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The effect of age, gender, body mass index and environment on the event of pulmonary tbc in Banjarbaru city

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Abstract

The incidence of pulmonary tuberculosis is in pulmonary tuberculosis patients who proved positive on the results of direct microscopic examination, Rapid Molecular Test, and culture (sputum and tissue). Factors that can affect the event of pulmonary tuberculosis are age, gender, and body mass index. This study was done to analyze the effect of age, sex, body mass index, and environment on the event of pulmonary tuberculosis in Banjarbaru City. This research used a cross-sectional study design. The research's respondents were 82 patients with pulmonary tuberculosis with proportional random sampling. This study used secondary data on the Online Tuberculosis Information System on the Wasor TB account of the Banjarbaru City Health Office. Analyzing data using a chi-square test and logistic regression. Patients with productive age have a tendency to have bacteriologically confirmed pulmonary tuberculosis (p=0.011). Patients with male sex tended to have bacteriologically confirmed pulmonary tuberculosis (p=0.022). Patients with an abnormal body mass index tended to have bacteriologically confirmed pulmonary tuberculosis (p=0.001). Patients with environments in the Banjarbaru area have a tendency for bacteriologically confirmed pulmonary TB incidence (p=0.235). Logistic regression analyzing showed that age (p=0.007; Exp(B)=5.305), gender (p=0.016; Exp(B)=3.830), BMI (p=0.001; Exp(B)=6.769) and environment (p=0.623; Exp(B)=1.647) with 95% confidence level. There is the effect of age, sex, and BMI on the event of pulmonary tuberculosis in Banjarbaru City. There is no environmental influence on the incidence of pulmonary tuberculosis in Banjarbaru City. The BMI had the most effect on the event of pulmonary tuberculosis in Banjarbaru City.

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I. BACKGROUND

Global commitment to TB control through several efforts, including the Moscow Declaration in 2017 by making important efforts to End TB By 2030 and SDGs by 2030 targeting ending the epidemic of Tuberculosis, AIDS, and malaria and reducing the incidence of TB [1]. WHO data in the 2020 Global TB Report, currently Indonesia is the second rank in the world as the largest event of TB sufferers after India. The estimation of incidence was 845,000 cases or 312 per 100,000 people, and mortality was 92,000 or 34 per 100,000 people, with a total population of 92,000. TB cases found were 568,987, with the number of Bacteriologically Confirmed TB cases being as many as 11,463 cases [2].

The National Commitment for TB control in Indonesia through the 2020-2024 RPJMN targets the incidence of TB from 272 per 100,000 population to 190/ per 100,000 population [1]. The national TB control target is to eliminate TB by 2030 and be free of TB by 2050 through the national TB control strategy [3]. One of the efforts towards the roadmap for the elimination of tuberculosis by 2030 is to achieve a high coverage of bacteriologically confirmed TB diagnosis [1].

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The province of South Kalimantan still has high Bacteriological Confirmed TB cases found in several areas of 13 City Districts based on data in 2020 with a target of 15,087 TB case findings with a Case Detection Rate / CDR of 81%. The number of bacteriologically confirmed TB is 1,660 cases (50.7%), clinically confirmed TB is 1,398 cases (42.7%), Extrapulmonary TB is 214 cases (6.5%), and Drug Resistant TB / MDR TB is 23 cases, so the total TB cases found in 2020 were 3,295 cases with a CDR of 21.8% [4].

Banjarbaru City is one of 13 regencies in South Kalimantan Province that carries out TB control activities continuously and continuously coordinated by the Banjarbaru City Health Office by overseeing 10 Puskesmas and 9 Hospitals where the case finding rate / CDR with an estimated case of 1183 and the minimum target of 70% CDR in 2018 is 454 cases (38.4% CDR), of which 161 cases of bacteriologically confirmed tuberculosis (35.5%), clinically confirmed cases of pulmonary tuberculosis 259 cases (57%) and the rest were extrapulmonary in 34 cases (7.5%) [5]. Then, the case finding rate with an estimated case of 1,113 and a target CDR of 72% in 2019 in 444 cases with a CDR of 39.9%, of which are bacteriologically confirmed tuberculosis cases as many as 212 cases (47.7%), clinically confirmed pulmonary tuberculosis cases 207 cases (46.6%) and the rest were extrapulmonary 25 cases (5.6%) [6]. Furthermore, the TB case finding rate with an estimated case of 1,115 and a target CDR of 81% in 2020 is 260 cases (CDR 23.3%), of which bacteriologically confirmed TB cases were 127 cases (48.8%), clinically confirmed pulmonary TB cases were 116 cases (44.6%) and the rest were extrapulmonary 17 cases (6.5%) [7].

