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Original Research

Factors That Affect the High Incidence of Pulmonary Tuberculosis

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Abstract

Background: Indonesia ranks second globally in the burden of tuberculosis (TB), following India. The World Health Organization (WHO) estimates 969,000 TB cases in Indonesia, with 717,941 officially reported. In 2022, TB case detection increased significantly across health facilities, involving 97% of health centers, 85% of government hospitals, and over 80% of private hospitals, indicating the continued urgency of TB control efforts.
Objective: This study aims to identify the contributing factors to the incidence of pulmonary tuberculosis in the working area of the Tamalatea Health Center, Jeneponto Regency.
Methods: This research employed a descriptive design involving 30 respondents selected through purposive sampling. Data were collected using structured observation sheets and analyzed descriptively to identify the influence of socioeconomic, knowledge, and environmental sanitation factors on TB incidence.
Results: The majority of respondents (96.7%) were classified as having low socioeconomic status. In terms of knowledge, 93.3% had good awareness of pulmonary TB, while 6.7% demonstrated low knowledge. Regarding environmental sanitation, 86.7% lived in homes with good conditions, while 13.3% lived in environments considered poor in sanitation.
Conclusion: Low socioeconomic status appears to be the most dominant factor influencing the incidence of pulmonary tuberculosis in this area. It is recommended that local government strengthen the empowerment of both human and natural resources to improve community income and reduce TB vulnerability.
Keywords: Environment; Knowledge; Risk Factor; Socioeconomic; Tuberculosis

Introduction

Pulmonary tuberculosis (TB) is a chronic infectious disease that remains a major global public health problem. Caused by the bacterium *Mycobacterium tuberculosis*, TB is primarily transmitted through the air and mainly affects the lungs, although it may also involve other organs (Nurdin et al., 2023). This bacterium thrives in poor environmental conditions, particularly in crowded, poorly ventilated, and humid living spaces, and its transmission is exacerbated by poverty, limited access to healthcare, and low public awareness. In individuals with weakened immune systems, latent TB infection can develop into active disease, leading to serious health outcomes (Mashuri et al., 2020).

Globally, the impact of TB is profound. The World Health Organization (WHO) has declared TB a global health emergency since 1993. According to the *Global Tuberculosis Report* (2022), approximately one-third of the world's population is infected with *Mycobacterium tuberculosis*. WHO estimates suggest that by 2030, nearly 1 billion new infections will occur and 70 million people may die from TB-related causes (Barokah, 2020).

Indonesia ranks second globally in TB burden, following India. According to WHO estimates in 2022, there were 969,000 TB cases in Indonesia, with a case notification rate of 717,941 (Ministry of Health, 2023). The national increase in TB case detection was recorded across various healthcare facilities: 97% of public health centers, 85% of

government hospitals, and 82% of private hospitals contributed to TB case reporting (Directorate General of Disease Prevention and Control, 2023).

Regionally, South Sulawesi Province is among the provinces with a high TB burden. In 2021, there were 31,022 estimated TB cases in the province, with only 47.7% (14,808 cases) reported. In 2022, the number rose significantly to 21,660 cases, reflecting a 68.3% increase. Specifically in Gowa Regency, TB cases surged to 11,778 in 2022 from approximately 7,000 cases before the COVID-19 pandemic an increase of nearly 40% (Gowa Health Office, 2023). This trend highlights the urgent need for strengthened TB prevention and control efforts at the local level.

Previous studies have identified several key factors influencing the incidence of pulmonary TB, including household contact with TB patients, inadequate knowledge regarding transmission prevention, and behavioral risks such as smoking. Mathofani and Febriyanti (2020) found a significant relationship between housing density and household contact history with pulmonary TB incidence. Similarly, Hudnah and Muslima (2023) reported that gender, age, socioeconomic status, and smoking habits significantly correlate with TB incidence.

Despite these findings, limited studies in the Gowa region have explored the concurrent influence of multiple behavioral and environmental factors on TB incidence, especially following the post-pandemic surge. In particular, the role of public knowledge, family TB history, and smoking behavior has not been sufficiently analyzed in an integrated framework.

Therefore, this study aims to analyze the relationship between knowledge, family TB contact history, and smoking habits with the incidence of pulmonary tuberculosis in the working area of the Somba Opu Health Center, Gowa Regency. The results are expected to contribute to targeted TB control strategies and public health interventions at the community level.

Methods

Study Design

This study employed an analytical descriptive design aimed at identifying the factors associated with the high incidence of pulmonary tuberculosis (TB) in the working area of the Tamalatea Health Center, Jeneponto Regency. The design was chosen to examine the relationships between multiple variables, including knowledge, socioeconomic status, and environmental conditions.

