

## Literature Review

**Literature review on factors associated with the incidence of pulmonary TB****Feriany Said\***

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**Abstract**

Tuberculosis is a disease that is easily transmitted and shows an increase in the number of new cases and the number of deaths caused by pulmonary TB. Indonesia is included in the top three countries with the highest caseload ratings in the world, after India and China, with 824,000 sufferers (WHO, 2021). In poor countries, pulmonary TB deaths account for 25% of all preventable deaths. This study aimed to find out the literature review of factors related to the incidence of pulmonary TB. The research method uses a literature review with a database, namely google scholar. The inclusion criteria used include the dependent variable of pulmonary TB incidence, with a cross-sectional study design. A total of 6 national journals that have been analyzed explain a significant relationship between nutritional status, age, sex, and environmental factors with the incidence of pulmonary TB. This research's contribution needs to eradicate pulmonary TB through improving family nutrition and interventions in the physical environment, especially environmental sanitation.

**Keywords:** pulmonary TB; related factors**1. Introduction**

Tuberculosis is an infectious disease caused by the germ *Mycobacterium tuberculosis*. Tuberculosis has increased the number of new cases and deaths caused by TB. The World Health Organization (WHO) has declared a global emergency for TB disease because, in most countries, TB is not under control. This is because many TB patients have not been successfully cured (Marlinae, 2019). The main symptom of pulmonary TB is coughing up phlegm for 2-3 weeks or more. Cough can be followed by additional symptoms, including phlegm mixed with blood, coughing up blood, shortness of breath, weakness, decreased appetite, malaise, night sweats without physical activity, and fever for over a month. Given that TB prevalence in Indonesia is still high, everyone who comes to a healthcare facility with these symptoms is considered a suspect (suspect) TB patient (Fitriani, 2020).

Globally, the number of cases of pulmonary TB incidence was 9.9 million cases in 2020, and there were 214,000 deaths of people with pulmonary TB among HIV-positive patients in 2020. Indonesia is in the top three countries with the highest case ranking worldwide after India and China, with 824,000 patients (WHO, 2021). In poor countries, pulmonary TB deaths account for 25% of all deaths, while in Southeast Asia, the global incidence of pulmonary TB accounts for 38% of pulmonary TB cases worldwide. Six countries have the largest cases of pulmonary TB in the world, namely India, Indonesia, China, Nigeria, Pakistan, and South Africa (Marlinae, 2019).

Based on the Regulation of the Minister of Health No. 67 of 2016 concerning Tuberculosis Prevention, the target of the national TB control program is to reduce new cases by 65 per 100,000 population and the death rate by 6 per 100,000 population and make Indonesia TB-free by 2050. The finding rate of Pulmonary TB cases in Lampung Province in 2021 was 41.67%, and this figure has not reached the set target of 85%.



WHO has declared a global emergency for tuberculosis because, in most countries, TB disease is not controlled because many patients are not successfully cured. WHO reports that 3 million people die from TB annually and an estimated 5,000 daily. Every year there are 9 million new TB sufferers, and 75% of death and morbidity cases in the community are suffered by people in productive age from 13 to 54 years (Marlinae, 2019). Although tuberculosis diagnosis and treatment are free, TB patients are deprived of transportation, accommodation, nutrition, and lost income due to their inability to work. The high cost of living can cause patients with Tb not to take treatment, and good care can even stop treatment. This condition will be at high risk of transmitting the disease to others and can also develop into Multidrug-Resistant TB (MDR). TB and MDR TB impact is a loss of 38% and 70% of income. In countries with several TB sufferers, such as Ethiopia, Indonesia, and Kazakhstan, patients experience job losses of 26% in TB cases and 53% in MDR TB, in addition to losing effective time due to disability and premature death (Rokom, 2019).

The government has tried to control pulmonary TB risk factors, including screening, case finding, and treatment. Intensive passive discovery of Pulmonary TB cases is carried out by examining patients with symptoms of Pulmonary TB who come to health care facilities. Active case discovery is carried out by tracing and examining contact cases by health workers and health cadres and mass screening, especially in vulnerable and at-risk groups. Efforts to treat Pulmonary TB are carried out by standards with the concept of treatment that favors patients through assistance from families, communities, and health workers, psychological, social, and economic support from the Central Government, Regional Governments, and non-government to ensure the continuity of treatment to completion and protection against stigma and discrimination related to the disease (Kemenkes RI, 2017).

