

Determinants of Pulmonary Tuberculosis Incidence at Laantula Jaya Health Center, Morowali District

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ABSTRACT

In 2019, there were 543,874 cases of pulmonary tuberculosis (TB) reported in Indonesia. Palu City recorded the highest number with 740 cases. However, other regions such as Banggai Laut and North Morowali also showed relatively high figures, with 119 and 203 cases, respectively. In Morowali Regency, pulmonary TB cases were also high, particularly in the working area of Laantula Jaya Health Center, where approximately 479 cases were reported in 2024. This study employed a quantitative design with a cross-sectional approach. The sample consisted of 83 respondents selected randomly. Data were analyzed using univariate and bivariate analyses with Chi-square test as the statistical reference. The results of univariate and bivariate analyses indicated a significant association between smoking habits ($p = 0.000$) and history of contact with TB patients ($p = 0.000$) and the incidence of pulmonary TB. Meanwhile, alcohol consumption ($p = 0.192$) showed no significant association with pulmonary TB incidence at Laantula Jaya Health Center, Morowali Regency. Therefore, intensive and sustainable health education programs on TB prevention are required, particularly concerning cough etiquette and smoking cessation. In addition, strengthening screening and contact tracing, as well as intensifying active surveillance, is crucial in TB control efforts.

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INTRODUCTION

Tuberculosis (TB) remains one of the major global public health concerns, particularly in developing countries such as Indonesia. It is caused by infection with *Mycobacterium tuberculosis*, which most commonly attacks the lungs and is transmitted through droplets from patients with smear-positive pulmonary TB (Rahayu, 2024).

According to the Global Tuberculosis Report 2024, there were approximately 10.6 million TB cases worldwide, with 1.3 million deaths, including those among HIV-positive patients. Drug-resistant TB (MDR/RR-TB) cases were reported at 410,000, while an estimated 3 million cases remain undiagnosed (WHO, 2024). Indonesia is among the five countries with the highest TB burden, with an estimated 1.06 million cases in 2023 and about 134,000 TB-related deaths annually (WHO, 2024).

This situation is also reflected in Central Sulawesi, where 5,741 pulmonary TB cases were recorded in 2019, with Palu City reporting the highest number (740 cases). More recent data indicate that in Morowali

District, particularly in the working area of Laantula Jaya Primary Health Center, 479 pulmonary TB cases were reported in 2024, showing that TB remains a significant public health problem at the local level.

Several factors have been associated with an increased risk of pulmonary TB. Studies in Indonesia have shown that smoking nearly doubles the risk of developing TB (Krismahardi, 2024), while alcohol consumption has been proven to reduce treatment effectiveness and increase the risk of failure in sputum conversion from positive to negative (Olys et al., 2016). In addition, household contact with active pulmonary TB patients increases the risk of transmission by up to 4–5 times (Efriza et al., 2023).

Given the high TB burden in the working area of Laantula Jaya Primary Health Center and the presence of significant risk factors such as smoking, alcohol consumption, and household contact, it is important to investigate the factors associated with the occurrence of pulmonary TB in this area.

METHOD

This study employed an analytic observational method with a cross-sectional approach to identify factors associated with the incidence of pulmonary tuberculosis. The research was conducted in the outpatient waiting room of Laantula Jaya Primary Health Center, Morowali District, Central Sulawesi, from July to August 2025. The study population consisted of 479 outpatients recorded at the health center in 2024. The sample size was determined using the Slovin formula with a 10% margin of error, resulting in 83 respondents, selected through simple random sampling.

The instruments used in this study included a structured questionnaire to obtain primary data, a camera for documentation during field activities, and SPSS software for data processing and analysis. Data sources consisted of primary data collected directly from respondents, secondary data obtained from medical records and official reports of Laantula Jaya Primary Health Center, and tertiary data gathered from previous studies as supporting evidence.

Data were analyzed using SPSS software. Univariate analysis was conducted to describe the frequency distribution of each variable, while bivariate analysis using the Chi-square test was performed to determine the relationship between smoking habits, alcohol consumption, and household contact with the incidence of pulmonary tuberculosis.

RESULTS

1) Respondent Characteristics Analysis

a) Distribution of Respondents by Gender

Gender		
	f	%
Male	50	60,2
Female	33	39,8
Total	83	100,0

Source: Primary Data, 2025

b) Distribution of Respondents by Age

Age		
	f	%
6-19	10	12,0
20-33	22	33,7
34-46	20	16,9
47-60	13	15,7
>60	18	21,7
Total	83	100,0

