



Determinant Factors Associated with the Incidence of Pulmonary Tuberculosis in Adults in UPTD of the Modayag Health Center

(Faktor Determinan Yang Berhubungan Dengan Kejadian Tuberkulosis Paru Pada Orang Dewasa di Wilayah Kerja UPTD Puskesmas Modayag)

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Abstract

Today's global concern is tuberculosis (TB), a public health issue that results in significant morbidity and mortality worldwide. After China and India, Indonesia has the third-highest prevalence of pulmonary TB worldwide. Knowledge, economic standing, and smoking behavior are decisive variables in the development of pulmonary tuberculosis. For discoveries in February 2023, there were 52 cases of pulmonary tuberculosis in the UPTD Working Area of the Modayag Health Center, East Bolaang Mongondow Regency. According to the study's findings, there is an association between knowledge factor and prevalence of pulmonary tuberculosis in adults in the Modayag Health Center's UPTD Working Area ($p=0.000$); there is a relationship between economic status factors and incidence of pulmonary tuberculosis in adults in the Working Area of the UPTD Puskesmas Modayag ($p=0.000$); and there is a relationship between smoking behavior factors and incidence of pulmonary tuberculosis. In addition to carrying out preventative and promotive efforts to prevent pulmonary tuberculosis, it is hoped that the East Bolaang Mongondow Health Office and all Puskesmas throughout East Bolaang Mongondow regularly carry out early identification of pulmonary tuberculosis problems.

Keywords: *Determinant; Pulmonary Tuberculosis, Community Health Center.*

INTRODUCTION

Pulmonary Tuberculosis (Pulmonary TB) is a disease caused by systemic mycobacterium tuberculosis germs so that it can affect all organs of the body with the largest location in the lungs which is usually the location of primary infection. Pulmonary tuberculosis is a lower respiratory tract infection that attacks lung tissue or lung parenchyma by mycobacterium tuberculosis bacilli (Irawati, 2020). Most TB germs attack the lungs, but can also affect other body organs. This bacteria is rod-shaped, has special properties, namely resistance to acid in staining, so it is also known as acid-resistant bacteria (BTA) (Setiarni et al., 2013). Pulmonary Tuberculosis (TB) is a public health problem in the world that causes high morbidity and mortality rates. high and is becoming a global challenge (Suswita et al., 2022).



Pulmonary tuberculosis (TB) is a direct infectious disease that attacks the lungs. Symptoms include respiratory symptoms such as coughing for more than 3 weeks, coughing up blood, shortness of breath and chest pain. However, sometimes systemic symptoms such as weight loss, increased body temperature, and malaise may appear. Tuberculosis is one of the most important public health problems in the world (Handriyo & Wulan, 2017). Pulmonary Tuberculosis is a long-standing disease caused by a bacterial pathogen and has never been handled properly. Efforts to resolve this have been carried out for 77 years since Indonesia's independence, vaccines and medicines have been found decades ago, but they have never been handled properly.

It is suspected that there are 824,000 cases in Indonesia. The Indonesian Ministry of Health targets that 90% of that number can be detected by 2024 (Through the 4th INA – TIME 2022 Activity, Minister of Health Budi asks that 90% of TB sufferers can be detected in 2024, 2022). WHO data reports that the estimated number of people diagnosed with TB in 2021 globally is 10.6 million cases, an increase of around 600,000 cases from 2020, which was estimated at 10 million TB cases. Of the 10.6 million cases, there are 6.4 million (60.3%) people who have been reported and undergoing treatment and 4.2 million (39.7%) other people have not been found/diagnosed and reported (KNCV Indonesia Foundation, 2022). Data on pulmonary tuberculosis cases in East Bolaang Mongondow Regency in 2020 accounted for 46% of the total population and in 2021 it increased to 49% (North Sulawesi Provincial Central Statistics Agency, 2023). According to research by Irawati, et al (2020), there is a relationship between the incidence of pulmonary TB and age, gender, occupation, education, per capita income, knowledge, BCG immunization status, smoking status, nutritional status, diabetes mellitus, history of drinking alcohol, contact pulmonary TB sufferers, occupancy density, ventilation area, and floor type (Irawati, 2020).

