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Risk Factors for Pulmonary Tuberculosis in Nabire Regency, Central Papua Province

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A B S T R A C T

This study aims to determine the risk factors for Pulmonary TB in Nabire Regency.This type of research is observational with a case control design. The population of this study was 6,621 people, a sample of 585 people. The sampling technique used the purposive sampling technique. Data were collected from SITB medical record data in 2024. Data were analyzed using the chi square test, Odds Ratio andlogistic regression.The results of the study showed that the factors that had a significant influence on the incidence of pulmonary tuberculosisthat is gender (p-value 0.002; OR = 1.960; CI95% (1.299 – 2.958) and HIV status (p-value 0.001; OR = 4.257; CI95% (2.451 – 8.955). The influencing factors were not significant with the incidence of pulmonary tuberculosis, ethnicity, smoking habits, history of DM and the distance. The most dominant factor is HIV status (p-value 0.001; OR = 4.506).

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INTRODUCTION

Pulmonary Tuberculosis (TB) is one of the infectious diseases that causes the most deaths in the world, including Indonesia (World Health Organization, 2022). Pulmonary TB often attacks people with low economic status, where dense residential conditions and limited access to health services increase the risk of transmission,(Craig et al., 2017). Based on the WHO Global Tuberculosis Report 2023, there are 10.6 million people who fall ill with TB, and as many as 1.3 million people die from TB. The prevalence of pulmonary TB tends to be high in countries with unresolved public health problems, especially in Southeast Asia, Africa, and the Western Pacific, with India, China, and Indonesia being the three countries with the highest number of cases (World Health Organization, 2023a).

Indonesia ranks third with the highest number of TB cases after India and China, withestimate1,060,000 new cases in 2023 and a death toll of around 134,000 people due to TB (World Health Organization, 2023b). The high number of TB cases in Indonesia reflects the complexity of the problem involving social, economic, and health factors. TB control efforts in Indonesia have been carried out intensively, but challenges remain in achieving TB elimination by 2030, in accordance with the global target.

In 2023, Central Papua Province was one of the provinces in Indonesia with high TB cases, with higher prevalence and incidence rates. Compared with other regions in Indonesia. Data shows that in 2023, Central Papua has a high incidence of TB due to environmental, and social factors, and limited access to health in remote areas..(Central Papua Provincial Health Office, 2024).

The Regency of Nabire, as one of the areas in Central Papua Province, also faces challenges in controlling TB. The vast and difficult-to-reach geographical conditions, as well as the diverse socio-economic conditions of the community, are thought to be factors that influence the spread and handling of TB in this area. Based on data from the Nabire Regency Health Office, in 2023 the incidence of Pulmonary TB in Nabire Regency was 1,933 cases out of a total of 4,993 cases in Central Papua Province or around 38.71% of cases in Central Papua Province. Meanwhile, in 2024 the incidence of Pulmonary TB in Nabire Regency was 2,269 cases and was the second highest cause of death with a percentage of around 13.33% in Nabire Regency (Nabire Health Office, 2025).

Pulmonary TB brings a large economic burden to the country, especially in developing countries. The economic burden caused by TB includes medical costs, decreased productivity, and social impacts that cause loss of family income. In Indonesia, TB causes economic losses of up to billions of rupiah each year. Indonesia allocates a special budget for TB control, but the budget is often insufficient, especially for areas with high cases such as Papua,((Ministry of Health of the Republic of Indonesia, 2020).

LITERATURE REVIEW

Meta Synthesis (Review of Previous Research)

Research on risk factors for pulmonary tuberculosis was conducted by Lestari et al., and found that productive age (15–45 years), male gender, low education, and low income are at higher risk of being infected with pulmonary TB(Lestari, 2019).

Similar research was conducted by Iwan Stia Budi, who found that the risk factors for the occurrence of tuberculosis in slum communities in Palembang City were a history of TB in family members, access to information, lighting, humidity, and the condition of the roof of the house., walls, floors of the house (Budi et al., 2018).