Wahyudi's research had the purpose of analyzing the relationship between TB suspects' characteristics and bacteriologically confirmed pulmonary tuberculosis at the Tanon Health Center. Of 80 respondents, 11 (13.8%) were found with a positive smear or bacteriological confirmation. The results of the analysis with the chi-square test obtained p = 0.003, indicating a relationship between age and pulmonary TB on positive smear or bacteriological confirmation. With the same chi-square test, p-value = 0.030, there was a significant relationship between gender and Bacteriologically Confirmed Pulmonary Tuberculosis [8].

Nutritional factors also affect the incidence of bacteriologically confirmed pulmonary tuberculosis. The research showed that people with poor nutritional status had a 3.7 times risk of suffering from severe TB disease compared to people with adequate nutritional status or more. Malnutrition in a person will affect the strength of immunity condition and the immunity reaction to disease. The measurement of BMI is a way to determine a person's nutritional status [9].

The place of residence of TB patients is also a factor that affects the incidence of Bacteriologically Confirmed Pulmonary Tuberculosis. One of them is in an area with a large population, a dense slum area, and a poor slum area. A dense and slum housing environment will facilitate the transmission of TB. Not all populations can access TB services, especially in Remote, Border, and Archipelago Areas. , as well as high-risk areas such as urban slum areas, ports, industries, and dense population [3].

Based on the background above, not many studies have been conducted on the distribution description of bacteriologically and clinically confirmed pulmonary tuberculosis from aspects of age, sex, body mass index, and environment. The goal of this study was to explain the effect of age, gender, body mass index, and environment on the event of pulmonary tuberculosis in Banjarbaru City.

II. METHOD

The type of research used was cross-sectional design. The location of data collecting was from 10 health centers and 1 hospital in the Banjarbaru City Health Office area in the period October - November 2021. The population of this study were patients with pulmonary tuberculosis who underwent microscopic examination or used the Rapid Molecular Test with confirmed bacteriological and clinical results. As many as 260 people. The criteria of respondents were:

- Bacteriological and clinical confirmed case data of pulmonary tuberculosis were taken from secondary data at online SITB in 2020.
- New Patients treated with Bacteriological and clinically Confirmed Pulmonary Tuberculosis 2020.
- Relapse patients were treated with bacterial and clinically confirmed pulmonary TB in 2020.
- Patients with a history of pulmonary TB treatment other than relapse (after Loss to Follow-up, treated after failure, etc.) in 2020
- Patients with no known history of previous pulmonary TB treatment in 2020.
- The patient must not be less than 15 years old. The exclusion criteria were as follows: Data on the incidence of extrapulmonary TB patients.

Sample size used two-proportion hypothesis test sample formula with Lameshow formula, obtained the minimal samples were 82 samples. The sampling method in this study was the cluster proportional random sampling method. The independent variables studied were age, gender, Body Mass Index (BMI) and Environment. The depen-

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dent variable to be studied in this study is the incidence of pulmonary tuberculosis.

Bivariate analysis used chi-square test and multivariate analysis used multiple logistic regression with 95% confidence level. To see the possibility of the emergence and development of a behavior associated with risk factors is calculated. Calculation of the risk for was reflected by the prevalence ratio (PR).

III. RESULT

A. Effect of age on the incidence of pulmonary tuberculosis in Banjarbaru City

The results of the analysis of the effect of age on the incidence of pulmonary tuberculosis using the chi-square test is in the following table.