The next factor or variable that has a very significant influence on the occurrence of TB is age, the older you are, the higher the risk of TB. Gender has a significant influence on the occurrence of TB disease, men tend to be more at risk than women. Educational status, in this case knowledge, also has a significant influence on the occurrence of tuberculosis. Low education is more at risk of developing tuberculosis than higher education. The economy has a significant influence on the occurrence of tuberculosis, poor people tend to be more at risk than non-poor people. Smoking behavior has a significant effect on the occurrence of tuberculosis (Lamrias & Lolong, 2007).

Globally, it is estimated that 10 million people developed TB disease in 2017, including 5.8 million men, 3.2 million women and 1 million children. There is an incidence in all countries and age groups, but overall 90% are adults (over 15 years old). In other words, pulmonary tuberculosis is a contagious and deadly disease (Rizkar Saputra & Herlina, 2021). Based on the background above, the problem formulation in this research is how knowledge, economic status and smoking behavior relate to the incidence of pulmonary tuberculosis in adults in the working area of the UPTD Modayag Community Health Center, East Bolaang Mongondow Regency.

METHOD

The research method used in this study is a quantitative research method, namely by providing an assessment through questionnaires and interviews as well as examination results. This type of research is an analytic observational study using a case control study design that uses a retrospective approach. The research location was carried out in the



Working Area of the UPTD Puskesmas Modayag Bolaang Mongondow Timur, North Sulawesi Province. The population in this study were all patients with pulmonary tuberculosis with a total of 52 patients. While the control population is all people who do not suffer from pulmonary tuberculosis as many as 52 people, so that the overall sample size is 104 people. The sampling technique used in this study was simple random sampling. The types of data used in this research are primary and secondary data. Primary data was obtained through interviews using a questionnaire as a guide while secondary data was obtained from medical records and program performance reports in the Working Area of the UPTD Puskesmas Modayag. Data processing is done by computer using descriptive statistics and non-parametric inferential statistics. The data processing stage is in the form of data editing (editing), data coding (coding) and entering data (data entry). Data analysis used the chi-square test. The research variable is the independent variable namely knowledge, economic status, smoking habits, the dependent variable is the incidence of pulmonary tuberculosis.

RESULTS AND DISCUSSION

Univariate Analysis

Based on the results of research conducted in the UPTD Working Area of the Modayag Health Center, data on the characteristics of the respondents were obtained as follows:

Table 1
Demographic Characteristics of Respondents Based on Education, Age, Occupation, Gender (n=104).

<i>Pendidikan</i>	<i>Frequensi</i>	<i>Percent (%)</i>
Not completed in primary school	11	10,6
Finished elementary school	29	27,9
Didn't finish middle school	29	27,9
Finished high school	28	26,9
College	7	6,7
<i>Age</i>		
0-14 Years (Young Age)	39	37,5
15-64 Years (Productive)	61	58,7
>=65 Years (Non-Productive)	4	3,8
<i>Occupation</i>		
Farmer	15	14,4
Miner	27	26
Trader	15	14,4
Mechanic	5	4,8
IRT	42	40,4
<i>Gender</i>		
Male	45	43,3
Female	59	56,7

(Source: Primary Data, 2023)

The research data in Table 1 regarding the characteristics of the respondents shows that the majority of the respondents' education was at most those who did not finish



elementary school and did not finish junior high school, each with 29 (27.9%) respondents. Likewise with the age of the respondents, more dominated by the productive age group (15-64 years) as many as 61 respondents (58.7%). Likewise the job characteristics of the respondents, most of them as housewives as many as 42 respondents (40.4%) of the total respondents. The sex of the respondents in this study was mostly female as many as 59 respondents (56.7%) of the total respondents.