Some studies show that risk factors for the incidence of Pulmonary TB are the age of pulmonary TB disease, most often found in productive age, which is 15-50 years. Today, with the onset of demographic transition, the life expectancy of the elderly is higher. At an advanced age of over 55, a person's immunological system will decline, making them susceptible to various diseases, including Pulmonary TB. In addition, the productive age is easier to become a transmission source because of its mobility. Nutritional status is important in transmission criteria (Yani, 2018). The main causes that influence the increasing burden of TB are caused by poor nutrition, increasing burden of life, and poor sanitary conditions (Kemenkes RI, 2016). Control of TB risk factors is aimed at preventing and reducing the transmission and incidence of TB disease. TB risk factors can be prevented by maintaining and improving the quality of housing and the environment by healthy house standards (Kemenkes RI, 2016). This study aimed to find out the literature review of factors related to the incidence of pulmonary TB.

## 2. Research Methods

This type of research uses a review literature review, a research method that tries to describe or describe literature relevant to a particular topic or field. The literature review provides a study of what researchers have discussed, theories, hypotheses supporting research problems, and appropriate research methodology.

## 3. Results and Discussion

**Table 1.** Results and discussion

No	Researcher Name and Year	Country/ Place	Research Design	Research Respondents	Research Findings
1	Sutriyawan et al. (2020)	Indonesian	Cross sectional	105 Respondent	Variables that are proven to be related to the incidence of tuberculosis at the Garuda Bandung Health Center are knowledge, nutritional status, and smoking habits.

No	Researcher Name and Year	Country/ Place	Research Design	Research Respondents	Research Findings
2	Sari (2018)	Indonesian	Cross-sectional	60 Respondent	The results showed that variables related to the incidence of pulmonary TB were nutritional status, ventilation, lighting, and humidity.
3	Sikumbang et al. (2022)	Indonesian	Cross sectional	94 Respondent	The results showed that factors associated with pulmonary TB disease in productive age in the Tegal Sari Health Center, Medan Denai District's working area were gender, age, occupancy density, and lighting occupancy.
4.	Syukur & Pakaya, 2021	Indonesian	Cross-sectional	180 Respondent	There is a relationship between age and environment in the incidence of pulmonary TB in the working area of the Bolangitang Health Center.
5	Darmin et al. (2020)	Indonesian	Cross sectional	73 Respondent	The analysis results in the study showed that education level, contact history, and smoking habits had a significant relationship with the incidence of pulmonary TB in the work area of the Inobonto Health Center.
6	Rahmawati, et al. (2022)	Indonesian	Cross-sectional	441 Respondent	Factors related to the incidence of pulmonary TB in productive age at the Pasar Minggu District Health Center in 2021 are age, gender, and nutritional status.

The literature search results found six national journals related to factors related to the incidence of pulmonary TB with different research areas. The research design from the six journals has something in common: observational analytics with a cross-sectional study approach. The results obtained from 6 journals were obtained by several previous researchers who stated there was a significant relationship between variables.

### **3.1.Relationship of Nutritional Status with the Incidence of Pulmonary TB**

The main cause that affects the increase in TB cases is malnutrition (Kemenkes RI, 2016). Some research results show the relationship between nutritional status and the incidence of pulmonary TB. In the results of research by Rahmawati et al. (2022) where the results of bivariate analysis using the chi-square statistical test found  $P \text{ value} = 0.041 < 0.05$ , meaning  $P \text{ value} < \alpha$ , which shows that there is a significant relationship between nutritional status and the incidence of tuberculosis. This study also determined the PR (Prevalence Ratio), which is 1.438 with 95% CI: 1.041–1.987, meaning patients with malnutrition are 1.438 times at risk of tuberculosis events compared to patients with good nutrition. This happens because some patients do not have jobs, so economically, sufferers are less able to buy good food, eventually making their diet unbalanced, where a balanced diet will cause poor nutritional status. Poor nutrition will impact low immunity status, so it is very risky to suffer from tuberculosis, in

line with the results of research by Sutriyawan et al. (2020), which proves that nutritional status is related to the incidence of pulmonary TB. People with undernourished or underweight nutritional status are at 1.6 times the risk of suffering from pulmonary TB compared to people with normal nutritional status. The study results illustrate that subjects with nutritional status are more or less experiencing the incidence of pulmonary TB because insufficient nutritional intake can result in low body resistance, making them vulnerable to attacks by pulmonary TB germs. Similarly, with the results of Sari research (2018) obtained  $p$  value = 0.006, at  $\alpha = 0.05$  ( $p \leq \alpha$ ), it can be concluded that there is a significant relationship between nutritional status and the incidence of Pulmonary TB. The analysis results obtained the value of OR (Odd Ratio) = 9,000, which means that respondents with less nutritional status have a nine times greater risk of experiencing the incidence of Pulmonary TB than respondents with good nutritional status.

