DETERMINANTS OF RISK FACTORS ON THE EVENT OF LUNG TB

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ABSTRACT

Pulmonary tuberculosis (TB) is one of the most prevalent infectious diseases in the world. Based on a report by the World Health Organization (WHO, 2012) one third of the world's population, which is around two billion people infected with Mycobacterium Tuberculosis. More than 8 million populations get active TB every year and around 2 million die. More than 90% of TB cases and deaths come from developing countries, one of which is in Indonesia. This research is an observational analytic study with a case control study design that aims to determine the effect of risk factors for pulmonary TB events using a retrospective approach. The results of this study indicate that the most dominant variable TB incidence in high school education cases is down to 45 people (97.8%) and the smallest House Density is 25 people (54.3%) and the most dominant control variable is no comorbidities namely as many as 47 people (97.9%) and the smallest Respondents' House Density fulfilled the requirements of 26 people (56.5%). Factors that significantly influence the incidence of pulmonary tuberculosis are nutritional status (p = 0,000, OR = 31,263), respondent employment (p = 0,000, OR = 21.77), comorbidities (p = 0,000, OR = 0.022), Ventilation (p = 0.008, OR = 4,680) and House Humidity (p = 0,000, OR = 9,625). The results of the study concluded that the variable that most influenced the incidence of pulmonary TB was Nutrition Status (p = 0.002, Exp (B) = 2.334).

KEYWORDS Lung TB, TBC, Risk Factors

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INTRODUCTION

One of the infectious diseases with the highest prevalence in the world is Tuberculosis (TBC/pulmonary TB). Data from WHO reports that there are about two billion people infected with Mycobacterium Tuberculosis. Indonesia is one of the developing countries where there are more than 90% of cases and deaths and it is reported that more than 8 million people are affected by active TB every year and around 2 million die (Depkes, 2012).

WHO also reported that from 2010 to March 2011, Indonesia recorded 430,000 pulmonary TB patients with 61,000 deaths. In 2009 it was reported that there were 528,063 pulmonary TB patients with 91,369 deaths and it was smaller than the situation in 2009 (Conesa-Botella et al., 2012).

In the last decade worldwide it was reported that the incidence of TB had increased drastically. We know that TB can affect anyone, male or female, young or old, poor or rich and anywhere. TB is also a health problem in Indonesia, both in terms of mortality and morbidity, as well as diagnosis and therapy. Indonesia ranks third after India and China with the largest TB problem among 22 countries where there are 101,000 deaths and 539,000 new cases every year. The increasing number of deaths continues to increase due to tuberculosis because the number of cases of pulmonary TB in Indonesia which is characterized by positive acid-fast bacilli in patients is 110 per 100,000, which is increasingly difficult to implement (Endrasari, 2011).

TB disease in Indonesia is rather worrying, so we must be alert early on & get complete information about TB disease where from the results of research reports it is stated that there is one new patient in one minute and there is a new patient of pulmonary tuberculosis that is contagious every two minutes.

If a person dies from tuberculosis, he will lose his income for about 15 years. Economically it causes losses and tuberculosis also has another bad impact, namely being ostracized by the community. And it was also reported that the highest pulmonary tuberculosis patients were in the productive age group 15-50 years, which was around 75%. An adult tuberculosis patient is also estimated to lose an average of 3-4 months of work time, resulting in a loss of household income of around 20-30% (Lipsky et al., 2012).

Based on the Health Profile of the Health Office, it is stated that pulmonary TB has many sufferers, where in 2013 the estimated target number of BTA Positive Pulmonary TB cases was 196 people or about 80% exceeding the national target of 75%. The highest CDR figures were in Datuk Bandar Health Center and Kampung Baru Health Center, each with 37 cases and conditions. The coverage of basic environmental health facilities in Tanjung Balai City is still low, which can be seen in the Tanjung Balai City Health Office profile that in 2016 from houses Those who did not meet the requirements in 2014 were provided with 7,330 housing units (27.66%). As a result of these activities, 4,313 houses have met the requirements as healthy homes, bringing the total healthy houses in Tanjung Balai City to 18,894 houses or 45.99%.

Based on this study, it is strongly suspected that there is a relationship between risk factors and the incidence of pulmonary TB at the Kampung Baru Health Center, Tanjung

Balai City. The purpose of this study was to analyze the determinants of risk factors for the incidence of pulmonary TB at the Kampung Baru Health Center, Tanjung Balai City in 2019.

RESEARCH METHOD

This research is an observational analytic study with a case control study design which aims to determine the effect of risk factors(Akiyama, Hamdeh, Micic, & Sakuraba, 2021). The incidence of pulmonary TB using a retrospective approach means that the risk factors are identified or occurred in the past and meaning that the effects are identified at this time (Kwon et al., 2020). The case group includes people who suffer from tuberculosis which is marked by the results of the examination at the Puskesmas while the control group includes people who are not exposed to tuberculosis (Wardhani, Dharma, & Susito, 2021). The group is then compared about the presence of causative agents or past experiences that may be relevant to the disease.