Surakhmi Oktavia et.al. 2016 also conducted a similar study by analyzing the risk factors for TB incidents in the Kertapati Palembang Health Center work area and the results were that the risk factors associated with TB incidents were education level (OR = 3.9), floor type (OR = 16.7), ventilation area (OR = 27.12), residential density (OR = 4.3), contact with TB sufferers (OR = 4.7), and nutritional status (OR = 16.7) (Oktavia & Rini Mutahar, 2016). The difference between this study and previous studies is the variables, the place and the design. This study used a case-control with a large sample size of 585 and was conducted in Nabire Regency, Central Papua Province.

Frame of Mind

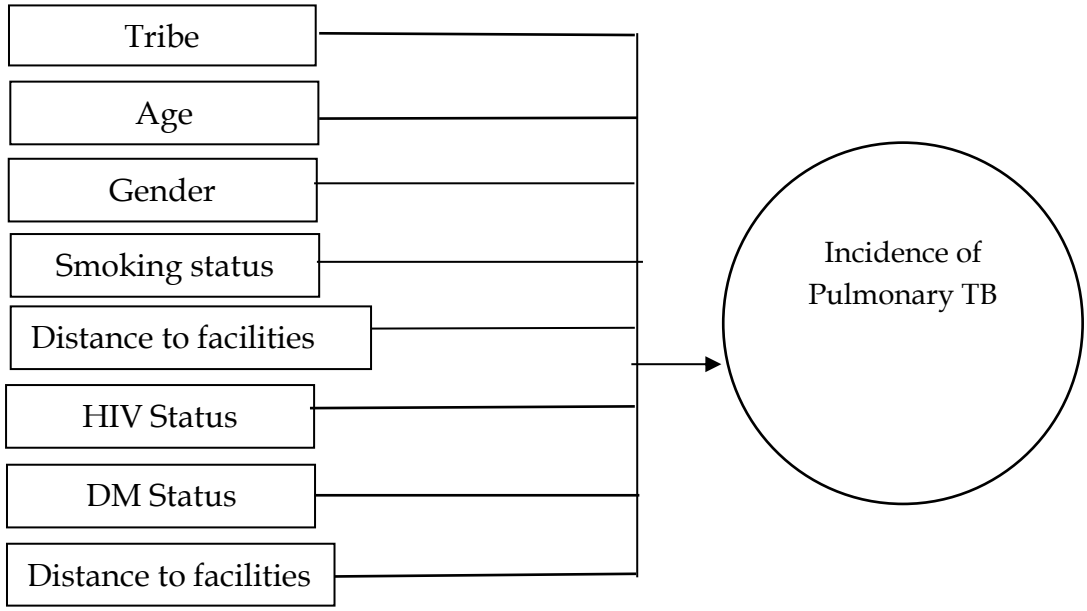

Figure 1. Conceptual Framework

METHODOLOGY

This study is an observational study with a case control study design. A case-control study is an epidemiological study design that studies the relationship between exposure (risk factors) to a disease or health status by comparing a group of cases to a control group based on their exposure status (Hasmi, 2016).The population of this study is 6,621 people, a sample of 585 people (117 cases and 468 controls) was obtained using the case-control proportion formula. The sampling technique uses the purposive sampling technique with complete medical recorded data criteria according to the variables to be studied. The data was collected from SITB medical record data in 2024. Data were analyzed using chi square test, Odds Ratio and logistic regression.