Bivariate Analysis

The results of research to determine the relationship between determinant factors and the incidence of pulmonary tuberculosis in adults in the UPTD Modayag Community Health Center are as follows:

Table 2.
Relationship Between Knowledge and Pulmonary Tuberculosis in Adults of UPTD Health Center in Modayag (n=104)

Knowledge	Incidence of Pulmonary Tuberculosis						<i>p</i>	OR (95% CI) 2,0
	Yes (Cases)		No (Controls)		Total			
	n	%	n	%	n	%		
Good	28	53,8	27	51,9	55	52,9	0,000	1.415-1.526
Not Good	24	46,2	25	48,1	49	47,1		
Total	52	100	52	100	104	100		

(Source: Primary Data, 2023)

Based on the data in Table 2, it shows that the group of respondents who had pulmonary tuberculosis (cases) were 24 respondents (46.2%) in the group of respondents with poor knowledge, while the group of respondents who did not have pulmonary tuberculosis (control) were 25 respondents (48.1%) in the group of respondents with poor knowledge. This shows that the proportion of the respondent group with poor knowledge tends to be more likely to suffer from pulmonary tuberculosis than the group of respondents who do not suffer from pulmonary tuberculosis.

The results of the Chi square test obtained a *p* value of 0.000 (<0.05), so H_0 was rejected, which means there is a relationship between knowledge and the incidence of pulmonary tuberculosis in adults in the UPTD Working Area of the Modayag Health Center. Calculation results of OR 95% CI = 2.0 (1.415 -1.526), which means that respondents with poor knowledge have twice the chance that their children will suffer from pulmonary tuberculosis compared to the control group.



Table 3
Relationship Between Economic Status and the Incidence of Pulmonary Tuberculosis in Adults in UPTD of Modayag Health Center (n=104)

Economic Status	Incidence of Pulmonary Tuberculosis						<i>p</i>	OR (95% CI) 2,34
	Yes (Cases)		No (Controls)		Total			
	n	%	n	%	n	%		
Upper Middle Economy	28	49,1	29	50,9	57	100	0,000	0,707-1,527
Lower Middle Economy	24	51,1	23	48,9	47	100		
Total	52	100	52	100	104	100		

(Source: Primary Data, 2023)

Based on Table 3, it shows that the group of respondents with pulmonary tuberculosis (cases) was 24 respondents (51.1%) in the group of respondents with lower middle economic status, while the group of respondents who did not have pulmonary tuberculosis (controls) were 23 respondents (48.9%) in the middle to lower economic status respondent group. This shows that the proportion of the respondent group with a high and lower middle economic status tends to be more likely to suffer from pulmonary tuberculosis than the group of respondents who do not suffer from pulmonary tuberculosis.

The results of the Chi square test obtained a *p* value of 0.000 (< 0.05), so H_0 was rejected, which means there is a relationship between economic status and the incidence of pulmonary tuberculosis in adults in the UPTD Working Area of the Modayag Community Health Center. The calculation results of OR 95% CI = 2.3 (0.707-1.527) which means that respondents with middle to lower economic status are 2.3 times more likely to suffer from pulmonary tuberculosis than the control group.

Table 4
Relationship Between Smoking Behavior and the Incidence of Pulmonary Tuberculosis in Adults in the UPTD of the Modayag Health Center (n=104)

Smoking Behavior	Incidence of Pulmonary Tuberculosis						<i>p</i>	OR (95% CI) 2,34
	Yes (Cases)		No (Controls)		Total			
	n	%	n	%	n	%		
Do Not Smoke	28	49,1	29	50,9	57	100	0,000	0,707-1,527
Smoke	24	51,1	23	48,9	47	100		
Total	52	100	52	100	104	100		

(Source: Primary Data, 2023)

Based on Table 4 it shows that the group of respondents who had pulmonary tuberculosis (cases) were 24 respondents (51.1%) in the smoking respondent group, while the respondent group who did not have pulmonary tuberculosis (control) were 23 respondents (48.9%) in the respondent group smoke. This shows that the proportion of



respondents who smoke tends to suffer from pulmonary tuberculosis more than the group of respondents who do not suffer from pulmonary tuberculosis.

The results of the Chi square test obtained a p value of 0.000 (<0.05), then H_0 was rejected, which means that there is a relationship between smoking behavior and the incidence of pulmonary tuberculosis in adults in the Working Area of the UPTD Puskesmas Modayag. The results of the calculation of OR 95% CI = 2.3 (0.707-1.527) which means that respondents who smoke have a 2.3 times chance of suffering from pulmonary tuberculosis compared to the control group.