This research was conducted in the work area of the Kampung Baru Health Center, Tanjung Balai City. This research was conducted by researchers in September 2019. The population of this study was residents aged 10 - 80 years at the Kampung Baru Health Center, Tanjung Balai City. The criteria for inclusion cases in this study were being willing to become research subjects by signing the research subjects by signing the informed consent and stating pulmonary tuberculosis by the Puskesmas and domiciled in the Kampung Baru Puskesmas area, Tanjung Balai City.

The control population was obtained from the outpatient visitor register at the Kampung Baru Health Center Tanjung Balai City in 2019 aged 10-80 years with inclusion criteria: willing to be a research subject by signing the research subject by signing an informed consent letter and declared not a patient pulmonary tuberculosis and ARI by the Puskesmas and domiciled in the area of the Kampung Baru Health Center, Tanjung Balai City.

Controls were residents aged 10-80 years who did not suffer from pulmonary TB diagnosed by a doctor or nurse who was recorded in the register book at the Kampung Baru Health Center, Tanjung Balai City. Determination of the sample size used case control by using the formula Stanley Lameshow, 1997 as below:

$$n = \frac{\{ Z\alpha\, [(1+1/c)pq + Z\beta \sqrt{[P1\ (p1q1 + p0q0/\ c}}{(P1 - P0)2}$$

Where :
n = Estimated sample size

Estimated sample size (n) is determined with a significance level (Z1 – /2) which is 5% (1.96), the test power (Z1 –) is 80% (0.20). f = proportion of unhealthy houses = 27.57% (30%) , c = 2 (number of controls) and R=3

In this study, the smallest R of the house sanitation variables (ventilation: 4.5; lighting: 6.9; humidity: 3.2 and density 3 in previous studies (Priyadi, 2003; Ruswanto, 2010) obtained a sample of 46 with a ratio of cases and controls 1:1 so that the control size is 1x 46 = 46. So, the number of samples required is 92 samples.

Sampling was done by purposive sampling where the selection of case samples was taken from the register of the Kampung Baru Health Center from 2018 to July 2019 which had inclusion criteria until the number of samples was met. Control samples were taken from the register according to the inclusion criteria. Characteristics of controls and cases by age and sex. The data used in this study are primary data obtained through the distribution of questionnaires and followed by direct interviews with high school students (SMA) Negeri 1 Berastagi, Karo Regency.

RESULT AND DISCUSSION

The results of this study were grouped into two groups, namely the control group and the case group with 46 respondents each. Based on the results of research on the age of the respondents, the majority of the case group were aged 10-50 years, namely 36 people (78.3%), while in the control group the majority were aged 10-50 years, namely 33 people (71.7%). Gender of respondents that the case group was mostly male, as many as 33 people (71.7%), while in the control group most of the men were as many as 40 people (87%). The nutritional status of the respondents that the case group was mostly lacking was 27 people (58.7%), while the control group was mostly normal, namely 44 people (95.7%).

The Socio-Economic Condition of the respondents stated that the case group was entirely below the minimum wage as many as 46 people (100%), while the control group was mostly below the minimum wage, which was 43 people (93.5%). The education of the respondents that the case group was mostly high school and below was 45 people (97.8%), while in the control group most of the high school were below as many as 44 people (95.7%).

The respondents' occupations that the case group mostly worked were 31 people (67.4%), while in the control group the majority were working as many as 45 people (97.8%). Comorbidities Respondents that the case group were equally as many as 21 people (47.7%) and the control group mostly had no comorbidities, namely 47 people (97.9%). The ventilation condition of the respondents that the case group was mostly unqualified as many as 36 people (78.3%), while in the control group the majority were qualified as many as 26 people (56.5%). The humidity of the respondent's house that the case group was mostly unqualified as many as 44 people (95.7%), while in the control group most of them did not meet the requirements as many as 32 people (69.6%).

Respondents' house lighting that most of the case groups did not meet the requirements, namely as many as 40 people (87%), while in the control group most of them did not meet the requirements as many as 30 people (65.2%).