RESEARCH RESULTS

Univariate Analysis

Table 1. Distribution of Independent and Dependent Variables

No	Variables	Frequency (n)	Percentage (%)
1	Ethnic group		
	Papua	389	66.5
	Non Papua	196	33.5
2	Age		
	< 15 years	30	5.1
	≥ 15 years	555	94.9
3	Gender		
	Man	267	45.6
	Woman	318	54.4
4	Smoking Habit		
	Smoke	247	42.2
	Do not smoke	3`38	57.8
5	Distance to Health Facilities		
	Far	85	14.5
	Near	500	85.5
6	HIV status		
	Positive	47	8
	Negative	538	92
7	DM History		
	Diabetes	14	2.4
	No Diabetes	571	97.6
8	Pulmonary TB		
	Positive	117	20
	Negative	468	80
Amount Per Variable		585	100

Source: SITB Secondary Data processed, 2025

Based on table 1, most respondents came from Papuan ethnicity as many as 389 people (66.5%), aged over 15 years as many as 555 people (94.9%), female gender as many as 318 people (54.4%), non-smokers as many as 338 people (57.8%), close distance from home to health facilities for examination as many as 500 people (85.5%), negative HIV status as many as 538 people (92%) and history of not suffering from DM as many as 571 people (97.6%). The incidence of negative pulmonary TB was 468 people (80%).

Bivariate Analysis

No.	Variable	Incidence of Pulmonary TB				n	%	*p-value*	RP CI 95%
1.	Tribe	Pulmonary TB		Negative Pulmonary TB					
		n	%	n	%				
	Papua	87	74.4	302	64.5	389	66.5	0.057	1,594 (1,010-2,515)
	Non-Papuan	30	25.6	166	35.5	196	33.5		

2.	Age								
	≥15 years < 15 Years	110 7	94 6	445 23	95.1 4.9	555 30	94.9 5.1	0.815	1,231 (0.515-2.943)
3.	Gender								
	Male Female	69 48	59 41	198 270	42.3 57.7	267 318	45.6 54.4	0.002	1,960 (1,299-2,958)
4.	Smoker Status								
	Smoke Do not smoke	55 62	47 53	192 276	41 59	247 276	42.2 57.8	0.286	1,275 (0.849-1.916)
5.	Distance								
	Far Near	22 95	18.8 81.2	63 405	13.5 86.5	85 500	14.5 85.5	0.187	1,489 (0.872 – 2.54)
6.	HIV Status								
	Positive Negative	23 94	19.7 80.3	24 444	5.1 94.9	47 538	8 92	0.001	4,527 (2,451-8,955)
7.	Diabetes Status								
	Diabetes No Diabetes	2 115	1.7 98.3	12 456	2.6 97.4	14 571	2.4 97.6	0.747	0.661 (0.146 – 2.994)

Based on the table above, it is known thatThe results of the chi square statistical test at a significance value of 95% (α= 0.05) obtained a p-value of 0.057 or p > α (0.05), thus the influence of ethnicity is not significant with the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. When viewed from the OR value = 1.594; CI95% (1.010-2.515), which is interpreted that people with Papuan ethnicity are at 1.594 times greater risk of being infected with Pulmonary TB compared to non-Papuan ethnicity.

The effect of age is not significant with the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. When viewed from the OR value = 1.231; CI95% (0.515-2.943), but because the lower and upper values cover the number 1, the OR value is not significant.

The results of the chi square statistical test at a significance value of 95% (α= 0.05) obtained a p-value of 0.02 or p < α (0.05), thus the influence of gender is significant with the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. When viewed from the OR value = 1.960; CI95% (1.299 - 2.958), which is interpreted that men are 1.299 times more at risk of being infected with Pulmonary TB compared to women. The influence of smoking habits is not significant with the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. When viewed from the OR value = 1.275; CI95% (0.849-1.916), but because the lower and upper values include the number 1, the OR value is not significant. the influence of distance is not significant with the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. When viewed from the OR value = 1.489; CI95% (0.872 – 2.54), which is interpreted that the OR distance is not significant because the lower and upper values cover the number 1. the effect of HIV status is significant with the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. When viewed from the OR value =

4.257; CI95% (2.451 – 8.955), which is interpreted that PLHIV are at 4.257 times greater risk of being infected with Pulmonary TB compared to non-PLHIV. The results of the exact fixher statistical test at a significance value of 95% (α= 0.05) obtained a p-value of 0.747 or p > α (0.05), thus the effect of DM status is not significant with the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. When viewed from the OR value = 0.661; CI95% (0.146-2.994), which is interpreted that DM status is not a risk factor for Pulmonary TB.