TABLE 1
ANALYSIS OF AGE ON THE EVENT OF PULMONARY TUBERCULOSIS IN BANJARBARU CITY

Age	Incidence of pulmonary tuberculosis					*P*-value	PR	95% (CI)
	Yes		No					
	N	%	N	%	Total			
Productive	38	64,4	21	35,6	59	0,011	4,136	1,468-11,653
Not Productive	7	30,4	16	69,6	23			
Total	45	54,9	37	45,1	82			

Source: Secondary Data Research Results in 2020

The table above shows that TB patients of productive age are more likely to have bacteriologically confirmed pulmonary TB disease compared to non-productive TB patients. Based on the statistical results using the continuity correction test with a 95% confidence level, *p*-value = 0.011 was obtained, then the decision was Ho rejected ($p < 0.05$), which means that productive age has a significant effect on the incidence of Bacteriologically Confirmed Pulmonary Tuberculosis. The PR result was 4.136 (95% CI 1.468-11.653), which means that TB patients of productive age have a 4.136 times greater risk of developing bacteriologically confirmed pulmonary TB disease compared to patients of unproductive age.

B. Effect of Gender on the Event of Pulmonary Tuberculosis in Banjarbaru City

The analysis of gender's effect with the event of pulmonary tuberculosis using the chi square test can be seen in the following table.

TABLE 2
CHARACTERISTICS OF BMI VARIABLES

Gender	Incidence of pulmonary tuberculosis					*P*-value	PR	95% (CI)
	Yes		No					
	N	%	N	%	Total			
Male	34	65,4	18	34,6	52	0,022	3,263	1,278-8,327
Female	11	36,7	19	63,3	30			
Total	45	54,9	37	45,1	82			

Source: Secondary Data Research Results in 2020

The table above shows that male TB patients are more likely to have Bacteriologically Confirmed Pulmonary Tuberculosis disease than female Pulmonary TB patients. Statistical results of the continuity correction test with a 95% confidence level, the *p*-value = 0.022, the decision is Ho is rejected ($p < 0.05$). It meant that gender has a significant effect on the event of Bacteriologically Confirmed Pulmonary Tuberculosis. The PR result was 3,263 (95% CI 1,278-8,327), which means that male pulmonary TB patients have a 3.263 times greater risk of developing bacteriologically confirmed pulmonary TB disease compared to female pulmonary tuberculosis patients.

C. The Effect of Body Mass Index on the Incidence of Pulmonary Tuberculosis in Banjarbaru City

The results of the analysis of the effect of BMI on the incidence of pulmonary tuberculosis using the chi square test is in the following table.

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TABLE 3
ANALYSIS OF BMI ON THE EVENT OF PULMONARY TUBERCULOSIS IN BANJARBARU CITY

IMT	Incidence of pulmonary tuberculosis					*P*-value	PR	95% (CI)
	Yes		No					
	N	%	N	%	Total			
Abnormal	25	80,6	6	19,4	31	0,001	6,458	2,252-18,521
Normal	20	39,2	31	60,8	51			
Total	45	54,9	37	45,1	82			

Source: Secondary Data Research Results in 2020

The table above shows that pulmonary TB patients with abnormal BMI have a greater incidence than those with normal BMI. Based on the results of the continuity correction test with a 95% confidence level, the p-value = 0.001, then the decision is Ho is rejected (p <0.05), which means that BMI has a significant effect on the event of pulmonary tuberculosis. The PR result was 6.458 (95% CI, 2.252-18.521), which means that patients with pulmonary tuberculosis with an abnormal BMI had a 6.458 times greater risk of developing bacteriologically confirmed pulmonary TB disease compared to patients with pulmonary tuberculosis who had a normal BMI.

D. Effect of Environment on the Event of Pulmonary Tuberculosis in Banjarbaru City

The results of environmental influences on the event of pulmonary tuberculosis using the Fisher's exact test is in the following table.