House Density of respondents that the case group is mostly eligible, namely as many as 25 people (54.3%), while in the control group most of them are qualified as many as 26 people (56.5%). Respondents' exposure to cigarette smoke that the majority of cases were not met the requirements as many as 32 people (69.6%), while in the control group most of them did not meet the requirements as many as 26 people (56.5%). The condition of the respondent's house floor that the case group was mostly qualified, as many as 36 people (78.3%), while in the control group most were qualified as many as 35 people (76.1%). The condition of the walls of the respondent's house that the case group was mostly eligible, namely 39 people (84.8%), while the control group was mostly eligible as many as 33 people (71.7%). For more details, it can be seen in the following table:

Table 1 Distribution of Proportion of Respondents by Age, Gender, Nutritional Status, Socio-Economic Condition, Education, Occupation, Associated Diseases, Ventilation Conditions, House Humidity, House Lighting Conditions, House Density, Cigarette Smoke Conditions in the House, Floor Conditions and Wall Conditions in the House Puskesmas Kampung Baru Tanjung Balai City 2019

No.	Independent Variable	Case		Control	
		f	%	f	%
	Age				
1.	10-50 year	36	78,3	33	71,7
2.	51 years and over	10	21,7	13	28,3
	Amount	46	100	46	100
	Gender				
1.	Male	33	71,7	40	87
2.	Female	13	28,3	6	13
	Amount	46	100	46	100
	Nutritional Status				
1.	Less	27	58,7	2	4,3
2.	Normal	19	41,3	44	95,7
	Amount	46	100	46	100
	Socio-Economic Situation				
1.	Under UMR	46	100	43	93,5
2.	Above UMR	0	0	3	6,5
	Amount	46	100	46	100
1.	**Education**				
2.	Under Senior High School	45	97,8	44	95,7
	D1 Above	1	2,2	2	4,3
	Amount	46	100	46	100
	Respondent Occupation				
1.	Doesn't work	15	32,6	1	2,2
2.	Working	31	67,4	45	97,8
	Amount	46	100	46	100
	Comorbidities				
1.	There are co-morbidities	21	47,7	47	97,9
2.	No co-morbidities	23	52,3	1	2,1
	Amount	46	100	46	100
	Ventilation State				
1.	Not eligible	36	78,3	20	
2.	Qualify	10	21,7	26	
	Amount	46	100	46	
	Home Humidity				
1.	Not eligible	44	95,7	32	
2.	Qualify	2	4,3	14	
	Amount	46	100	46	
	Home Lighting State				
1.	Not eligible	40	87	30	
2.	Qualify	6	13	16	
	Amount	46	100	46	
	House Density				
1.	Not eligible	21	45,7	20	
2.	Qualify	25	54,3	26	
	Amount	46	100	46	100

	Exposure to Cigarette Smoke				
1.	Exist	32	69,6	26	56,5
2.	No	14	30,4	20	43,5
	Amount	46	100	46	100
	Floor Condition				
1.	Not eligible	10	21,7	11	23,9
2.	Qualify	36	78,3	35	76,1
	Amount	46	100	46	100
	the State of the Walls of the House				
1.	Not eligible	7	15,2	13	
2.	Qualify	39	84,8	33	
	Amount	46	100	46	

Bivariate Analysis

Based on the results of the research, the risk factors studied were Age, Gender, Nutritional Status, Socio-Economic Condition, Education, Occupation, Comorbidities, Ventilation Conditions, House Humidity, House Lighting Conditions, House Density, Cigarette Smoke Conditions in the House, Floor Conditions and Circumstances Wall. The age of the respondent has no effect on the incidence of pulmonary tuberculosis with a probability value (p) = 0.630. The value of the Odds Ratio (OR) is 1.418 (95% CI; 0.548-3.668) meaning that respondents suffer from pulmonary tuberculosis 1.418 times greater with age 10-50 years compared to respondents with age > 51 years.

The gender of the respondent has no effect on the incidence of pulmonary tuberculosis with a probability value (p) = 0.122. The Odds Ratio (OR) value is 0.381 (95% CI; 0.130-1.112) meaning that gender is not a determining factor for the occurrence of pulmonary tuberculosis in respondents. The nutritional status of the respondent has an effect on the incidence of pulmonary tuberculosis with a probability value (p) = 0.000. The Odds Ratio (OR) value is 31,263 (95% CI; 6,744-144.926) meaning that the respondent suffers from Pulmonary Tuberculosis 31.263 times greater with undernourished nutritional status compared to respondents with normal nutrition.

The respondent's socioeconomic condition has no effect on the incidence of pulmonary tuberculosis with a probability value (p) = 0.242. The Odds Ratio (OR) value is (95% CI; 0.548-3.668) meaning that respondents suffering from pulmonary tuberculosis are 8 times greater with income below the minimum wage compared to respondents with income above the minimum wage. The respondent's education has no effect on the incidence of pulmonary tuberculosis with a probability value (p) = 1,000. The Odds Ratio (OR) value is 2.045 (95% CI; 0.179-23.378), meaning that respondents suffering from pulmonary tuberculosis are 2.045 times greater with high school education and below compared to respondents with education > D1 and above.