Source: Primary Data, 2025

c) Distribution of Respondents by Last Education Level

Last Education Level		
	f	%
SD	34	41,0
SMP	6	7,2
SMA	43	51,8
Total	83	100,0

Source: Primary Data, 2025

2) Univariate Analysis

a) Distribution of Respondents by TB Status

TB Status		
	f	%
Positif TB	23	27,7
Negatif TB	60	72,3
Total	83	100,0

Source: Primary Data, 2025

b) Distribution of Respondents Based on Smoking Habit

Smoking Habits		
	f	%
Smoker	39	47,0
Non Smoker	44	53,0
Total	83	100,0

Source: Primary Data, 2025

c) Distribution of Respondents Based on Alcohol Consumption

Alcohol Consumption		
	f	%
Yes	19	22,9
No	64	77,1
Total	83	100,0

Source: Primary Data, 2025

d) Distribution of Respondents Based on Contact History

Contact History		
	f	%
History of Close Contact	44	53,0
No Contact History	39	47,0
Total	83	100,0

Source: Primary Data, 2025

3) Bivariate Analysis

a) Smoking Habits

Smoking Habits	TB Status						<i>p Value</i>
	Positif		Negatif		Total		
	f	%	f	%	f	%	
Yes	20	87.0	19	31,7	39	47.0	0,000
No	3	13,0	41	68.3	44	53.0	
Total	23	27.7	60	72.3	83	100.0	

Source: Primary Data, 2025

b) Alcohol Consumption

Alcohol Consumption	TB Status						<i>p Value</i>
	Positif		Negatif		Total		
	f	%	f	%	f	%	
Yes	8	34,8	11	57.9	19	22,9	0,192
No	15	65,2	49	76.6	64	77,1	
Total	23	27.7	60	73.3	83	100.0	

Source: Primary Data, 2025

e) Riwayat Kontak Contact History

Contact History	TB Status						<i>p Value</i>
	Positif		Negatif		Total		
	f	%	f	%	f	%	
History of Close Contact	23	52,3	21	47,7	44	53,0	0,000
No Contact History	0	00.0	39	100.0	39	47.0	
Total	23	27,7	60	72,3	83	100.0	

Source: Primary Data, 2025

DISCUSSION

1. The Relationship between TB Status and Smoking Habits

The results of the study at Laantula Jaya Health Center showed a significant relationship between smoking habits and the incidence of pulmonary TB. Smoking prevalence remains high in this area, especially among adult men, most of whom work in the plantation and mining sectors. Smoking is often perceived as part of daily life and a means of social interaction, making it difficult to quit. This finding confirms that smoking plays a role in increasing the risk of Mycobacterium tuberculosis infection by damaging the cilia of the respiratory tract and weakening the body's defense system. This result is consistent with the findings of Tandang et al. (2018) in Kupang City and Suharmanto et al. (2023) in South Lampung, which revealed that active smokers are at a higher risk of developing TB compared to non-smokers. Similarly, Lubisa et al. (2025) found a significant association between smoking behavior and pulmonary TB, concluding that longer smoking duration increases TB risk and delays recovery. Thus, both active and passive smoking contribute significantly to TB transmission in the Laantula Jaya Health Center community.

2. The Relationship between TB Status and Alcohol Consumption

The study conducted at Laantula Jaya Health Center found no significant relationship between alcohol consumption and the incidence of pulmonary TB. The low prevalence of alcohol consumption in this area may be influenced by social, cultural, and economic factors, as the community tends to prioritize basic needs over purchasing alcohol, which is considered a non-essential item. In addition, limited access to alcoholic beverages in rural areas further reduces alcohol consumption among residents.

These findings are in line with Rostina (2019) in South Sulawesi, who also reported no significant association between alcohol consumption and pulmonary TB, as other risk factors such as smoking exposure, nutritional status, and household crowding were more dominant. However, this result contrasts with Abdillah (2022), who found alcohol consumption to be a significant risk factor for TB. This indicates that in the local context of Laantula Jaya, alcohol consumption is not a major factor influencing TB transmission.

3. The Relationship between TB Status and Contact History

This study found a significant relationship between a history of close contact with TB patients and the incidence of pulmonary TB at Laantula Jaya Health Center. Close contact, whether within the household or social interactions, was identified as a key factor accelerating disease transmission. Overcrowded housing and poor ventilation in this area further increased the risk of TB spread among family members. This situation is exacerbated by the community's low awareness of cough etiquette, mask use, and the importance of maintaining distance from TB patients.

These findings are supported by Susanti et al. (2021), who reported that individuals with a history of close contact had a higher risk of contracting TB compared to those without such contact. WHO also notes that nearly half of TB cases worldwide are transmitted through household contact. Therefore, close contact history is a significant factor in TB incidence in the Laantula Jaya Health Center area, particularly among residents living in crowded settlements with poor sanitation and limited ventilation.