TABLE 4
ANALYSIS OF THE INFLUENCE OF THE ENVIRONMENT ON THE INCIDENCE OF PULMONARY TUBERCULOSIS IN THE CITY OF BANJARBARU

Environment	Incidence of pulmonary tuberculosis					*P*-value	PR	95% (CI)
	Yes		No					
	N	%	N	%	Total			
Within Region	43	57,3	32	42,7	75	0,235	3,359	0,612-18,435
Out of Territory	2	28,6	5	71,4	7			
Total	45	54,9	37	45,1	82			

Source: Secondary Data Research Results in 2020

The table above shows that Pulmonary TB sufferers who are in the Banjarbaru City area are more affected than Pulmonary TB sufferers who are outside the Banjarbaru City area. The results of the Fisher's exact test with a 95% confidence level, the p-value = 0.235, the decision is Ho is accepted (p > 0.05), which means that the environment does not significantly affect the incidence of pulmonary tuberculosis. The PR result was 3.359 (95% CI 0.612-18.435), which means that patients with pulmonary tuberculosis residing in the Banjarbaru area have a 3.359 times greater risk than pulmonary TB patients outside the Banjarbaru area. Based on the results of this study, the environment in the Banjarbaru City area that was most affected by pulmonary TB cases was 75 patients (91.5%) compared to TB patients outside the Banjarbaru City area, which was only 7 patients (8.5%).

E. Effect of Age, Gender, Body Mass Index, and Environment on the Event of Pulmonary Tuberculosis in Banjarbaru City

From bivariate analysis, all variables, namely age, gender, BMI, and environment, have a p-value <0.25 so that all model candidates who will enter the multivariate stage can be continued according to the data in the following table:

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TABLE 5
INITIAL MODEL MULTIVARIATE TEST RESULTS

Variable	sig.	Exp (B)	95% CI	
			Lower	Upper
Age	0,008	5,208	1,540	17,611
Gender	0,028	3,551	1,144	11,028
BMI	0,001	6,810	2,110	21,977
Environment	0,623	1,647	0,225	12,076
Description:				
Sig	= Significant			
Exp. (B)	= Beta Exponent Value			
95% CI Lower	= Bottom Data Interval			
95% CI Upper	= Upper Data Interval			

TABLE 6
SECOND MODEL MULTIVARIATE TEST RESULTS

Variable	sig.	Exp (B)	95% CI	
			Lower	Upper
Age	0,007	5,305	1,578	17,832
Gender	0,016	3,830	1,281	11,445
BMI	0,001	6,769	2,110	21,70
Description:				
Sig	= Significant			
Exp. (B)	= Beta Exponent Value			
95% CI Lower	= Bottom Data Interval			
95% CI Upper	= Upper Data Interval			

Based on the table above, the significance value of the age variable is 0.007 <0.05, so Ho is rejected, and it can be concluded that age has a significant partial effect on the event of pulmonary tuberculosis. To see the results of changing the old Exp (B) value with the new Exp (B) can be seen in the table below:

TABLE 7
CHANGES IN THE VALUE OF OR / EXP (B) IN THE MULTIPLE LOGISTIC REGRESSION TEST

Variable	OR Lama	OR Baru	Kali 100	Perubahan Exp (B) (%)
Age	5,208	5,305	100	1,86
Gender	3,551	3,830	100	7,86
BMI	6,810	6,769	100	0,60

The independent variable that most dominantly affects the incidence of pulmonary TB in Banjarbaru City is the BMI variable (p-value = 0.001) with a beta exponent value (Exp B) of 6.769, which means that patients with pulmonary TB with abnormal nutritional status will be 6.769 times more likely to experience pulmonary TB. The event of bacteriologically confirmed pulmonary TB is compared with patients with pulmonary TB whose nutritional status is normal.

IV. DISCUSSION

A. Effect Between Age and The Incidence of Pulmonary Tuberculosis

Based on the results of research using the continuity correction test, a p-value of 0.011 (p <0.05) was obtained, meaning that Ho was rejected; it can be concluded that there is a significant influence between productive age and the incidence of pulmonary tuberculosis in Banjarbaru City. The value of the Prevalence Ratio is 4.136 (95% CI 1.468 – 11.653); this means that patients with pulmonary TB of productive age

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have the potential to be 4.136 times more likely to experience bacteriologically confirmed pulmonary TB compared to non-productive pulmonary TB patients.