The respondent's occupation has an effect on the incidence of pulmonary tuberculosis with a probability value (p) = 0.000. The Odds Ratio (OR) value is 21.774 (95% CI; 2.733-173.473) meaning that respondents suffering from pulmonary tuberculosis are 21.774 times greater than those who have not worked for years than those who work. The respondent's comorbidities have an effect on the incidence of pulmonary tuberculosis with a probability value (p) = 0.000. The Odds Ratio (OR) value is 0.022 (95% CI; 0.003-0.175) meaning that respondents suffer from pulmonary tuberculosis 0.022 times greater with comorbidities compared to respondents who do not suffer from comorbidities.

The ventilation condition of the respondent's house has an effect on the incidence of Pulmonary Tuberculosis with a probability value (p) = 0.001 The Odds Ratio (OR) value is 4.680 (95% CI; 1.881-11.643) meaning that the respondent suffers from pulmonary tuberculosis 4.680 times greater with ventilation that does not meet the requirements compared to with proper ventilation. The humidity of the respondent's house affects the incidence of pulmonary tuberculosis with a probability value (p) = 0.002 Odds Ratio (OR) value is 9.625 (95% CI; 2.043-45.37) meaning that the respondent suffers from tuberculosis 9.625 times greater with humidity that does not meet the requirements compared to respondents who do not suffer from pulmonary tuberculosis.

The lighting of the respondent's house has no effect on the incidence of Pulmonary Tuberculosis with a probability value (p) = 0.28 The Odds Ratio (OR) value is 3.556 (95% CI; 1.881-11.643) meaning that the respondent suffers from Pulmonary Tuberculosis 3.556 times greater than the house that has lighting who do not meet the requirements compared to respondents who have eligible home lighting. The density of the respondent's house has no effect on the incidence of Pulmonary Tuberculosis with a probability value (p) = 1,000 The Odds Ratio (OR) value is 1.092 (95% CI; 0.480-2.485) meaning that the respondent suffers from Pulmonary Tuberculosis 1.092 times greater with the density of houses that do not meet the requirements compared to respondents who have a density of houses that meet the requirements.

Exposure to cigarette smoke at the respondent's house has no effect on the incidence of pulmonary tuberculosis with a probability value (p) = 0.280 The Odds Ratio (OR) value is 1.758 (95% CI; 0.746-4.142), meaning that the respondent suffers from pulmonary tuberculosis 1.758 times greater with cigarette smoke. are at home compared to respondents where there is no cigarette smoke at home. The condition of the floor of the respondent's house has no effect on the incidence of Pulmonary Tuberculosis with a probability value (p) = 1,000 The Odds Ratio (OR) value is 0.884 (95% CI; 0.334-2.342) meaning that the respondent suffers from Pulmonary Tuberculosis 0.884 times greater with floors that do not meet the requirements compared to respondents who have a house floor that meets the requirements.

The condition of the walls of the respondent's house has no effect on the incidence of pulmonary tuberculosis with a probability value (p) = 0.206 The Odds Ratio (OR) value is 0.456 (95% CI; 0-163-1.275) meaning that the respondent suffers from Pulmonary Tuberculosis 0.456 times greater than the condition of the walls of houses that do not meet the requirements compared to respondents who have walls of houses that meet the requirements. For more details, it can be seen in the following table:

Table 2 Cross-tabulation of the Effect of Age, Gender, Nutritional Status, Socio-Economic Conditions, Education, Occupation, Associated Diseases, Ventilation Conditions, House Humidity, House Lighting Conditions, House Density, Cigarette Smoke Conditions in the House, Floor Conditions and Wall Conditions on The Incident of Pulmonary Tuberculosis at the Kampung Baru Health Center, Tanjung Balai City in 2019

Risk Factor	1 Lung TBC Case				X^2 / (p.value)	1.1 OR (95% CI)
	Case		Control			
	Jlh	%	Jlh	%		
Age (year)						
10-50	36	78,3	33	71,7	0,522	1,418
51 >	10	21,7	13	28,3	(0,630)	(0,548-3,668)
Amount	46	100	46	100		