Samples/Participants

The study population consisted of individuals diagnosed with pulmonary TB who were registered at the Tamalatea Health Center. A total of 30 respondents were selected using purposive sampling, with inclusion criteria being: (1) present at the time of data collection, (2) able to read and write, and (3) willing to participate as respondents by providing informed consent. Exclusion criteria included individuals who were severely ill or unwilling to participate during the data collection period.

Instruments

Data collection in this study utilized a structured questionnaire and an observation sheet, both of which were developed based on a comprehensive literature review of factors influencing tuberculosis incidence. The instrument consisted of three main sections: (1) knowledge, measured using a Guttman scale where “True” responses were scored as 1 and “False” as 0, assessing respondents' understanding of TB transmission, prevention, and symptoms; (2) socioeconomic status, evaluated through open-ended questions regarding monthly household income, which were then categorized according to national poverty thresholds; and (3) environmental conditions, assessed using an observation checklist that included indicators such as ventilation quality, humidity, housing density, and sanitation around the home. Prior to full implementation, the instruments underwent expert validation and a pilot test to ensure content accuracy, clarity, and contextual relevance.

Data Collection

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Data Analysis

All collected data were cleaned and edited to ensure completeness and accuracy. Data coding was applied by assigning numerical codes to qualitative responses. Data were then entered into Microsoft Excel and subsequently analyzed using SPSS version 25. Descriptive statistics were used to summarize respondent characteristics and variable distributions. Cross-tabulations were applied to explore associations between knowledge, economic status, environmental factors, and TB incidence, and a Chi-square test was used to determine statistical significance at the 95% confidence level ($p < 0.05$).

Ethical Considerations

This study was conducted in adherence to ethical research principles, including respect for privacy, confidentiality, and the right to refuse participation. Respondents were informed about the study objectives and procedures, and written informed consent was obtained prior to data collection.

Results

Age

From the results of the research conducted in the Tamalatea Health Center Working Area of Jeneponto Regency, data was obtained that the age of the most respondents in the age range of 23 – 31 as many as 11 respondents (36.7%), while the least in the age range of 41 – 49 was 1 respondent (3.3%).

Table 1 Frequency Distribution of Respondents by Age

Age	Frequency (F)	Percentage (%)
23 – 31	11	36,7
32 – 40	5	16,7
41 – 49	1	3,3
50 – 58	5	16,7
59 – 67	6	20
68 – 75	2	6,7
Total	**30**	**100**

Source : SPSS Processed Data

Gender

From the results of the research conducted in the Tamalatea Health Center Working Area of Jeneponto Regency, data was obtained that the gender of male and female respondents was the same, namely 15 respondents (50%) each.

Table 2 Frequency Distribution of Respondents by Gender

Gender	Frequency (F)	Percentage (%)
Male – Male	15	50
Woman	15	50
Total	**30**	**100**

Source : SPSS Processed Data

Education

From the results of the research conducted in the Tamalatea Health Center Working Area, Jeneponto Regency, data was obtained that the education of the most respondents was elementary school, which was 19 respondents (63.7%), while the least was high school, which was 4 respondents (13.3%).

Table 3 Frequency Distribution of Respondents by Education

Education	Frequency (F)	Percentage (%)
SD	19	63,3
JUNIOR	7	23,3
SMA	4	13,3
Total	**30**	**100**

Source : SPSS Processed Data

Work

From the results of the research conducted in the Tamalatea Health Center Work Area, Jeneponto Regency, data was obtained that the most respondents' jobs were housewives, namely 12 respondents (40%), while the least were drivers, daily laborers, handymen, bricklayers, carpenters, parking attendants, and self-employed, each with 1 respondent (3.3%).

Table 4 Frequency Distribution of Respondents by Occupation

Work	Frequency (F)	Percentage (%)
Laborer	2	6,7
Day Laborers	1	3,3
IRT	12	40
Farmer	8	26,7
Driver	1	3,3
Craftsman	1	3,3
Masons	1	3,3
Carpenter	1	3,3
Parking Attendant	1	3,3
Self employed	2	6,7
Total	**30**	**100**

Source : SPSS Processsed Data

Socio-Economic

From the results of research that has been carried out in the Jeneponto Regency Health Center Working Area, data was obtained that the socio-economic conditions of the community were low for 29 respondents (96.7%), and the community with high socio-economic conditions was 1 respondent (3.3%).