The results of this study indicate that patients with pulmonary tuberculosis of productive age have the potential to experience a greater incidence of bacteriologically confirmed pulmonary tuberculosis disease than patients with pulmonary tuberculosis who are of non-productive age, from 59 pulmonary tuberculosis patients (71.95%) of productive age there are 38 people (64.4%) with bacteriologically confirmed pulmonary tuberculosis, while 21 people (35.6%) had clinically confirmed pulmonary tuberculosis. Age, as one of the characteristics in epidemiological studies, is an important variable because a lot of diseases are found with various variations caused by age. The role of the age variable is quite important, among others, because the study of the relationship between the variation of disease and age can provide an overview of the factors causing the disease, and age can also be a secondary factor that must be taken into account in observing or researching differences in disease frequency against other variables.

The age variable plays a role in the event of pulmonary TB, where the risk for developing pulmonary TB is said to be like an inverted normal curve, which means that the higher the initial stage and the lower the decrease over 2 years of age until adults have good resistance to pulmonary tuberculosis. The peak is, of course, young adults and decreases again when a person or group approaches old age, where each certain age group has different disease risk factors.

Putranto Perdana's Research (2006) stated that productive age has a higher risk of transmission of pulmonary TB disease than non-productive age. Productive age is a risk for the level of transmission because it interacts with other people, has high mobility, and becomes a chance for bacteria to be transmitted to other people and the environment around [10].

These results are in line with Irawan's research (2010) entitled Factors Related to the Incidence of Pulmonary TB at H. Adam Malik Hospital. The results of that study indicated that the age of the respondent was associated with the incidence of pulmonary TB, and the age group is 55-60 years with a percentage of 52.9% [11].

According to Murfikin (2013), productive age plays an important role in meeting economic needs, so those at productive age are very risky for developing pulmonary TB [12].

B. The Effect of Gender and the Event of Pulmonary Tuberculosis

Based on the results of the study using the continuity correction test, the p-value of 0.022 ($p < 0.05$) means that Ho is rejected. There is a significant effect between gender and the event of pulmonary tuberculosis in Banjarbaru City. The value of the Prevalence Ratio is 3.263 (95% CI 1.278-8.327); this means that male pulmonary TB patients are 3.263 times more likely to have bacteriologically confirmed pulmonary TB than female patients.

The large number of cases of pulmonary TB that occurs in men is due to the fact that men have higher mobility than women, so they are more likely to be exposed, in addition to habits such as smoking and consuming alcohol, which can lower the body's defense system, so it is natural that smokers and drinkers alcohol is often referred to as an agent of pulmonary TB disease [3].

Global Tuberculosis Report data in WHO 2014 Data from the Global Tuberculosis Report in WHO shows that pulmonary TB is increasingly occurring in young people, where it is more common in economically productive communities, especially in women aged 15-24 years [13]. Other research results that support this research are those conducted by Eka Fitriani. In 2013, where gender was significantly associated with the incidence of pulmonary tuberculosis, men had a 2 times higher risk of suffering from pulmonary tuberculosis than women. In accordance with previous studies, the proportion of male pulmonary tuberculosis patients (60.0%) was higher than females (40.0%) [14].

In line with Eisner's theory 2011, The large number of cases of pulmonary TB that occur in men is due to the fact that men have higher mobility than women, so they are more likely to be exposed to habits such as smoking and consuming alcohol can make it easier for men to become infected with pulmonary TB. Smoking is burning tobacco, which is then inhaled by the smoke that blows continuously into the oral cavity, which becomes a stimulus to change blood flow and reduce salivation. As a result, the oral cavity becomes dry, so smokers are at greater risk of being infected with mycobacterium bacteria. Exposure to cigarette smoke can also result in a decrease in epithelial mucociliary activity, a decrease in the clearance of foreign particles by the epithelium, and abnormalities in vascular permeability, which can increase a person's risk of being infected with pulmonary TB [15].

