Original Article

Analysis of Factors Affecting The Incident of Pulmonary Tuberculosis in Lautem City - Timor Leste

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Abstract

Tuberculosis (TB) is an infectious disease that is the main cause of death in developing countries and is the 3rd highest cause of death in the world. Behavioral factors that can influence the incidence of pulmonary TB in Lautem City include close contact with TB patients, alcohol use, smoking behavior, nutritional status, access to health care facilities, and family support. This study aimed to analyze the factors that influence the incidence of pulmonary TB in Lautem City, Timor Leste. This research is analytic observational with case control method. The number of case samples was 40 people. Data was collected through in-depth interviews using a structured questionnaire. Data were analyzed univariately, bivariate analysis using chi squared, and multivariate analysis using logistic regression. The results showed that the factors that influenced the incidence of TB in the Municipality of Lautem-Timor Leste were close contact with TB patients OR = 8,704; 95% CI = 2,390 – 31,699; p = 0.01), alcohol use, (OR = 4.702; 95% CI = 1.522-14.531; p = 0.007). Other factors that do not affect are access to health facilities, family support, nutritional status and smoking.For the results of the regression test the effect of consuming alcohol is 52%, close contact is 66.8% and if done simultaneously 90.49%. The factors that influence the incidence of pulmonary TB in the Municipality of Lautem Timor Leste are close contact with TB sufferers and alcohol use.

Keywords: Tuberculosis,risk factors,city Lautem,Timor-Leste.

Introduction

Tuberculosis or better known as TB is an infectious disease that is the main cause of death in developing countries. This disease is caused by the bacterium Mycobacterium tuberculosis [1, 2]. Generally, after entering the body through the respiratory cavity, these bacteria will go to the lungs. But not only in the lungs, these bacteria can also go to other body organs, such as lymph nodes, skin, intestines/digestive tract, lining of the brain, and so on. This bacterium is in the form of a bacillus and is acid-fast, so it is often referred to as BTA (Acid Resistant Basil) [3, 4].

Tuberculosis is still a public health problem that is a global challenge. Globally in 2018 as many as 10 million people were infected and 1.5 million people died from TB [5]. This makes TB the 3rd leading cause of death in the world after coronary artery disease (ischemic heart) and stroke. Therefore, ending the TB pandemic is one of the 2030 SDGs(Sustainable Development Goals) that must be achieved by every country [6, 7].

Timor Leste is the country with the sixth highest TB burden in the world. The death rate from TB also continues to increase every year. Until 2017, it reached 106 deaths per 100,000 population [8]. The incidence of TB in Lautem City in 2018 was 145 cases, 123 cases in 2019 and 105 cases in 2020.

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The incidence of pulmonary TB is the highest compared to other types of TB. From 2018 to 2020, more than 80% of TB cases in Lautem City are pulmonary TB.

Based on the TB incidence rate in Lautem, TB sufferers in Lautem are not only active TB but also latent TB that can develop into active TB. Latent TB cases in Lautem are difficult to detect due to the unavailability of radiology facilities and the lack of awareness of the public who only seek treatment when they are sick due to the difficulty of access to transportation to the community health centre, the distance from home to the community health centre which is far, and economic conditions that do not allow it.

The incidence of pulmonary TB in Lautem City is influenced by behavioral factors and non-behavioral causes. Behavioral factors can be influenced by three factors, namely: Predisposing factors include knowledge, education, attitudes, values, and beliefs. Enabling factors include health service facilities, transportation, and sources of information. Reinforcing factors include social support including family support, support from the surrounding environment, and support from health workers [1, 7, 9–12].

Based on the description of the problems above,the researcher is interested in analyzing the factors that influence the incidence of pulmonary tuberculosis to find out what factors influence the incidence of pulmonary tuberculosis in Lautem Municipality - Timor Leste.

Material and Methods

Material

The type of research used in this research is analytic observational with a case control study design. The sampling technique was carried out by simple random sampling. The sample group of cases in this study were pulmonary TB patients with smear postive which were 40 people and the control group sample was 40 people who had never been infected with pulmonary/extrapulmonary TB,both smear positif /radiology.People who live in the Municipality of Lautem, The case group and control group were given the same treatment. Data was collected through in-depth interviews using a structured questionnaire. Data were analyzed univariately, bivariate analysis using chi squared, and multivariate analysis using logistic regression.

Result and Discussion

The results of univariate analysis (Table 1.) show that 51.2% of respondents are female and most of their education is junior high school graduates. 87.5% of respondents aged 43.78 years, 71.3% of respondents do not work, and 77.5% of their income is below the minimum wage. Most of the respondents smoked (57.5%) and consumed alcohol (58.8%), and 66.3% had close contact with TB patients. Respondents with difficult access to health care facilities were 53.7%, had family support as much as 51.2%, and had poor nutritional status by 51.3%.