Table 3. Bivariate Analysis Between Dependent and Independent Variables

Variables	*p-value*	95% CI		Information
		Lower	Upper	
Ethnic group	0.057	1,010	2,515	Candidate
Age	0.815	0.515	2,943	Not a Candidate
Gender	0.002	1,299	2,958	Candidate
Smoking Habit	0.286	0.849	1,916	Not a Candidate
Distance to Health	0.187	1,872	2,540	Candidate
Facilities	0.001	2,451	8,362	Candidate
HIV status	0.747	0.146	2,994	Not a Candidate
DM History				

Source: SITB Secondary Data processed, 2025

The table above shows the variables of ethnicity, gender, distance to health facilities and HIV status are included in the category of p-value <0.25, so they are included in the multivariate model and tested together with the binary logistic regression test of the forward LR method. The results of the multivariate analysis obtained a p-value <0.05 as in Table 13 below.

Table 4. Multiple Logistic Regression Variable Analysis

No	Variables	B	*p-value*	OR	95% CI for Exp(B)	
					Lower	Upper
1	HIV status	1,510	0.001	4,506	2,419	8,393
2	Gender	0.669	0.002	1,952	1,281	2,974
	Constant	-2,458	0.001	0.086		

Source: SITB Secondary Data processed, 2025

Table 4 above, obtained a beta correlation coefficient value of 1.510 which states that there is an influence with a p value of 0.001; OR = 4.506; CI95% (2.419– 8.393), which is interpreted that PLHIV status is the most dominant factor in the incidence of Pulmonary TB in Nabire Regency, Central Papua Province.

DISCUSSION

The Influence of Tribe on the Incidence of Pulmonary Tuberculosis in Nabire Regency

The results of the study showed that the influence of ethnicity was not significant with the incidence of pulmonary tuberculosis in Nabire Regency, Central Papua Province, but from the OR value, the Papuan tribe was at risk of

being infected with pulmonary tuberculosis by 1.594 times higher than the non-Papuan tribe. The incidence of pulmonary tuberculosis infection in the Papuan tribe was 66.5%. In line with previous research byAnggraeni et al., (2024) in Jayapura City, Papua, the Papuan tribe has the largest number of TB patients, namely 90.63% compared to non-Papuan tribes.The Promised Neverland (2020)that the Papuan tribe is 1.6 times more at risk of contracting pulmonary TB compared to non-Papuan tribes. This is because the majority of Papuans have socio-economic conditions that are still below standard. The existence of a culture of eating betel nut and the behavior of spitting betel nut in the wrong place is one of the risks of TB transmission.

Papuans have a higher risk of pulmonary tuberculosis compared to non-Papuans, due to factors such as knowledge, habits of living in ethnic houses, and housing density. In addition, lack of access to health services, environmental conditions such as high density and poor air quality, and the presence of other lung diseases also increase the risk of TB (Pangaribuan & Khotimah, 2020; Yigibalom et al., 2019).

Beliefs in culture and traditional practices within a tribe can determine attitudes towards modern medical treatment, differing understandings about the causes and treatment of disease influence a person's approach to disease control.(Tutuhatunewa et al., 2024). This forms a behavior that inhibits the success of controlling Pulmonary TB in Nabire district, namely the high number of drop outs of treatment causing a high risk to other family members, coupled with poor preventive behavior in preventing Pulmonary TB, causing an increasingly high risk of Pulmonary TB infection.(Sukatemin, 2022; Yigibalom et al., 2019).

The Influence of Age on the Incidence of Pulmonary Tuberculosis in Nabire Regency

The results of the study showed that age was not significant and was not a risk factor for the incidence of Pulmonary TB in Nabire Regency, Central Papua Province in the group of positive TB cases with age > 15 years as much as 94% higher than age < 15 years. In line with the findings of previous research byDzakiyah et al., (2023);Widiati & Majdi (2021)that age is not a risk factor for the occurrence of pulmonary tuberculosis.