Table 5 Distribution of Respondent Frequency by Socio-Economic

Social Economy	Frequency (F)	Percentage (%)
Tall	1	3,3
Low	29	96,7
Total	**30**	**100**

Source : SPSS Processed Data

Knowledge

From the results of research that has been carried out in the Jeneponto Regency Health Center Working Area, data was obtained that the public's knowledge about pulmonary TB was good as many as 28 respondents (93.3%), while those who were knowledgeable were less than 4 respondents (6.7%).

Table 6 Frequency Distribution of Respondents based on Knowledge

Knowledge	Frequency (F)	Percentage (%)
Good	28	93,3
Less	2	6,7
Total	**30**	**100**

Source : SPSS Processed Data

Environmental Sanitation

From the results of research that has been carried out in the Jeneponto Regency Health Center Working Area, data was obtained that environmental sanitation was reviewed from the condition of people's houses. A total of 26 respondents (93.3%) with good environmental sanitation, while 4 respondents (13.3%) lacked environmental sanitation.

Table 7 Frequency Distribution of Respondents by Environmental Sanitation

Environmental Sanitation	Frequency (F)	Percentage (%)
Good	26	86,7
Bad	4	13,3
Total	**30**	**100**

Source : SPSS Processed Data

Discussion

The findings of this study indicate that low socioeconomic status, limited knowledge about pulmonary TB, and poor environmental conditions are key factors associated with the high incidence of tuberculosis in the working area of the Tamalatea Health Center. The association between low income and TB incidence aligns with previous literature stating that individuals from lower socioeconomic backgrounds often experience barriers in accessing timely and consistent healthcare services. Despite the availability of free healthcare programs, economic insecurity and daily survival needs may deter individuals from seeking preventive or early curative care. This observation is consistent with Tjiptoherijanto (2019), who emphasized that low-income individuals are often more vulnerable to TB, not only due to reduced healthcare access but also because of malnutrition, which compromises immunity and increases susceptibility to infection.

In terms of knowledge, the study found that individuals with better awareness of TB transmission, symptoms, and prevention tend to exhibit behaviors that reduce their risk of contracting the disease. This is consistent with the health behavior theory proposed by Notoatmodjo (2010), which posits that knowledge is a foundational element influencing health attitudes and practices. The findings also echo those of Becker, who segmented health behavior into three key domains: knowledge, attitude, and practice. The dissemination of accurate information through health promotion and counseling activities, especially those delivered by health workers at the primary care level, appears to play a pivotal role in influencing community behavior and awareness, as observed in the Tamalatea Health Center area.

Environmental factors also emerged as significant in this study. Respondents living in poorly ventilated and overcrowded homes were more likely to be diagnosed with pulmonary TB. This finding is in line with research by Hudnah and Muslima (2023), who found a strong relationship between household density, environmental hygiene, and TB incidence. Notoatmodjo (2010) similarly emphasized that physical conditions of housing including ventilation, humidity, and occupancy are critical determinants of respiratory infections. Environments that lack adequate airflow and are shared by many individuals increase the probability of airborne transmission of TB bacteria, particularly in the presence of an active case.

While the results of this study align with many existing findings, there are contrasting results in the literature. For example, a study by Suryani et al. (2021) found that knowledge alone was not significantly associated with reduced TB incidence unless coupled with community-based behavioral change interventions. This suggests that while awareness is necessary, it may not be sufficient unless supported by enabling factors such as access to resources, social support, and consistent follow-up.

This study has several limitations. First, the sample size was relatively small (n=30), which may limit the generalizability of the findings to broader populations. Second, the use of self-reported questionnaires may introduce response bias, particularly in assessing knowledge and behaviors. Third, the cross-sectional nature of the study design restricts causal inference; although associations are evident, the directionality of the relationship cannot be definitively established. Lastly, environmental data were gathered through observation rather than objective measurement tools, which may affect precision.

Future research should consider using longitudinal designs, larger sample sizes, and multi-site approaches to strengthen the evidence base. It would also be beneficial to explore the role of community health worker interventions and local health education programs in modifying health-seeking behavior and environmental risk management.

Conclusion

Based on the analysis of the three factors-knowledge, socioeconomic status, and environmental conditions it can be concluded that low socioeconomic status plays the most significant role in the incidence of pulmonary tuberculosis in the working area of the Tamalatea Health Center. Economic

limitations may hinder individuals from accessing or utilizing available health services, despite the presence of free public healthcare programs. The inability to prioritize preventive care due to daily survival needs reflects a broader structural barrier that must be addressed in TB control strategies.

For future researchers, it is recommended to expand the scope of the study by increasing the number of respondents and incorporating a wider range of variables, such as nutritional status, comorbidities, housing quality indices, and health-seeking behaviors. This would allow for a more comprehensive understanding of the multifactorial nature of TB transmission and support the development of more targeted public health interventions.

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