Table 1. Univariate Analysis

Variables	n	%
Gender		
Male	39	48.8
Female	41	51.2
Education		
Primary school	16	20.0
Junior high school	34	42.5
Senior high school	17	21.3
University	13	16.3
Age		
< 43.78	10	12.5
≥ 43.78	70	87.5
Profession		
Employ	23	28.7
Unemployment	57	71.3
Income		
≥ Regional minimun wage	18	22.5
< Regional Minimun wage	62	77.5
Smoking history		
Smoke	46	57.5
Not smoke	34	42.5
Alcohol consumption		
Consume	47	58.8
Not consume	33	41.2
Close contact		
Yes	53	66.3
No	27	33.7
Access to health facilities		
Easy	37	46.3
Difficult	43	53.7
Family support		
Yes	41	51.2
No	39	48.8
Nutritional status		
Good	39	48.7
No	41	51.3

The results of the bivariate analysis are in Table 2. It shows that the factors that influence the incidence of pulmonary tuberculosis are smoking history, alcohol consumption, and close contact with TB patients with a p-value <0.05. While the factors that do not affect the incidence of pulmonary tuberculosis are access to health care facilities, family supp ort,nutritional status, age, gender, and education with a p-value>0.05.

Table 2. Bivariate Analysis

No	Variable	Cases		Control		p-value	OR	95% CI
		n	%	n	%			
Bivariate Analysis Independent Variable								
1.	**Access to health facilities**							
	Easy	19	47.5	18	45.0	1.000	1.106	0.459-2.664
	Difficult	21	52.5	22	55.0			
2.	**Family support**							
	Yes	19	47.5	22	55.0	0.655	0.740	0.307-1.783
	No	21	52.5	18	45.0			
3.	**Nutritional status**							
	Good	16	40.0	23	57.5	0.365	1.680	0.680-4.126
	No	24	60.0	17	52.5			
4.	**Smoking history**							
	Smoke	29	75.5	17	42.5	0.013	3.567	1.400-9.088
	Not smoke	11	24.5	23	57.5			
5.	**Alcohol consumption**							
	Consume	32	80.0	15	37.5	0.000	6.667	2.440-18.212
	Not consume	8	20.0	25	62.5			
6.	**Close contact**							
	Yes	36	90.0	17	42.5	0.000	12.17	3.637-40.765
	No	4	10	23	57.5			
Bivariate Analysis Confounding Variable								
1.	Age							
	< 43.78	4	10.0	6	12.8	0.156	0.756	0.187-3.051
	≥ 43.78	36	90.0	34	87.2			
2.	Gender							
	Male	17	42.5	22	55.0	0.371	0.605	0.250-1.463
	Female	23	57.5	18	45.0			
3.	Education							
	< 9years	9	22.5	7	17.5	0.780	1.369	0.454-4.123
	≥ 9years	31	77.5	33	82.5			

Table 3. the results of the multivariate analysis show that 2 variables affect the incidence of smear-positive pulmonary TB and 1 variable has no effect on the incidence of smear-positive Lung TB in Lautem Municipality, the following variables indicate that smoking has a p-value of 0.359 and (OR = 1.703, 95% CI = 0.546 – 5.311) is a variable that has no effect on the incidence of pulmonary TB in Lautem Municipality. While alcohol consumption has a p-value of 0.007 (OR = 4.702, 95% CI = 1.522-14.531) and history of contact with TB patients has a P-value of 0.001 and OR = 8.704, 95% CI = (2.390-31.695) is a variable that affects lung TB incidence in TB patients in Lautem Municipality.

Table 3. Multivariate Analysis

Variable	Sig.	Exp(B)	*95% CI for EXP(B)*	
			Lower	Upper
Smoke	0,359	1.703	0.546	5.311
Alcohol consumption	0.007	4.702	1.522	14.531
Close contact	0.001	8.704	2.390	31.695
Constant	0.001	0.231		

The results of the bivariate analysis showed that the factors that influenced the incidence of pulmonary TB were: smoking history, alcohol consumption, and close contact with patients. The factors that do not affect the incidence of pulmonary TB are access to health services, family support, and nutritional status. The confounding factors (age, gender, and education) did not influence the incidence of TB.