Discussion

1. Relationship Between Knowledge and the Incidence of Pulmonary Tuberculosis in Adults in the UPTD of Modayag Health Center.

The results showed that there was a relationship between knowledge and the incidence of pulmonary tuberculosis in adults in the Working Area of the UPTD of the Modayag Health Center. The dominance of good knowledge possessed by respondents means that pulmonary tuberculosis can be prevented. The lower the knowledge, the higher the proportion of pulmonary tuberculosis problems, and vice versa. This shows that knowledge is a component that cannot be ignored. Knowledge about pulmonary tuberculosis influences people's behavior in taking preventive measures. People who have good knowledge are expected to be able to take measures to prevent pulmonary tuberculosis well.

This research is in line with the research of Ningsih et al (2022) which states that there is a relationship between knowledge and public attitudes about efforts to prevent tuberculosis transmission. One of the causes of the lack of public knowledge in efforts to prevent transmission of tuberculosis is the lack of information and education from health workers or posyandu cadres about tuberculosis, causing a lack of public knowledge about tuberculosis. Other factors that can influence a person's attitude include family, peer influence, personal experience, and information obtained from various sources (Ningsih et al., 2022).

The results of this study are also in line with Hasudungan and Wulandari (2020) who stated that there is a relationship between the knowledge of TB sufferers and the stigma of the disease in the Working Area of the Parongpong Health Center, Parongpong District, West Bandung Regency (Hasudungan & Wulandari, 2020). Likewise with the results of Muaz's research (2014) which stated that knowledge was one of the factors that influenced the incidence of acid-resistant bacillus pulmonary tuberculosis at the Serang Health Center. Without sufficient knowledge, it is very difficult to prevent pulmonary tuberculosis (Faris Muaz, 2014).

This is also in line with the results of Darmawansah and Wulandari's research (2021) which stated that the level of knowledge is related to the incidence of pulmonary tuberculosis in the Padang Serai Health Center Work Area, Bengkulu City. The results of this study indicate that the lower a person's knowledge, the higher the risk of getting pulmonary TB compared to someone who has good knowledge (Darmawansyah & Wulandari, 2021).

2. The Relationship Between Economic Status with the Incidence of Pulmonary Tuberculosis in Adults in the UPTD of Modayag Health Center.



The results of the study show that there is a relationship between economic status and the incidence of pulmonary tuberculosis in adults in the UPTD Working Area of the Modayag Community Health Center. The lower the economic status, the higher the proportion of pulmonary tuberculosis problems, and vice versa. This shows that economic status is a component that also cannot be ignored. Economic status as a basis for preventing pulmonary tuberculosis. Economic status influences people's behavior in taking preventive measures for pulmonary tuberculosis. People who have middle and upper economic status will be able to take preventive measures for pulmonary tuberculosis well too. With a good economic status, encourage individuals or families to try to maintain health and prevent disease.

Economic status is associated with the incidence of pulmonary tuberculosis in adults. Economic status is one of the factors associated with the incidence of pulmonary tuberculosis. These results are in line with research by Irawati et al (2020) which stated that there is a socio-economic relationship with pulmonary TB. From these results it can be seen that even high socioeconomic (affordable) people still have the potential to get pulmonary TB disease. From the observations of researchers, the economic status in Pecung Village can be said to be low. The majority of people make their living as fishermen whose income is not fixed, making it difficult to meet the needs of a decent living (Irawati, 2020).

The results of this study are also supported by the research of Saputra and Herlina (2021) which states that there is a relationship between socioeconomic status and the incidence of pulmonary TB at the puskesmas. The importance of socioeconomic status for pulmonary tuberculosis and sharing their experiences with those around them to help reduce the spread of this disease (Rizkar Saputra & Herlina, 2021). There is a relationship between economic level and the incidence of pulmonary tuberculosis at the Kaliwungu Health Center, Kaliwungu District, Kudus Regency. This relationship is weak because the Correlation Coefficient of 0.412 is below 0.505 (Rosiana, 2013).

The results of the research by Setiarni et al (2013) stated that economic status is one of the factors associated with the incidence of pulmonary tuberculosis. Economic status is related to the incidence of pulmonary tuberculosis in adults in the Working Area of the Tuan-Tuan Public Health Center, Ketapang Regency, West Kalimantan, although it is not statistically significant (Setiarni et al., 2013).