Gender						
Male	33	71,7	40	87	3,25 (0,122)	0,381 (0,130-1,112)
Female	13	28,3	6	13		
Amount	46	100	46	100		
Nutritional Status						
Less	27	58,7	2	4,3	31,472 (0,000)	31,263 (6,744-144,926)
Normal	19	41,3	44	95,7		
Amount	46	100	46	100		
Socio-Economic Situation						
Under UMR	46	100	43	93,5	3,101 (0,242)	
Above UMR	0	0	3	6,5		
Amount	46	100	46	100		
Education						
Under Senior High School	45	97,8	44	95,7	0,345 (1,000)	2,045 (0,179-23,378
D1 Above	1	2,2	2	4,3		
Jumlah	46	100	46	100		
Respondent Occupation						
Doesn't work	15	32,6	1	2,2	14,829 (0,000)	21,774 (2,733-173,473)
Working	31	67,4	45	9 7,8		
Amount	46	100	46	100		
Comorbidities						
There are co-morbidities	23	50	45	97,8	27,284 (0,000)	0,022 (0,003-0,175)
No co-morbidities	23	50	1	2,2		
Amount	46	100	46	100		
Ventilation State						
Not eligible	36	78,3	20	43,5	11,683 (0,001)	4,680 (1,881-11,643
Qualify	10	21,7	26	56,5		
Amount	46	100	46	100		
Home Humidity						
Not eligible	44	95,7	32	69,6	10,895 (0,002)	9,625 (2,043-45,347)
Qualify	2	4,3	14	30,4		
Amount	46	100	46	100		
Home Lighting State						
Not eligible	40	87	30	65,2	5,974 (0,28)	3,556 (1,243-10,170)
Qualify	6	13	16	34,8		
Amount	46	100	46	100		
House Density						
Not eligible	21	45,7	20	43,5	0,44 (1,000)	1,092 (0,480-2,485)
Qualify	25	54,3	26	56,5		
Amount	46	100	46	100		

Exposure to Cigarette Smoke						
Exist	32	69,6	26	56,5	1,680	1,758
No	14	30,4	20	43,5	(0,280)	(0,746-4,142)
Amount	46	100	46	100		
Floor Condition						
Not eligible	10	21,7	11	23,9	0,062	0,884
Qualify	36	78,3	35	76,1	(1,000)	(0,334-2,342)
Amount	46	100	46	100		
the State of the Walls of the House					2,300	0,456
Not eligible	7	15,2	13	28,3	(0,206)	(0,163-1,275)
Qualify	39	84,8	33	71,7		
Amount	46	100	46	100		

Multivariate Analysis

After processing the data and the results of the analysis between the bivariate variables between the independent and dependent variables resulting in p < 0.25, then the independent variables were entered into the multivariate stage as shown in the following table:

Table 3. The results of the first stage of the Double Logistics Regression Test that will be included in the Model

No	Variable	*p*Value	Description
1	Age	0,629	Not Candidate
2	Gender	0,132	Not Candidate
3	Nutritional status	0,000	Candidate
4	Socio-Economic	0,046	Not Candidate
5	Education	0,605	Not Candidate
6	Profession	0,000	Candidate
7	Comorbidities	0,000	Candidate
8	Ventilation State	0,002	Candidate
9	Humidity	0,001	Candidate
10	Lighting	0,025	Candidate
11	House Density	0,553	Not Candidate
12	Smoke Exposure	0,327	Not Candidate
13	House floor	0,603	Not Candidate
14	House wall	0,068	Not Candidate

To determine the effect of the independent variables (Age, Gender, Nutritional Status, Socio-Economic Conditions, Education, Occupation, Associated Diseases, Ventilation Conditions, House Humidity, Lighting, House Density, Exposure to Cigarette Smoke, Floor Conditions and Wall Conditions) with the dependent variable (The incidence of pulmonary tuberculosis) was simultaneously performed with multivariate analysis using multiple logistic regression. To find the most dominant factor for pulmonary tuberculosis, through several steps, namely:

1. There is a selection of potential variables to be included in the model. Variables selected as candidates or considered significant. In this modeling, all candidate variables based on the Chi-Square test with a significance level of p<0.25 were included in the multiple logistic regression test. The use of statistical significance of

p<0.25 to allow hidden variables that are actually important to be included in the multivariate model. Then variables that have a p-value > 0.05 will be removed gradually (backward selection).

2. Then the next step is testing simultaneously with the enter method to identify the most influential factors on the incidence of pulmonary tuberculosis in respondents. In the first stage of the multiple logistic regression test, a significant p value of less than 0.05 was chosen (p <0.05).
3. And the third step is if in the first stage there is still a variable that has a p value> 0.05 then a second stage logistic test is carried out by only testing the variable with a p value <0.05.

In this study, the independent variable with a value of <0.25 based on the Chi-Square test and can be used as a candidate model in the first stage of the logistic regression test (Nutrition Status, Occupation, Comorbidities, Ventilation and Humidity Conditions), while the variables Age, Gender , Socio-Economic Conditions, Education, Lighting, House Density, Smoke Exposure, House Floor Conditions and House Wall Conditions were not included in the multiple logistic regression modeling.