The role of the risk of pulmonary TB, age factors form a normal inverted curve where there is a high risk at the age of infants up to two years then decreases to a peak in young adulthood, there is a decrease in risk because at that age the body has good TB resistance. Then approaching old age, the body's resistance will decrease again so that the risk of contracting TB becomes high.(Marlinane et al., 2020).

In contrast to research findings(Marsanda et al., 2024;Maulani et al., 2025)that the greatest risk of pulmonary TB is adulthood, where at that age is a productive age. This is likely because at a productive age there is high mobility (on average still working) so that it affects the body's resistance and can cause greater exposure to TB germs. The prevalence of TB increases with age, because of the possibility of reactivation of TB bacteria for those who have suffered from

pulmonary TB and besides that the duration of exposure to TB bacteria is longer than the age group below.

There is no influence of age on the incidence of Pulmonary TB in Nabire Regency because there are similar risk factors with the incidence of pulmonary TB such as the residential environment in Nabire Regency in the indigenous people of the Honai house which is a unique and interesting ethnic house, made of wood and straw or thatch. The ethnic houses inhabited by these people do not meet health requirements because they do not have windows, air vents, dirt floors and wooden walls that do not meet health standards. Coupled with the habit of respondents making a fireplace in the Honai, it causes a lot of smoke that cannot escape, so the risk of transmission is very easy to occur with respondents who have the habit of living in ethnic Honai houses. The relationship between the habit of living in ethnic Honai houses has a 2.667 times greater chance of suffering from pulmonary TB compared to respondents who do not have the habit of living in ethnic Honai houses(Yigibalom et al., 2019).

The Influence of Gender on the Incidence of Pulmonary Tuberculosis in Nabire Regency

The results of the study showed that gender had a significant effect on the incidence of pulmonary tuberculosis in Nabire Regency, Central Papua Province with an OR value that men were 1.960 times more at risk of being infected with pulmonary tuberculosis compared to women. In the group of positive cases of tuberculosis, there were 110 men (94%) higher than 48 women (41%). Previous research findingsSunarmi & Kurniawati, (2022);Nansorina et al., (2024;Maghfiroh et al., (2025)that gender influences the incidence of pulmonary tuberculosis and the risk is higher in men.

Men have a high risk of developing pulmonary TB due to factors such as the environment and habits of the patient. Patients with low levels of immunity are very susceptible to being infected with tuberculosis bacteria. In addition, excessive activity without adequate rest can also increase this risk. Unhealthy lifestyles such as smoking and drinking alcohol can also increase the risk of pulmonary TB infection.(Maulani et al., 2025;Asparian et al., 2024;and Angraini et al., 2025). This is likely because men are more exposed to higher risk factors for TB and have less knowledge about the disease.(Dzakiyah et al., 2023).

Men are more susceptible to pulmonary TB than women in Nabire Regency due to outdoor activities and unhealthy lifestyles. Men tend to be more active outside the home and exposed to TB germs. They are also more likely to engage in risky behaviors such as smoking and alcohol consumption, which can weaken the immune system.(Sukatemin, 2022).

Men and women have differences in many things, including: social relationships, environmental influences, lifestyle habits, biological and physiological differences. However, women and men have the same opportunity to access every information, including information about pulmonary TB treatment, where men and women receive the same pulmonary TB treatment program.(Marsanda et al., 2024).

The Influence of Smoking Habits on the Incidence of Pulmonary Tuberculosis in Nabire Regency

Smoking is a habit that is often found inlifeeveryday. Everywhere it is easy to find people smoking, both men, women, teenagers, old people, rich and poor, there is no exception. How smoking can be a part of people's lives. In terms of health, there is no one point that agrees or sees the benefits. However, it is not easy to reduce or eliminate it. Therefore, lifestyle is very interesting as a health problem, at least considered a risk factor for various diseases(Febriza et al., 2025).