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C. Effect of Body Mass Index with Bacteriologically Confirmed Pulmonary Tuberculosis Incidence

Based on the results of statistical analysis using the continuity correction test, *p*-value=0.001 ($p < 0.05$) means that Ho is rejected, and there is a significant effect between Body Mass Index and the event of pulmonary tuberculosis in Banjarbaru City. The PR result was 6.458 (95% CI 2.252 – 18.521), which means that patients with pulmonary TB with an abnormal BMI have a 6.458 times higher risk of experiencing Bacteriologically Confirmed Pulmonary TB than patients with Lung TB who have a normal BMI.

There is a relationship between malnutrition and infectious disease morbidity. Nutritional deficiencies that play a role in the immune system, such as protein and iron, cause a person to be infected with diseases [16]. The results of this study indicate that there is a relationship between the event of pulmonary TB and nutritional status (p = 0.003); namely, people who are undernourished/poor have a risk of developing pulmonary TB 2.184 times higher than those with good nutrition, statistically significant (95% CI = 1.315). –3,629). This is also reinforced by the results of other studies that nutritional status is less at risk for suffering from TB disease compared to good nutrition, from Ahmad Dahlan's findings (2001) by 2.5 times and the findings of Rusnoto (2006) by 3,789 times [16, 17].

In line with Maksalmina's theory 2013, One of the factors that influence pulmonary TB disease is nutritional status. Nutritional status is one of the most important factors in the body's defense against infection. In a state of poor nutrition, the body's immune reaction will weaken so that the ability to defend itself against infection decreases [18].

A person's nutritional factors also affect the incidence of bacteriologically confirmed pulmonary tuberculosis. The results showed that people with poor nutritional status had a 3.7 times risk of suffering from severe TB disease compared to people with adequate nutritional status or more. Malnutrition in a person will affect the strength of the immune system and the immunologic response to disease. Measurement of BMI is a way to determine a person's nutritional status. Nutritional status determines the normal health of the body and all system functions in the body, including the immune system, which is responsible for the body's defense against various infectious diseases, one of which is tuberculosis [9].

If a person's immune system decreases due to any reason, for example, old age, pregnant women, coinfection with HIV, people with diabetes mellitus, poor nutrition, or immunosuppressive conditions when infected with Mycobacterium Tuberculosis, it is easier to fall ill [3].

TB mostly attacks weak socio-economic groups. Lack of calories, protein, vitamins, iron and others (malnutrition), will affect a person's immune system, making them susceptible to various diseases, including pulmonary tuberculosis. This situation is an important factor that affects in poor countries, both adults and children [19].

According to Darmanto (2007), the condition of poverty is closely related to education, environmental sanitation conditions, nutrition, and access to health services. A decrease in income can lead to a lack of purchasing power to meet food consumption, which will affect nutritional status. If the nutritional status is poor, it will cause decreased immunity, making it easier to get pulmonary TB infection. Economic factors, in this case, poverty, in general, are closely related to various health problems due to the inability to overcome them. The problem of poverty will greatly reduce the community's ability to meet nutritional needs, housing, and a healthy environment. Obviously, all of this will easily cause tuberculosis [20].

Adult tuberculosis patients with poor nutrition will complicate the treatment undertaken, so patients with poor nutrition have a greater risk of death than patients with normal nutritional status [21].

D. Effect of Environment on the Event of Pulmonary Tuberculosis

The results of the statistical analysis using the Fisher exact test, with a p-value of 0.235 (p>0.05), means that Ho is accepted. It can be concluded that there is no significant effect on the environment or the incidence of pulmonary tuberculosis in Banjarbaru City. The Prevalence Ratio value is 3.359 (95% CI 0.612 – 18.435); this means that pulmonary TB patients living in the Banjarbaru City area have 3.359 times more risk of experiencing bacteriologically confirmed pulmonary TB compared to TB patients outside the Banjarbaru City area.