Multivariate Modeling I

Variable	B	*pvalue*	OR	95 % CI	
				Lower	Upper
Nutritional status	2,344	0,002	10,428	2,340	46,467
Respondent's Job	1,744	0,079	5,722	0,817	40,056
Comorbidities	-3,910	0,01	0,020	0,002	0,203
Home Ventilation	1,376	0,63	3,975	0,926	16,911
Home Humidity	0,422	0,715	1,525	0,158	14,681

Multivariate Modeling II

Variable	B	*pvalue*	OR	95 % CI		OR Changes
				Lower	Upper	
Nutritional status	2,419	0,001	11,230	2,596	48,581	7,691 %
Respondent's Job	1,795	0,071	6,021	0,859	0,859	5,22 %
Comorbidities	-3,995	0,001	0,018	0,002	0,002	-10 %
Home Ventilation	1,471	0,035	4,356	1,111	1,111	185,639 %

Multivariate Modeling III

Variable	B	*pvalue*	OR	95 % CI		OR Changes
				Lower	Upper	
Nutritional status	2,373	0,001	10,725	2,557	44,981	4,71 %
Comorbidities	-4,096	0,001	0,017	0,002	0,171	5,882 %
Home Ventilation	1,479	0,045	4,390	1,032	18,669	-0,774 %
Humidity	0,6117	0,591	1,853	0,195	17,636	-16,73 %

Final Multivariate Modeling

Variable	B	*pvalue*	OR	95 % CI	
				Lower	Upper
Nutritional status	2,344	0,002	10,428	2,340	46,467
Respondent's Job	-3,910	0,001	0,020	0,002	0,203
Comorbidities	1,376	0,063	3,957	0,926	16,911

Home Ventilation	0,422	0,715	1,525	0,158	14,681
Home Humidity	1,744	0,079	5,722	0,817	40,056

Based on the final multivariate modeling, to see the most dominant variable on the incidence of pulmonary TB is to look at the largest OR, then the largest OR is the Nutritional Status variable where the OR is 10.428 and the confounding variables are ventilation, humidity and work because p value > 0 ,05. choose 2 correct answer items among the 6 answer choices, namely as many as 13. So the number of Knowledge items = 839 / 1500 = 55.9% so categorized the Student Knowledge Score is Less Good.

B. Discussion

Comparison of characteristics between age, gender and socio-economic conditions, education, lighting, house density, smoking behavior, floor and wall conditions did not differ, but there were differences in nutritional status, occupation, comorbidities, ventilation, humidity between samples and controls. so that it may affect the incidence of pulmonary tuberculosis.

The results of the bivariate analysis showed that of the fourteen independent variables that were significant for the incidence of pulmonary tuberculosis, and with a p value of <0.05, the variables were nutritional status, occupation, comorbidities, ventilation and humidity.

Age characteristics can affect the incidence of pulmonary tuberculosis because the older a person is, the more susceptible they are to pulmonary tuberculosis. The results of the study were that the total age of 10-50 years in cases and controls was 75% and > 51 years 25%. The statistical results were p>0.05 (p=0.630) and OR = 1.418 (0.548-3.668) meaning that there was no significant relationship between age and the incidence of pulmonary TB.

Gender can also cause pulmonary tuberculosis. The results of the study total cases and controls in male sex was 79% and female was 21%, where this was due to the smoking habit factor in men almost twice as much as women. Pulmonary TB disease tends to be higher in male than female (according to WHO), but at least in a year period there are about 1 million women who die from pulmonary TB, it can be concluded that women are more likely to die from pulmonary TB than women. with the consequences of the process of pregnancy and childbirth. In the male gender this disease is higher because of smoking tobacco and drinking alcohol so that it can reduce the body's defense system, so that it is more easily exposed to the causative agent of pulmonary agents.

Nutritional status plays a role as a risk factor for pulmonary tuberculosis. Poor nutritional status increased the risk of pulmonary tuberculosis 31 times greater than normal nutritional status, with OR = 31,263; 95% CI = 6.744-144.926. The results of this study are the same as the results of previous studies which showed that people with BMI <18.5 had 11.31 times greater risk of developing pulmonary tuberculosis with BMI 18.5 with OR values: 11.331 and 95% CI 4.05<OR <31.59 (Priyadi, Juhaeni, & Taufiq, 2020). The condition of a person with poor nutrition then there is a reciprocal relationship with infectious diseases where if a person is exposed to infection from the disease he is suffering from, it will worsen the nutritional state and vice versa if someone is in poor nutrition it will make it easier to get infectious diseases.

Common diseases related to nutritional problems include diarrhea, tuberculosis, measles and whooping cough. The results of research by Elvia Karyadi (2002) from the regional nutrition center at the University of Indonesia stated that the number of TB sufferers with malnutrition or excess nutrition in adults (18 years and older) is a This is an important problem because in addition to having the risk of certain diseases, it can also affect work productivity.