The results of the study showed that smoking habits were not significant and did not pose a risk to the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. The results of the distribution data showed that in the group of positive TB cases with smoking habits of 47%, the percentage was not much different from those who did not smoke at 53%. This indicates that there are the same risk factors for smokers and non-smokers. In line with the findings of the study(Ernawati et al., 2017;Lubisa et al., 2025)that smoking habits do not have a significant effect on the incidence of pulmonary tuberculosis.

Active smokers have a higher risk compared to passive smokers and non-smokers. Cigarette smoke contains harmful substances, especially tar and nicotine which have been proven to be immunosuppressive by reducing the host's innate immune system and increasing susceptibility to infection.(Anggraini & Hutabarat, 2021).

Substantially, the relationship shown between smoking behavior and the incidence of tuberculosis is directly proportional, namely, the more cigarettes smoked, the greater the risk of being infected with tuberculosis, the greater the severity of tuberculosis, the greater the recurrence of tuberculosis, and the greater the failure of tuberculosis therapy.(Aprilisya et al., 2025). The amount of exposure to cigarette smoke is influenced by the quantity of cigarettes smoked and other supporting factors such as the length of smoking history, age of starting smoking, category of light or heavy smokers, type of cigarettes and passive or active smokers are at greater risk of developing pulmonary tuberculosis.(Atira, 2020).

The effects of smoking will be very dangerous for someone who has a history of smoking for a relatively long period of time > 10 years.(Aprilisya et al., 2025). The longer a person smokes, the more health problems are caused by the content in cigarettes. This is because the dangerous chemicals contained in cigarettes or cigarette smoke if inhaled for a long period of time will accumulate in the body and result in damage to the function of internal organs, especially the function of the lung defense. Damage to the function of the lung defense causes the immune system to decrease and the function of phagocytosis is damaged, causing the risk of being infected with tuberculosis bacteria.(Febriza et al., 2025).

Someone who starts smoking as a teenager will have the greatest possibility of smoking for a long period of time. This is related to several studies which say that the incidence of pulmonary TB will increase if you smoke for a long period of time.(Lubisa et al., 2025). A person who first starts smoking will not initially feel the pleasant effects of the cigarette, because nicotine in cigarettes has toxic effects on first-time use such as coughing, dizziness and nausea. The

age of starting smoking affects the length of smoking where the younger a person starts smoking, the longer a person has a history of smoking and the harder it is to quit smoking, and the length of time a person smokes can increase the risk of pulmonary tuberculosis.(Atira, 2020).

The Influence of Distance from Home to Health Facilities on the Incidence of Pulmonary Tuberculosis in Nabire Regency

The results of the study showed that the effect of the distance from home to health facilities was not significant with the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. The results of the OR value were interpreted that the distance from home to health facilities was 1.489 times greater risk of being infected with pulmonary TB compared to the distance from home to nearby health facilities, but from the lower value it was less than 1 so it was not significant. This interpreted that distant access to services was at risk of delaying treatment and prevention of Pulmonary TB, but this was influenced by public knowledge in preventing Pulmonary TB.

The results of this study are in line with previous research byYustian & Wahyuddin, (2023);Maulani et al., (2025)that there is no influence of access to health services on the incidence of Pulmonary TB. A person with easy access to services but has a lifestyle that increases the risk, can also contribute to the transmission of tuberculosis. This is also influenced by knowledge and higher income, more able to maintain their health by occupying housing that meets health requirements, good nutritional intake, and being able to finance the necessary health care(Nansorina et al., 2024).

Beliefs in culture and traditional practices within a tribe can determine attitudes towards modern medical treatment. Different understandings of the causes and treatment of disease influence a person's compliance, which has an impact on the success of treatment and disease control.(Tutuhatunewa et al., 2024). Understanding the official or common language used in health services can be a barrier for some patients who are not used to using official or common language when going for treatment.(Marme et al., 2023).

Transportation plays an important role in access to health services, especially in areas with limited transportation infrastructure. Regional differences, which have access to varying services, can identify areas with higher or lower disease incidence rates as well as varying socioeconomic and family welfare levels.(Sukatemin, 2022).