The population growth rate of Banjarbaru City throughout the year is quite high, so the population growth rate in 2020 is calculated at 2.34%. The city of Banjarbaru, which is synonymous with the City of Education, where there are various public and private universities, causes many newcomers to live in this city to study. In addition, the strategic position of Banjarbaru City, both administratively and economically accessible, encourages an increase in the population [7].

The results of the research showed that the environment in Banjarbaru is the most common cause of pulmonary tuberculosis. 75 cases of pulmonary tuberculosis found in 5 sub-districts within the city of Banjarbaru, in the Landasan

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Ulin sub-district, which had a large number of patients with bacteriologically and clinically confirmed pulmonary TB, 23 cases (28.05%) were found and the lowest was in the South Banjarbaru sub-district with 11 cases. Cases (13.42%).

If viewed by sub-district, the highest population is in the Landasan Ulin sub-district, as many as 78,872 people or 29%, while the least is in the Cempaka sub-district, which is 37,182 people or 14%. Health facilities located in the Landasan Ulin sub-district include Idaman Hospital, Guntung Payung Health Center, Guntung Manggis Health Center, and East Landasan Ulin Health Center [7]. Landasan Ulin sub-district has a fairly large area accompanied by large population growth and high mobilization, so it can cause or trigger conditions that allow the high incidence of pulmonary tuberculosis in the area.

The environment influences the incidence of TB because environmental conditions such as residential density, house humidity, ventilation, sunlight, house floors and walls, and a dirty environment are associated with TB incidence. According to Tambayong22 (2000), the condition of the living environment can be a risk factor for the transmission of pulmonary TB disease. Roofs, walls, and floors can be breeding grounds for germs. Floors and walls that are difficult to clean will cause a buildup of dust, so they will serve as a good medium for the proliferation of Mycobacterium tuberculosis. Someone who lives in a clean house is also likely to get TB disease because someone doesn't always stay in his house; he may one day be in another place such as in the office, bus, market, and other places that are not necessarily free from TB germs. However, living in a clean environment can reduce the risk of TB [22]. Also explained by Notoatmodjo (2003), the home environment is one of the factors that have a major influence on the health status of its inhabitants [23]. The results of this study are in line with previous research conducted by Siti Fatimah (2008) entitled "The Relationship of Home Environmental Health Factors with the Incidence of Pulmonary TB in Cilacap Regency in 2008". From the results of the study, it was concluded that there was a relationship between home environmental health factors and the incidence of pulmonary tuberculosis in Cilacap Regency [24].

Girsang's research (2011) explained that there are two risk factors that lead to pulmonary TB disease. First, environmental factors, namely the condition of the patient's house that does not meet the requirements, including non-permanent walls, high residential density, no garbage disposal, earth-floored houses, and consuming water that does not meet the requirements. The two behavioral factors are that people still have unhealthy lifestyles, and there are still many people who smoke [25].

Sudiantara (2014) said that the incidence of pulmonary TB related to the physical environment of the house does not stand alone by one factor, but many factors that are related together are humidity and ventilation of the bedroom. In a state of inadequate ventilation, air is trapped in the room, and the room becomes stuffy and humid. Humidity in the house facilitates the proliferation of Mycobacterium tuberculosis bacteria, and the condition of air ventilation in small rooms is closely related to the incidence of pulmonary TB disease. Ventilation, less than 15% of the floor area, has a 16.9 greater risk of pulmonary TB. Bedroom ventilation plays a major role in air circulation, especially releasing CO2, including polluted materials such as bacteria, so if the ventilation of a room does not meet minimum standards, then the room will become hot and the air will stagnate in it [26].

V. CONCLUSION

The conclusion of this study is that there is an effect of productive age with an Exp (B) value of 5.305, male sex with an exp (B) value of 3.380, an abnormal body mass index with an Exp (B) value of 6.769 and the environment has no effect on the incidence of pulmonary tuberculosis in Banjarbaru City.