Home sanitation is at risk for the incidence of pulmonary tuberculosis, but the components of the house that are most at risk for the incidence of pulmonary tuberculosis are house ventilation and humidity in the house. People who live in homes that have ventilation areas that do not meet the requirements have a 4 times greater risk of being infected with pulmonary tuberculosis than people who live in homes that have adequate ventilation, with OR values: 4,680; 95%CI: 1.881-11.643.

The results showed that the total cases and controls in the socioeconomic conditions of the respondents were below the minimum wage as much as 96.7% and above the minimum wage was 3.3% and statistically p <0.05 (p = 0.242). The results of the bivariate analysis showed that respondents with income the average is below the minimum wage as a factor in the incidence of pulmonary tuberculosis, but after being included in the multivariate analysis, the average income level of the respondents is not a risk factor for the incidence of pulmonary tuberculosis. That after being compared with other people's studies, this study is similar to the research conducted by Priyadi (2003) which showed that the level of expenditure was not related to the incidence of pulmonary tuberculosis, but several studies showed a relationship between low income and the incidence of pulmonary tuberculosis (Coker, 2003). Ratnasari, 2005; Mahfudin, 2006). Family income will have an impact on daily lifestyles, including food consumption, health care, besides that it will also affect home ownership (house construction). The head of the family who has an income below the minimum wage will consume food with nutritional levels that are not according to the needs of each family member so that they have poor nutritional status and will make it easier to get infectious diseases including pulmonary tuberculosis (Latenstein et al., 2020).

The results of the study found that the total cases and controls in the respondent's education were the third high school under as much as 96.7% and control as much as 3.3%. And statistically p<0.05 (p=1,000), OR = 2.045 (0.179-23.378), meaning that there is no relationship between education and the incidence of pulmonary tuberculosis. Education about pulmonary tuberculosis is influenced by educational background which has a positive effect on healing, this is in accordance with what was stated by the Ministry of Health of the Republic of Indonesia that the relatively low level of education in patients with pulmonary tuberculosis causes limited information about the symptoms and treatment of pulmonary tuberculosis. Low education does not guarantee that it can lead to a lack of public awareness of personal health in this case in the form of prevention of disease problems.

The results showed that the total cases and controls in the respondent's work were 17.4% of unemployed cases and 82.6% of working cases with p<0.05 (p=0.000) meaning that there was a significant relationship between work and pulmonary TB. Differences in the work that a person has causes there are differences in the socioeconomic status they have (Notoatmodjo, 2007). Every job is a burden for the perpetrator. The burden in question is the physical, mental and social workers. The abilities of the workers differ from one another, namely the physical, mental or social of the workers. The abilities of the workers differ from one another in terms of skills, compatibility, nutritional status, gender, age and body size.

Unqualified humidity with humidity > 70% increased the risk 9 times greater than the house with humidity 40-70% against pulmonary tuberculosis with OR value: 9.625; 95%CI: 2,043-45,347.Ventilation is an indicator to obtain room humidity that is acceptable to the body as well as the ability to kill germs in the house. This study is in accordance with previous studies which showed that the incidence of pulmonary tuberculosis would be at risk with ventilation <10% (OR: 229.994; 95% CI: 3.39-265.51), humidity >70% (OR: 9.299; 95% CI: 2.2-37.84) (Rikyandini, 2012).

The same thing is also in line with the research conducted by Helda Suarni on the risk factors associated with the incidence of pulmonary TB in Pancoran Mas District, Depok in 2009, the results showed that the ventilation condition of the house was a risk factor with OR = 14,182, this means that ventilation conditions are less has a risk of transmission of 14,182 times from good ventilation (Asari & Helda, 2021).

It is reported that the house is declared healthy and comfortable, if the air temperature and humidity of the room are in accordance with normal human body temperature. Air temperature and humidity are strongly influenced by air conditioning and lighting. Insufficient or uneven ventilation will make the room feel stuffy or stuffy and will cause high humidity in the room (Ministry of Housing and Regional Infrastructure, 2002). Indicators of humidity in the house are very closely related to the conditions of ventilation and lighting in the house (Putri, Thohari, & Sari, 2022).

Ventilation in the house has many functions, besides keeping the air flow in the house fresh, it also frees the room air from bacteria, especially pathogenic bacteria, because there is always a continuous flow of air. Another function is to keep the room in the house always in optimum humidity. Insufficient ventilation will increase the humidity in the room due to evaporation and absorption of fluids from the skin. High room humidity will be a good medium for the growth and reproduction of pathogenic bacteria, including tuberculosis germs (Wati & Ridlo, 2020). Tuberculosis germs are able to survive in dark and damp places and will be dormant in dry and cold places. Pulmonary tuberculosis bacteria will die at 1000C heating for 5-10 minutes, or at 600C for 30 minutes. The ability of tuberculosis bacteria to develop at a temperature of 350C-400C, does not grow at a temperature of 250C or more than 400C, and tuberculosis bacteria will thrive in an environment with high humidity, because tuberculosis will thrive in an environment with high humidity, because water makes up more than 80% the volume of bacterial cells and is the best medium for the growth and survival of bacterial cells (Hapsari, 2019).