Geographically, the location of health service facilities in Nabire district varies between regions consisting of coastal areas, mountains and plains. One of the inhibiting factors for the use of the nearest health service facilities is the ongoing stigma in the community about tuberculosis being considered related to HIV/AIDS, thus encouraging them to seek services in places that are far from their homes and unknown to neighbors and relatives.(Sukatemin, 2022). This condition is in accordance with research conducted by(Purnamasari et al., 2022)with the results that there is a relationship between stigma and compliance with taking medication. This is also the case with research conducted(Daramatasia & Kurniyanti, 2021)which reported that as many as 72% of respondents with pulmonary TB experienced high stigma in society.

One type of stigma that exists is the stigma of society that describes negative reactions or judgments from society. The emergence of the stigma of society towards the existence of people suffering from tuberculosis as perpetrators of bad behavior causes tuberculosis sufferers to choose health care facilities outside their residential area.(Hasudungan et al., 2020; (Aryani, 2021)

The Influence of HIV Status on the Incidence of Pulmonary Tuberculosis in Nabire Regency

The results of the study showed that the influence of HIV status was significant with the incidence of pulmonary tuberculosis in Nabire Regency, Central Papua Province and from the OR results, HIV status was at 4.527 times greater risk of being infected with pulmonary tuberculosis compared to HIV negative. In line with the findings of previous studies byHaryani & Burmanajaya, (2023);(Yunisa, 2023)that HIV sufferers are 2.313 times more at risk of suffering from pulmonary tuberculosis.

Human Immunodeficiency Virus(HIV) is a disease that attacks white blood cells and causes a person's immune system to decline and become susceptible to various diseases and cause death. Aquired Immune Deficiency Syndrome (AIDS) is a collection of signs and symptoms that will appear due to damage to the immune system.(Cahyawati, 2018)..

People with a history of HIV/AIDS are about 30 times more likely to develop tuberculosis than people who are not infected with the virus. Tuberculosis is one of the most common opportunistic infections in HIV infection and can precede the development of AIDS, but often the two are diagnosed together.(Dafitri & Medison, 2020). Tuberculosis (TB) and human immunodeficiency virus (HIV) infections interact and affect each other's pathophysiology. Tuberculosis is the leading cause of death in AIDS patients. HIV infection is among the strongest risk factors for Mycobacterium tuberculosis infection and progression to active disease increases the risk of reactivation of latent TB.(Mukuku et al., 2019;(Wonderful & Beautiful, 2023).

Factors that can affect HIV sufferers with pulmonary TB incidents are the possibility of someone becoming a TB patient, including low immunity and HIV/AIDS infection. The increase in HIV infection also contributes to the TB problem because the number of people infected with HIV increases, so the number of TB patients will also increase (Haryani & Burmanajaya, (2023).

The Influence of DM History on Pulmonary Tuberculosis Incidence in Nabire Regency

The results of the study showed that the influence of DM history was not significant with the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. When viewed from the OR value with a value <1, it is interpreted that DM history is not a risk factor for pulmonary TB infection. According to(Batubara & Fairuza Alziwinindya, 2024), that there is no strong and definite data showing the incidence/prevalence of pulmonary tuberculosis among diabetes mellitus sufferers.

It is unclear whether DMincrease vulnerabilityto initial infection with Mycobacterium tuberculosis or the risk of progression from TB infection to active disease, but evidence of impairment in innate and adaptive immunity in patients with DM suggests that this chronic disease may impact both stages of TB.(Gotera et al., 2021). Recent findings on the biology underlying and promoting the TB-DM relationship support inefficient innate immunity, followed by a hyperreactive cellular response to Mycobacterium tuberculosis (Mtb) however, the contribution of changes*response*on TB susceptibility or more adverse clinical outcomes of TB patients with DM remains unclear.