The results of Pratiwi's research, et al (2013) stated that the socioeconomic level with the incidence of positive smear pulmonary TB in the working area of the Peterongan Health Center had a significant relationship. Research with correlation analytic through this cross sectional approach, has a sample of 30 respondents taken using the Simple Random Sampling technique. The independent variable in this study is the socioeconomic level (education, employment, income) related to the incidence of pulmonary tuberculosis (Pratiwi & Roosihermiatie, 2013).

3. The Relationship Between Smoking Behavior and the Incidence of Pulmonary Tuberculosis in Adults in the UPTD of the Modayag Health Center.

The results of the study showed that there was a relationship between smoking behavior and the incidence of pulmonary tuberculosis in adults in the UPTD of Modayag Health Center and that the group of respondents who had pulmonary tuberculosis (cases) was 24 respondents (51.1%) in the group of respondents who



smoked, while the group of respondents who did not have tuberculosis lungs (control) of 23 respondents (48.9%) in the smoking respondent group. This shows that a greater proportion of the group of respondents who smoke tend to suffer from pulmonary tuberculosis than the group of respondents who do not suffer from pulmonary tuberculosis.

The results of the Chi square test obtained a p value of 0.000 (< 0.05), so H_0 was rejected, which means there is a relationship between smoking behavior and the incidence of pulmonary tuberculosis in adults in the Modayag Health Center UPTD Working Area. The calculated results of OR 95% CI = 2.3 (0.707-1.527) which means that respondents who smoke are 2.3 times more likely to suffer from pulmonary tuberculosis compared to the control group.

Currently, the government is intensively campaigning about the dangers of smoking for Indonesian people. Public awareness is needed so that the negative health impacts of smoking can be avoided. The results of this study are in line with the results of research by Aryawati, et al (2021) which states that there is a relationship between smoking behavior and the incidence of pulmonary TB in Sidosari Village, Natar District. The results of the analysis carried out using the USG & MCUA method showed that pulmonary TB was the priority problem as indicated by the score using the MCUA and USG methods. It was found that out of a sample of 18 families, 8 families (40%) were active smokers. Thus the researchers suggest that counseling and public education be held about the dangers of smoking behavior on TB disease through media that are easily understood by the surrounding community (Wayan et al., 2021).

Also agreed with Rianto (2018) stating that smoking habits are related to the incidence of pulmonary tuberculosis in outpatients at the Sukasari Health Center, Cianjur Regency. Smoking is the main cause of chronic and obstructive lung diseases, such as bronchitis and emphysema. Smoking is also linked to influenza and other lung infections. In asthma sufferers, smoking will worsen asthma symptoms because cigarette smoke will narrow the respiratory tract further. Adverse effects include increased susceptibility to chronic cough, phlegm production and hoarseness. This can worsen the condition of tuberculosis bacterial infection. Patients who have smoking habits have a 2.3 times chance of suffering from tuberculosis compared to patients who do not smoke (Rianto, 2018).

CONCLUSION

The conclusions in this study are as follows:

1. There is a relationship between knowledge and the incidence of pulmonary tuberculosis in adults in the UPTD of Modayag Health Center.
2. There is a relationship between economic status and the incidence of pulmonary tuberculosis in adults in the UPTD of Modayag Health Center.
3. There is a relationship between smoking behavior and the incidence of pulmonary tuberculosis in adults in the UPTD of Modayag Health Center

IMPLICATIONS

This implication refers to the conclusions in the results of research conducted by researchers, so the researchers make research implications, namely, it is hoped that the



East Bolaang Mongondow Health Service and all Community Health Centers throughout East Bolaang Mongondow carry out early detection of pulmonary tuberculosis problems on a regular basis, in addition to carrying out preventive and promotive efforts in prevent pulmonary tuberculosis. The government, in this case the UPTD of the Modayag Health Center, conducted counseling about pulmonary tuberculosis and the dangers of smoking. The government is also trying to implement a program to improve the economic status of the community as a priority or district government work program to reduce the incidence of pulmonary tuberculosis.

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