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Factors Influencing The Occurrence Of Pulmonary Tuberculosis In The Productive Age Group

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ABSTRACT

Pulmonary tuberculosis (pulmonary TB) is an infectious disease that remains a public health problem, particularly among the productive age group. This age group has high levels of mobility and social activity, placing them at greater risk of TB transmission. The occurrence of pulmonary TB is influenced by various factors, both individual and environmental. This study aims to determine the factors influencing the occurrence of pulmonary tuberculosis in the productive age group. This study used quantitative methods with an analytical design and a *case-by-case approach. control*. The research sample consisted of a case group (pulmonary TB sufferers) and a control group (non-pulmonary TB sufferers) in health service area X. Data were collected using questionnaires and observation sheets, then analyzed using the Chi-Square test. The results showed that nutritional status, residential density, smoking habits, and home ventilation had a significant effect on the occurrence of pulmonary TB ($p < 0.05$).

Keywords: Pulmonary Tuberculosis, Productive Age, Risk Factors, Public Health





1. Introduction

Pulmonary tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis. tuberculosis* and is transmitted through the air. This disease remains a major health problem worldwide, including in Indonesia. Pulmonary TB not only impacts individual health but also has significant social and economic consequences, particularly among the productive age group.

The productive age group, aged 15–64, is economically and socially active. The high level of activity and social interaction in this group increases the risk of exposure to and transmission of pulmonary TB. Furthermore, pulmonary TB in those of productive age can reduce work productivity and quality of life, as well as create an economic burden on families and communities.

The occurrence of pulmonary TB is influenced by various factors, including individual factors such as nutritional status and smoking habits, as well as environmental factors such as housing density and home ventilation conditions. These factors can affect a person's immune system and increase the risk of TB infection.

Efforts to prevent and control pulmonary TB require a comprehensive understanding of the factors influencing its occurrence. Therefore, this study is crucial to identify factors associated with the occurrence of pulmonary TB in the productive age group as a basis for planning TB control programs.

2. Research Methods

a. Types and Design of Research

This research uses a quantitative method with an analytical design and case study approach. control.

b. Location and Time of Research

The research was conducted in health service area X in May-August 2025.

c. Population and Sample

The research population is the entire productive age population in region X. The sample consists of:

- Case group: productive age pulmonary TB sufferers
 - Control group: non-pulmonary TB sufferers of productive age
- Sampling was carried out using purposive sampling technique.

d. Research Variables

- Dependent variable: Incidence of pulmonary TB
- Independent variables:
 - 1) Nutritional status
 - 2) Residential density
 - 3) Smoking habit
 - 4) Home ventilation





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e. Research Instruments

The research instruments were in the form of structured questionnaires and home condition observation sheets.

f. Data analysis

Data were analyzed univariately and bivariately using the Chi- Square test with a significance level of $p < 0.05$.

g. Research Ethics

The research was conducted by paying attention to the principles of research ethics, including *informed consent*, *consent*, data confidentiality, and respondent anonymity.

3. Research Results And Discussion

a. Research result

1) Respondent Characteristics

Table 1
Distribution of Respondent Characteristics

| Characteristics | Cases (n=40) | Control (n=40) | Total (%) |
|-----------------|--------------|----------------|-----------|
| Age | | | |
| 15–34 years | 18 | 20 | 47.5 |
| 35–64 years | 22 | 20 | 52.5 |
| Gender | | | |
| Man | 25 | 23 | 60.0 |
| Woman | 15 | 17 | 40.0 |

2) Nutritional status

Table 2
Relationship between Nutritional Status and the Incidence of Pulmonary TB

| Nutritional status | Case | Control | p- value |
|--------------------|------|---------|--------------|
| Not enough | 26 | 11 | |
| Normal | 14 | 29 | 0.001 |

3) Residential Density

Table 3
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**Relationship between Residential
Density and the Incidence of Pulmonary TB**

Residential Density Case Control p- value

| | | | |
|-----------|----|----|--------------|
| Congested | 28 | 13 | |
| Not dense | 12 | 27 | 0.002 |

4) Smoking Habit

Table 4

**Relationship between Smoking
Habits and the Incidence of Pulmonary TB**

Smoking Habit Case Control p- value

| | | | |
|--------------|----|----|--------------|
| Smoke | 30 | 16 | |
| Do not smoke | 10 | 24 | 0.001 |

5) Home Ventilation

Table 5

**Relationship between Home
Ventilation and the Incidence of Pulmonary TB**

Home Ventilation Case Control p- value

| | | | |
|--------------|----|----|--------------|
| Not eligible | 27 | 12 | |
| Qualify | 13 | 28 | 0.002 |

b. Discussion

The study results showed that nutritional status significantly influenced the occurrence of pulmonary TB in the productive age group. Respondents with poor nutritional status were more frequently found in the case group than in the control group. Poor nutritional status can reduce the immune system, increasing susceptibility to *Mycobacterium infection. tuberculosis*.

Housing density also significantly influences the incidence of pulmonary TB. Densely populated housing increases the risk of TB transmission due to close contact between individuals and poor air circulation. These conditions facilitate the spread of droplets containing TB germs.

Smoking is a significant risk factor for pulmonary TB. Research shows that smokers were more prevalent in the case group. Smoking can damage the lung's defense system and reduce mucociliary function, making it easier for TB bacteria to enter the respiratory tract.





Inadequate home ventilation is also significantly associated with the incidence of pulmonary TB. Poor ventilation results in suboptimal air exchange, allowing TB germs to survive longer in indoor air. A well-ventilated home can reduce the concentration of airborne germs and lower the risk of transmission.

The results of this study align with the epidemiological theory of TB, which states that the occurrence of pulmonary TB is influenced by the interaction between host, agent, and environmental factors. Therefore, efforts to control pulmonary TB need to be carried out comprehensively, taking into account both individual and environmental factors.

4. Conclusion And Suggestions

a. Conclusion

Factors influencing the occurrence of pulmonary tuberculosis in the productive age group include nutritional status, housing density, smoking habits, and home ventilation. These factors are significantly associated with the incidence of pulmonary TB.

b. Suggestion

1) For Health Services and Community Health Centers

Improving TB prevention programs through improving nutrition and education on healthy lifestyle behaviors.

2) For the Community

It is expected to maintain a healthy lifestyle, avoid smoking, and improve the condition of the home environment.

3) For Further Researchers

It is recommended to conduct further research with a cohort or multivariate design.

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