REFERENCES

[1] TBC. National Guidelines for Tuberculosis Control. Jakarta: Indonesian Ministry of Health; 2020.
[2] WHO. Global Tuberculosis Report; 2020. Available from: https://shorturl.at/glm8O.
[3] JDIH. Minister of Health Regulation Number 67 concerning Tuberculosis Control; 2016. Available from: https://shorturl.at/sg5oL.
[4] SKHS. 2020 Annual Profile Report. South Kalimantan, Indonesia: Provincial Health Service; 2020.
[5] BHS. 2018 Annual Health Profile Report. Banjarbaru City, Indonesia: Health Service; 2018.
[6] BHS. 2018 Annual Health Profile Report. Banjarbaru, Indonesia: Banjarbaru City Health Service; 2019.
[7] BHS. 2020 Annual Health Profile Report. Banjarbaru, Indonesia: Banjarbaru City Health Service; 2020.
[8] Wahyudi. Relationship between TB Suspect Characteristics and BTA (+) Pulmonary TB at Tanon Community Health Center; 2005.

ISSN: 2517-9616
DOI: 10.20474/jahms-9.1

[9] Dodor E. Evaluation of nutritional status of new tuberculosis patients at the effia-nkwanta regional hospital. Ghana medical journal. 2008;42(1):22.
[10] Ali SM, Kandou GD, Kaunang WP. Factors related to compliance with treatment for pulmonary TB sufferers in the working area of Siko Health Center, Ternate City. Graha Medika Nursing Journal. 2019;2(1):72-81.
[11] Irawan. Factors related to the incidence of pulmonary TB at H. Medan, Indonesia: Adam Malik General Hospital; 2010.
[12] F M. The Relationship between Smoking Habits and the Incidence of Pulmonary TB in the Working Area of the Sidomulyo Health Center. Riau, Indonesia ; Sidomulyo Health Center; 2013.
[13] WHO. Global Tuberculosis Report; 2014. Available from: https://shorturl.at/ZFBoF.
[14] Eka F. Risk Factors Associated with the Incidence of Pulmonary Tuberculosis at the Brebes Regency Health Center. Jurnal Kesmas UNNES Semarang. 2013;.
[15] Eisner. Disease Including TB, Bacterial Pneumonia and Other Respiratory Disease. Boston: Pearson; 2011.
[16] Dahlan A. Factors associated with the incidence of BTA (+) pulmonary TB disease, Case Control Study in Jambi 2000–2001. Indonesia: University of Indonesia; 2001.
[17] Rusnoto. Factors associated with the incidence of pulmonary TB in adults (Case Study at the Pati Lung Disease Prevention and Treatment Center). Semarang, Indonesia: Diponegoro University; 2006.
[18] Maksalmina. Nutrition, Family Nutrition Food and Disease Risk. Indonesia: Kompas Media Nusantara; 2013.
[19] Naga SS. Complete guide book of internal medicine. Jogjakarta, IND: CV. Sagung Seto; 2012.
[20] Darmanto D. Respirology. Jakarta, IND: Jakarta Medical Book Publishers; 2007.
[21] Werdhani. Pathophysiology, Diagnosis and Classification of Tuberculosis. Jakarta, Indonesia: Fakultas Kedokteran Universitas Indonesia; 2013.
[22] Tambayong J. Pathophysiology for Nursing. Jakarta, IND: EGC; 2000.
[23] Notoatmodjo S. Health Behavior Science. Jakarta: Rineka Cipta; 2003.
[24] Fatimah S. The Relationship Between Home Environmental Health Factors and the Incidence of Pulmonary Tuberculosis in Cilacap Regency. Indonesia: Diponegoro University; 2008.
[25] Girsang M, Tobing K, Rafrizal R. Faktor Penyebab Kejadian Tuberculosis Serta Hubungannya dengan Lingkungan Tempat Tinggal di Provinsi Jaw A Tengah (Analisis Lanjut Riskesdas 2007). Indonesian Bulletin of Health Research. 2011 3;39(1):34-41. doi: 10.22435/bpk.v39i1 Mar.77.34-41.
[26] Sudiantara K, Wahyuni NPS, Harini I. Factors Influencing the Increase in Pulmonary TB Cases. Denpasar: Poltekes Denpasar. 2014;.

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