CONCLUSION

Based on the distribution of questionnaires that have been previously described regarding the factors associated with the incidence of pulmonary TB at Laantula Jaya Health Center, Morowali Regency, several conclusions can be drawn:

1. There is a significant relationship between pulmonary TB incidence and smoking habits at Laantula Jaya Health Center, indicating that smoking behavior plays a role in increasing the risk of pulmonary TB.
2. There is no relationship between pulmonary TB incidence and alcohol consumption at Laantula Jaya Health Center, showing that alcohol consumption does not have a significant effect on the incidence of pulmonary TB.
3. There is a significant relationship between pulmonary TB incidence and contact history at Laantula Jaya Health Center, confirming that direct or indirect exposure to TB patients is an important factor in the transmission of pulmonary TB.

In conclusion, the findings of this study emphasize the importance of strengthening TB prevention efforts by focusing on smoking behavior and close contact tracing. Future studies are recommended to further explore other social and environmental factors that may influence TB incidence in this region.

Suggestions

Based on the findings of this study, several suggestions are proposed. First, it is necessary to strengthen health education programs that are intensive and continuous, particularly concerning TB prevention, cough etiquette, and smoking cessation. Such education should be adapted to the cultural and social characteristics of the local community. Second, health centers need to intensify active surveillance activities, including contact tracing of TB patients and routine screening in high-risk communities, especially in plantation areas and densely populated settlements. Third, TB prevention and control should not only be the responsibility of the health sector but also require cross-sectoral collaboration, involving education, social, and village government sectors through community-based programs. Finally, given the challenging geographical conditions in Laantula Jaya, the establishment of mobile health posts or the deployment of village TB volunteers is essential to improve access to health services for communities living in remote or hard-to-reach areas.

REFERENCES

- [1] Abdillah, R., Nugroho, S. W., & Prasetyo, A. (2022). Hubungan Konsumsi Alkohol terhadap Kejadian Tuberkulosis Paru di Kabupaten Sampang. *Jurnal Kesehatan Lingkungan Indonesia*, 21(2), 104–110
- [2] Efriza, Irma, R., & Akbar, F. (2023). Hubungan Riwayat Kontak Dengan Kejadian Tuberkulosis Di Indonesia (Studi Meta-Analysis). *Jurnal Puclic Health*, 10(1), 17–24.
- [3] Krismahardi, A. (2024). Risiko Kepadatan Hunian, Kebiasaan Merokok dan Riwayat Kontak terhadap Kasus Tuberkulosis Paru di Indonesia: Meta Analisis. *Buletin Keslingmas*, 43(1), 33–40. <https://doi.org/10.31983/keslingmas.v43i1.11306>
- [4] Lubisa, M. E., Lukito, A., Dianitha, E., Yuridzak, A., & Kirame, G. Y. (2025). Hubungan Perilaku Merokok dengan Kejadian Penyakit Tuberkulosis Paru di Wilayah Kerja UPT Puskesmas Medan Teladan. *Jurnal Kesehatan Deli Sumatera*, 3(1).
- [5] Olys, Suprihati, Widjanarko, B., Suharyo, H., & Lukmono, D. T. (2016). Faktor Risiko Gagal Konversi Pengobatan Penderita Baru Tuberkulosis Paru Fase Intensif (Studi di Kota Bandar Lampung). *Jurnal Epidemiologi Kesehatan Komunitas*, 1(2), 89–95.
- [6] Rahayu, O. N. F. D. A. (2024). Faktor Risiko Mycobacterium Tuberculosis, Kepadatan Hunian dan Kualitas Fisik Rumah Penderita TB Paru. *Jurnal Ilmu Kesehatan Masyarakat*, 13(02), 158–165. <https://doi.org/10.33221/jikm.v13i02.2742>
- [7] Rostina, R., Ahmad, N. A., & Hasrul, H. (2019). Analisis Faktor Risiko Kejadian Tuberkulosis Paru di Wilayah Pesisir Sulawesi Selatan. *Jurnal Kesehatan Masyarakat*, 15(3), 241–248.
- [8] Suharmanto, S., et al. (2023). Kebiasaan Merokok Berhubungan dengan Kejadian TB Paru di Wilayah Kerja UPTD Puskesmas Tanjung Agung. *Jurnal Penelitian dan Pengembangan Pelayanan Publik (JPPP)*, 6(3). Retrieved from: <https://jurnal.globalhealthsciencegroup.com/index.php/JPPP/article/view/2424>
- [9] Susanti, D., Sari, N., & Hendrawati, D. (2021). Faktor Risiko Penularan Tuberkulosis Paru di Lingkungan Rumah Tangga. *Jurnal Kesehatan Masyarakat*, 9(2), 145–152.
- [10] Tandang, F., Amat, A. L. S., & Pakan, P. D. (2021). Hubungan Kebiasaan Merokok pada Perokok Aktif dan Pasif dengan Kejadian Tuberkulosis Paru Di Puskesmas Sikumana Kota Kupang. *Cendana Medical Journal, Universitas Nusa Cendana*, 15(3), 382–390.
- [11] WHO. (2025, July 1). Strengthening TB surveillance to accelerate Indonesia’s path to elimination. World Health Organization Indonesia