The three factors that influence the incidence of pulmonary TB were re-analyzed using multivariate logistic regression with the backword method at a significance level of 95%. Variables that met the logistic regression requirements were included in the multivariate modeling with p<0.25 conditions. The results of multivariate analysis using logistic regression showed that the factors that were proven to affect the incidence of pulmonary TB in Lautem Municipality were close contact variables with p-value = 0.001 (OR = 8.704; 95%CI = (2.390-31.695)) and alcohol consumption with patients TB p= 0.007 (OR=4.702; 95% CI=(1.522-14.531), while the one that was not proven to affect the incidence of pulmonary TB was smoking history with p=0.359.

The results of the final logistic regression model show that the factors that have been shown to affect the incidence of pulmonary TB in Lautem Municipality are. TB and a history of close contact with TB sufferers have a 66.88% possibility

of influencing the incidence of TB, and together they allow a 90.49% probability of influencing the occurrence of pulmonary TB in Lautem Municipality.

Variables proved to affect the incidence of pulmonary TB

Close contact with TB patients

The effect of close contact with TB patients on the incidence of pulmonary TB in Lautem Municipality was proven in this study to be a risk factor for pulmonary TB in patients in Lautem Municipality. Contact with TB patients can lead to further development of pulmonary TB in Lautem Municipality. The results of the multivariate test analysis showed that there was an influence between contacts with TB patients and the incidence of pulmonary TB in Lautem City patients with a P-value of 0.001, OR = 8.704 and 95% C1 = 2.390-31.699). The results of statistical analysis showed that contacts with TB patients had an 8,704 times greater risk of developing TB compared to the control group.

Alcohol consumption

The bivariate analysis conducted showed that the proportion of respondents who consumed alcohol was higher in the case group (80.0%) compared to the control group (37.5%). This is significantly related to the incidence of pulmonary TB in the bivariate analysis and when entered into the multivariate analysis, the results of the multivariate test analysis showed that there was an influence between alcohol use and the incidence of pulmonary TB in the municipality of Lautem with P-value 0.007, OR = 4.702 and 95% CI. : (1,522-14,531).

Variables proved not to affect the incidence of pulmonary TB

Access to health facilities

Bivariate analysis of the distribution of access to health facilities for TB patients in case and control groups in Lautem City showed that the proportion of patients with easy access to health facilities was lower than patients with difficult access to health facilities in cases and controls. The statistical test carried out was the Chi-square test with a significance level of 5% (0.05), giving a p-value of 1,000 with OR = 1.106 (0.307-1.783). No significant differences were found regarding the proportion of easy AFK in the case and control groups. Difficult access to health facilities could not be determined as a risk factor for TB in Lautem City patients (OR = 1.106, 95% CI = (0.307-1.783).

Family support

The results of this study indicate that the proportion of those who have family support is less than those who do not have family support in both cases and controls. The statistical test performed was the Chi-square test with a significance level of 5% (0.05), giving a p-value of 0.655 with OR = 0.740 (95% CI = 0.307-1.783). No significant difference was found regarding the proportion of those who received family support in the case and control groups. Family support could not be determined as a risk factor for TB infection (with p-value 0.371 and OR = 0.740 (95% CI = 0.307-1.783).

Nutritional status

Results Bivariate analysis of the study on the nutritional status of patients in the case and control groups with the incidence of pulmonary TB patients in Lautem City. The proportion of patients with good nutritional status was lower than patients with no nutritional status in the groups, cases, and controls. The statistical test carried out was the Chi-square test with a significant level of 5% (0.05), giving a p-value of 0.365 with OR = 1.680 (95% CI = (0.680-4.126). No significant difference was found regarding the proportion of good nutritional status. in the case and control groups Nutritional status could not be determined as a factor influencing the incidence of pulmonary TB (OR = 1.680 (95% CI = (0.680-4.126).

Smoking history

The bivariate analysis conducted showed that the proportion of respondents smoking was higher in the case group (75.5%) compared to the control group (42.5%). This is significantly related to the incidence of TB in the bivariate analysis but when entered into the multivariate analysis, the results of the multivariate test analysis showed that there was no effect between smoking and the incidence of pulmonary TB in Lautem Municipality with a P-value of 0.359, OR = 1.703 and 95% CI: 0.546 – 5.311.

Conclusion

The factors that influence the occurrence of TB in Lautem Municipality are close contact with TB sufferers and alcohol consumption.

a. A The probability of contracting TB if there is close contact with a TB patient is 66, 88%.

b. The probability of being infected with TB due to alcohol use is 52.0%

c. The probability of becoming infected with TB if there is close contact with a TB patient and consuming alcohol, probability of having both risk factors is 90, 49%.

Factors that have not been shown to affect the incidence of pulmonary TB in Lautem Municipality include access to health facilities, family support, nutritional status, and smoking.

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