From the results of the study, it can be seen that the total lighting conditions for cases and controls were mostly lighting conditions that did not meet the requirements, namely 87% in cases and 65.2% in controls. After processing the data, the statistical test results obtained p value > 0.05 (p = 0.28), so there was no significant relationship between lighting conditions and the incidence of pulmonary tuberculosis. This is not in accordance with the results of research by Musadad (2001) who conducted research on the relationship between home environmental factors and the incidence of pulmonary tuberculosis transmission in the household, from the study it was found that poor lighting conditions had a 3.7 times risk of contracting tuberculosis. pulmonary culosis when compared with the sun-kissed house.

Variables that are not proven as risk factors after obtaining the adjusted OR value include age, gender, socioeconomic conditions, education, lighting, occupancy density, smoking behavior, floor conditions and wall conditions.

Occupancy density according to the OR value shows that it is not a risk factor for the incidence of pulmonary tuberculosis. That this result is the same as the research conducted by Priyadi (2003) which showed that occupancy density had no relationship with the incidence of pulmonary tuberculosis.

The area of the house that is not proportional to the number of residents will cause overcrowded where we know that residential density is one of the elements in house sanitation where the density of residents in one residential house will greatly affect the occupants. This situation makes it unhealthy which is also the cause of the lack of consuming oxygen or fresh air, so if in a family there is someone who suffers from infectious diseases, especially tuberculosis, it is easier to spread it to other family members (Wati & Ridlo, 2020).

After conducting the research, exposure to cigarette smoke was also not statistically proven as a risk factor for pulmonary tuberculosis. This study is different from the results of research conducted by Wijaya (2012) which showed that smoking can increase pulmonary tuberculosis infection, the risk of disease development, and the cause of death in tuberculosis patients. From the results of data collection, the proportions between the case and control groups were both greater in exposure to cigarette smoke in the family, namely 69.6% in cases and 56.5% in controls.

Habits or activities that can interfere with health include smoking habits where smoking can interfere with the effectiveness of some respiratory defense mechanisms, the results of cigarette smoke can stimulate mucosal formation and reduce cilia movement, including tuberculosis bacteria and result in susceptibility to pulmonary tuberculosis infection (Aditama & Winarto, 2021).

From the results of the study, it was found that the total conditions of the type of floor that met the requirements of cases and controls were 77% and those who did not meet the requirements were 23%. The results of the statistical test obtained p value = > 0.05 (p = 1,000), so there was no significant relationship between the condition of the floor type at home and the incidence of pulmonary tuberculosis. Odds ratio 0.884 (0.334-2.32) which means that the condition of the floor is not a risk factor for pulmonary tuberculosis in respondents.

When compared with the results of other people's studies, this study is in accordance with research conducted by Toni Lumban Tobing on the influence of behavior of pulmonary TB patients and sanitation conditions on the prevention of potential transmission of pulmonary TB with p = 0.414 and OR = 0.7 with 95% CI (0.321 -1.599).

From the results of the study, it was found that the total condition of the condition of the walls of the house that met the requirements of cases and controls was 78% and those who did not meet the requirements were 22%. statistical test results obtained p value> 0.05 (p = 0.206), then there is no significant relationship between the condition of the walls of the house with the incidence of pulmonary tuberculosis. The odds ratio is 0.456 (0.163-1.275), which means that the condition of the walls of the house is not a risk factor for pulmonary tuberculosis.

CONCLUSION

Based on the results of the analysis and discussion, it can be concluded that the factors that significantly influence the incidence of pulmonary tuberculosis are nutritional status (p = 0.000, OR = 31.263), respondent's occupation (p = 0.000, OR = 21.710), comorbidities (p=0.000, OR=0.022), Ventilation Condition (p=0.001, OR=4.680) and House Humidity (p=0.000, OR=9.625). The factors that had no significant effect on the incidence of pulmonary TB were Age (p=0.630, OR=1.418), Gender (p=0.122, OR=0.381), Socio-Economic Condition (p=0.242, OR=), Education (p =1,000, OR=2,045), Lighting (p=0,28, OR=3,56), House Density (p=1,000, OR=1,092), Smoking Behavior (p0,280, OR= 1,7582), Circumstances Floor (p=1,000, OR=0,884) and Wall Condition (p=1,000, OR=0,466). The results of the multivariate test found that one variable that had the most influence on the incidence of pulmonary tuberculosis was Nutritional Status (p=0.002, Exp(B)=2.344).

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