Diabetes mellitus is associated with dyslipidemia caused by high dietary fat intake and dysregulated hepatic lipid metabolism, while TB is associated with malnutrition and wasting syndrome. resulting in increased free fatty acid flow to the liver and overproduction of triglycerides and VLDL. High insulin levels stimulate lipogenesis.inhepatocytes that fail to inhibit lipolysis resulting in increased free fatty acid flow to the liver and excessive production of triglycerides and VLDL. TG levels are related to the severity of TB disease.(Maghfiroh et al., 2025).

This is related to the hyperglycemic condition that occurs in DM patients can reduce the immunological response, making it easier for TB infection to occur. There is a study that states that diabetes mellitus can increase the risk of TB infection. This bacterial infection can also cause the body to be unable to control blood sugar levels, so that TB patients will easily experience diabetes mellitus(Lin, 2019).

The absence of a history of DM influencing the results of this study may occur due to control of blood sugar levels.bloodhigh which does not affect the disruption of beta cells. Adequate blood sugar control factors do not interfere with the body's immune system so that the risk of pulmonary tuberculosis does not occur. It is different if blood sugar levels are not controlled and with increasing age causes the body's immunity to decrease noisy with the occurrence of pulmonary tuberculosis(Agility, 2021).

Dominant Influence

The results of the study showed that HIV status is the most dominant factor influencing the incidence of Pulmonary TB in Nabire Regency, Central Papua Province. This is because PLHIV have decreased immunity and are easily attacked by TB bacilli, which has an impact on the high incidence of Pulmonary TB.(Haryani & Burmanajaya, 2023;(Haryani & Burmanajaya, 2023).

CONCLUSION

1. The influence of ethnicity was not significant on the incidence of pulmonary tuberculosis in Nabire Regency, Central Papua Province (p-value 0.057; OR = 1.594; CI95% (1.010-2.515).
2. The effect of age was not significant on the incidence of pulmonary tuberculosis in Nabire Regency, Central Papua Province (p-value 0.815; OR = 0.815; CI95% (0.515-2.943).

3. The influence of gender was significant on the incidence of pulmonary tuberculosis in Nabire Regency, Central Papua Province (p-value 0.002; OR = 1.960; CI95% (1.299-2.958).
4. The effect of smoking habits was not significant on the incidence of pulmonary tuberculosis in Nabire Regency, Central Papua Province (p-value 0.286; OR = 1.275; CI95% (0.849-1.916).
5. The effect of distance from home to health facilities was not significant on the incidence of Pulmonary TB in Nabire Regency, Central Papua Province (p-value 0.187; OR = 1.489; CI95% (0.872 – 2.54).
6. The influence of HIV status was significant on the incidence of pulmonary tuberculosis in Nabire Regency, Central Papua Province (p-value 0.001; OR = 4.257; CI95% (2.451 – 8.955).
7. The influence of DM history was not significant on the incidence of Pulmonary TB in Nabire Regency, Central Papua Province (p-value 0.747; OR = 0.661 CI95% (0.146 – 2.994).
8. HIV status (p value 0.001; OR = 4.506; CI95% (2.419 – 8.393) is the most dominant factor influencing the incidence of Pulmonary TB in Nabire Regency, Central Papua Province.

RECOMMENDATION

Program policies are needed to conduct routine screening for Pulmonary TB, HIV and blood glucose control for DM patients so that the management target is effective, so it is necessary to create standard therapy guidelines and provide effective medicines for the community and health promotion by promoting a healthy lifestyle such as a healthy diet, increasing physical activity such as exercise, avoiding cigarettes and alcohol, clean and healthy living behavior in preventing Pulmonary TB.

FURTHER STUDY

Further research is needed on the relationship between diabetes mellitus and tuberculosis through nutritional intake so that a person's nutritional status can be known from the nutritional intake of DM patients, using a quantitative approach because in this study, DM patients were still found to be not significantly related and for researchers to always conduct research using research designs that are rarely used by other researchers such as cohort research designs and others that can determine the cause and effect between the factors studied and the incidence of Pulmonary TB and for further research, a larger sample can be used.

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