### **3.2.The relationship Between Age and the Incidence of Pulmonary TB**

Patients with Pulmonary TB disease are most often found at the productive age of 15-50 years. Today, the demographic transition is caused by the higher life expectancy of the elderly. At an advanced age of over 55, a person's immunological system declines, making it very susceptible to various diseases, including Pulmonary TB. In addition, productive age is easier to become a transmission source because of its mobility. The results of Sikumbang et al. (2022) research found a  $p$ -value = 0.006 at  $\alpha = 0.05$  ( $p \leq \alpha$ ), which means that there is a relationship between sex and the incidence of Pulmonary TB in the Working Area of the Tegal Sari Medan Denai Health Center. The results of the research analysis of Rahmawati et al. (2022), where the results of the chi-square test showed that there is a significant relationship between age and the incidence of tuberculosis ( $P$  value = 0.003 < 0.05) with a PR (Prevalence Ratio) value of 0.559 or with  $1/PR=1/0.559=1.788$ . PR scores show that respondents with reproductive age categories have a greater chance of getting a risk of tuberculosis. Based on the results of Syukur & Pakaya research (2021), the results of the analysis found that the chi-square value of 38,000 with  $\alpha = 0.000 < 0.05$  means that there is a relationship between age and the incidence of pulmonary TB, so  $H_0$  was rejected and  $H_a$  was accepted. Namely, there is a relationship between age and the incidence of Pulmonary TB in the work area of the Bolangitang Health Center. The age of Tb sufferers has associated with the incidence of Pulmonary TB + cases, and most are aged < 55 years. In line with the research results of Sikumbang et al. (2022), it was found that the Chi-square test obtained a value of  $p = 0.007$  which shows that there is a relationship between age and the incidence of pulmonary TB in the work area of the Tegal sari Medan Denai Health Center.

### **3.3.Sex Relationship with the Incidence of Pulmonary TB**

Sikumbang et al. research (2018) obtained the results of a chi-square test analysis  $p$  value = 0.006 so that  $H_a$  was accepted and  $H_0$  was rejected, which means that there is a relationship between sex and the incidence of Pulmonary TB in the Working Area of the Tegal Sari Medan Denai Health Center, where men are at risk of experiencing more pulmonary TB due to higher activity and working hours than women. Moreover, smoking and drinking alcohol can reduce endurance which is very influential in increasing the risk of TB. Thus, men are more susceptible to TB bacteria than women and children, contributing to the high number of pulmonary Tb rates and lifestyle affecting tuberculosis sufferers.

### **3.4.Relationship of smoking status with the incidence of pulmonary TB**

Smoking habits are a trigger factor that also increases the risk of developing pulmonary TB. Smoking is an activity of sucking toxins that can damage health so that it is easily infected. The results of research by Sutriyawan et al. (2020) prove that smoking habits are associated with the incidence of pulmonary TB. Active smokers are 1.9 times more likely to suffer from pulmonary TB than

nonsmokers. Smoking is one of the risk factors for pulmonary TB. Smoking behavior of pulmonary tuberculosis sufferers has been going on for years. Some patients are declared BTA-positive pulmonary tuberculosis and do not stop smoking because they are dependent on smoking. From the results of research by Darmin et al. (2020), where the results of the *Chi-square* test obtained a p-value = 0.006 (p-value <0.05), there is a significant relationship between smoking habits and the incidence of pulmonary TB. There is a significant relationship between smoking habits and the incidence of pulmonary TB in the work area of the Inobonto Health Center. This shows respondents who had smoking habits before suffered from pulmonary TB. Smoking as much as 20 cigarettes per day can be considered a heavy smoker. The impact on health, especially the lungs, is not very good. This makes contracting Mycobacterium tuberculosis bacterial infection easier because these bacteria will easily multiply in the lungs of someone who has experienced damage or complications.

### **3.5. The relationship of the physical environment with the incidence of pulmonary TB**

The main cause affecting the increase in TB cases is poor sanitary conditions (Ministry of Health RI, 2016). Control of TB risk factors aims to prevent and reduce transmission and cases of TB disease. Control of TB risk factors is carried out, among others, by maintaining and improving the quality of housing and its environment by healthy housing standards (Ministry of Health RI, 2016). The results of Sari's research (2018) show that physical environmental factors (ventilation, lighting, and humidity) are related to the incidence of pulmonary TB in the Walantaka Health Center work area. Environmental factors such as occupant density, house floors, ventilation, lighting, humidity, and temperature affect the risk of pulmonary TB events caused because the house is a gathering place for family members for a long time. Every positive BTA transmits to 10-15 other people, so the chance of contact contracting TB is 17%. Contacts closest to you are twice as likely to be at risk as casual contacts.

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### **Recommendations**

Efforts to eradicate tuberculosis include providing. Adequate nutrition. Adequate nutritional intake is highly recommended to improve the nutritional status in tuberculosis patients. Improving clean and healthy living behavior and improving environmental quality by healthy home standards must be applied to create a clean and healthy environment to minimize the transmission of pulmonary TB to family members and the community.

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