. This condition usually lasts for a short time, only a few minutes to hours, and is characterized by heightened alertness and energy, alongside physiological responses such as mild fatigue, digestive issues, and a lack of relaxation. Nevertheless, mild stress is adaptive; it can spur individuals to think more effectively, boost motivation, and strengthen their ability to cope with life's challenges. Furthermore, at this level, individuals generally maintain a strong sense of control over themselves and their lives, enabling them to effectively manage their emotions and the situations they face. Consequently, mild stress does not significantly impair daily functioning; instead, it can serve as a protective factor, helping individuals prevent stress from escalating to more severe levels (Sitohang, 2023).

These findings align with research conducted by Ramadhani et al. (2025), which identified respondents experiencing mild stress. This is further supported by Rachman et al. (2025), who found that fewer individuals experienced mild stress compared to other stress levels. Based on these results—and supported by theory and prior research—the researchers posit that the stress levels observed in pulmonary TB patients stem from a combination of biological, psychological, and social factors encountered during treatment. The researchers also hypothesize that the majority of respondents in the moderate and severe stress categories likely experienced physical and emotional exhaustion due to medication side effects and changes in health status that restricted their daily activities.

Relationship Between Duration of Illness and Stress Levels Among Pulmonary TB

Spearman's rho correlation analysis demonstrated a significant relationship between the duration of illness and stress levels among patients with pulmonary TB. The correlation coefficient of 0.714 indicates a strong positive correlation, suggesting that patients with a longer duration of illness tend to experience higher levels of stress. The statistical significance of $p < 0.001$ confirms that this association is highly significant. These findings indicate that the duration of pulmonary TB is an important factor associated with patients' psychological well being. Clinically, the strength of this correlation suggests that prolonged exposure to the demands of the disease and its treatment may increase psychological distress. Therefore, psychological assessment and support should be considered an integral component of pulmonary TB management alongside pharmacological treatment

The duration of illness among patients with pulmonary TB is closely associated with the length of treatment required. Patients must undergo continuous treatment until they achieve the prescribed therapeutic outcome. Standard pulmonary TB treatment consists of an intensive phase of approximately two months followed by a continuation phase of approximately four months, resulting in a minimum treatment duration of six months. This prolonged treatment period requires patients to maintain consistent adherence to the prescribed medication regimen to achieve treatment success (Sari et al., 2022). During this period, pulmonary TB may affect both the physical and psychological well being of patients. Physical manifestations may include weight loss, fatigue, pain, sleep disturbances, and reduced physical activity and mobility resulting from impaired pulmonary function, which can ultimately reduce quality of life. At the same time, patients may experience psychological problems such as anxiety, stress, and depression, accompanied by feelings of helplessness, loss of independence, and decreased self confidence. The prolonged treatment process may further aggravate these psychological difficulties, demonstrating the interconnected nature of the physical and psychological consequences of pulmonary TB and the need for comprehensive patient management (Illona et al., 2020).

These findings can be interpreted within the framework of stress theory proposed by Charles D. Spielberger (1972), which conceptualizes stress as an individual's physical and psychological response to external demands or environmental stimuli perceived as threatening.

In the context of pulmonary TB, the duration of illness may function as a persistent stressor because patients are continuously exposed to the demands of the disease, prolonged treatment, medication related adverse effects, limitations in daily activities, and potential social consequences. Prolonged exposure to these stressors may increase the psychological burden experienced by patients and contribute to progressively higher levels of stress (Fadilla et al., 2024).

The present findings are consistent with previous studies demonstrating an association between the duration of pulmonary TB and patients' stress levels. Nabilla et al. (2024) reported that patients with a longer duration of illness tended to experience higher levels of stress. Prolonged illness may increase both physical and psychological burdens in daily life, while persistent treatment demands may negatively affect quality of life and contribute to anxiety and feelings of hopelessness. Similarly, Fiamanda and Widyaningsih (2024) reported a significant association between treatment duration and stress levels among patients with pulmonary TB. This finding is further supported by Nurjihan et al. (2024), who identified a significant relationship between the duration of illness and stress levels in patients with pulmonary TB. Akbar et al. (2025) also reported a significant association between treatment duration and stress levels, further strengthening the evidence that prolonged exposure to the disease and its treatment may contribute to psychological distress.

The strong positive correlation observed in this study suggests that the psychological burden of pulmonary TB may accumulate over the course of the illness. During the early stages following diagnosis, patients may experience mild to moderate stress as they adjust to the diagnosis, treatment regimen, and changes in their daily routines. As treatment progresses, however, the continuous demands of long term medication, adverse effects of anti tuberculosis drugs, restrictions on daily activities, and changes in social and occupational roles may contribute to cumulative psychological stress. Consequently, stress levels may increase over time, particularly among patients who have limited coping resources or inadequate social support. Coping abilities, family support, and patients' knowledge and understanding of pulmonary TB may also play important roles in determining how individuals respond to the demands associated with prolonged illness.

Nevertheless, the observed correlation should not be interpreted as evidence that disease duration is the sole determinant of stress levels. Psychological distress among patients with pulmonary TB is multifactorial and may also be influenced by age, sex, educational level, occupation, socioeconomic status, family support, adverse effects of anti tuberculosis drugs, comorbidities, and social stigma. These variables were not examined in the present study and may therefore act as potential confounding factors. The absence of adjustment for these factors represents an important limitation and should be considered when interpreting the strength of the observed association. Future studies should consider incorporating these variables into multivariable analyses to determine the independent contribution of disease duration to stress levels among patients with pulmonary TB.

4. CONCLUSION

The majority of patients with pulmonary tuberculosis at Kota Utara Community Health Center had been undergoing treatment for more than two months and experienced moderate to severe levels of stress. A strong, positive, and statistically significant correlation was identified between the duration of illness and stress levels, as indicated by Spearman's rho correlation coefficient of 0.714 ($p < 0.001$). These findings suggest that a longer duration of pulmonary tuberculosis is associated with greater psychological distress among patients. Therefore, comprehensive pulmonary tuberculosis management should extend beyond pharmacological treatment to include routine psychological assessment and appropriate psychosocial support, particularly for patients undergoing prolonged treatment. Further studies incorporating potential confounding factors, such as socioeconomic status, family support, treatment related adverse effects, comorbidities, and social stigma, are warranted to better elucidate the factors contributing to stress among patients with pulmonary tuberculosis.

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