Factors Associated with Tuberculosis in Deli Serdang, North Sumatera

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ABSTRACT

Background: Tuberculosis (TB) is still a major public health problem in most developing countries and its incidence is rising in many developed countries. This study aimed to examine factors associated with tuberculosis in Deli Serdang, North Sumatera

Subjects and Method: This was a cross-sectional study conducted in Deli Serdang, North Sumatera. A sample of 190 study subjects was selected for this study comprising of 95 TB patients and 95 non-TB patients. The dependent variable was tuberculosis. The independent variables were sex, education, BCG immunization, smoking, nutritional status, and dwelling density. Data on TB status were taken from medical record. The other variables were measured by questionnaire. The data were analyzed by a multiple logistic regression.

Results: The risk of TB decreased with female sex (OR= 0.33; 95% CI= 0.11 to 0.98; p= 0.046). The risk of TB increased with low education (OR= 8.47; 95% CI= 3.01 to 23.80; p<0.001), had no BCG immunization (OR= 8.86; 95% CI= 3.28 to 23.94; p<0.001), smoking (OR 6.69; 95% CI= 2.20 to 20.38; p=0.001), high dwelling density (OR= 10.35; 95% CI= 4.06 to 26.41; p<0.001), and poor nutritional status (OR= 3.44; 95% CI= 0.85 to 14.03; p= 0.085).

Conclusion: The risk of TB decreases with female sex, but increases with low education, had no BCG immunization, smoking, high dwelling density, and poor nutritional status.

Keywords: Tuberculosis, sex, BCG immunization, dwelling density, nutritional status

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BACKGROUND

Tuberculosis (TB) is an infectious disease, the leading cause of death in the world. In developing countries including in Indonesia and other developing countries, the prevalence of TB is still quite high (Sutoyo, 2016).

The high prevalence of this disease is a challenge for all parties to continue to control TB infection by making a definitive early diagnosis as an effort to suppress TB transmission (Susilayanti et al., 2012).

The TB incidence is still high in North Sumatra, a serious problem that must be addressed immediately, in 2016 the number of new cases of smear positive pulmonary TB was 11,771 people, of which 66% were infections in men and 34% in women, while in Deli Serdang District according to the 2016 District / City Health Profile, the number of new smear positive cases reached 2184 people with a total number of 3833 people (North Sumatra Provincial Health Office, 2017; Ministry of Health RI, 2016).

According to Prihanti, risk factors for increased pulmonary tuberculosis are ventilation, occupancy density, water sources,

landfills, sputum disposal sites, income and smoking history (Prihanti et al., 2015). This study aims to determine the factors that influence pulmonary TB in Deli Serdang District.

SUBJECTS AND METHOD

1. Study Design
This was an analytic observational study with a cross sectional design. The study was conducted in Deli Serdang, North Sumatra.

2. Population and sample
A sample 190 study subjects was selected by probability sampling, consisting of 95 TB patients and 95 non TB patients.

3. Study Variables
The dependent variable was tuberculosis. The independent variables were sex,

education, BCG immunization, smoking, dwelling density, and nutritional status. Data on TB status were taken from medical record. The other variables were measured by questionnaire. The data were analyzed by a multiple logistic regression.

RESULTS

1. Frequency distribution of study subjects
Table 1 shows the frequency distribution of research subjects. Table 1 shows that 60% of pulmonary TB sufferers are men, 70% do not work, 80% education <high school, 70% did not get BCG immunization, 70% were smoking, and 80% live in high dwelling density.

Table 1. Frequency distribution of the study subjects

Characteristics		TB cases					
		Yes		No		Total	
		n	%	n	%	n	%
Age	35-40 years	28	50	29	50	57	100
	41-45 years	16	50	16	50	32	100
	46-50 years	9	50	9	50	18	100
	> 50 years	42	50	41	50	83	100
Gender	Male	60	60	44	40	104	100
	Female	35	40	51	60	86	100
Occupation	Not working	42	70	15	30	57	100
	Working	53	40	80	60	133	100
Education	<SHS	48	80	11	20	59	100
	≥SHS	47	40	84	60	131	100
Knowledge	Low	43	70	19	30	62	100
	High	52	40	76	60	128	100
BCG immunization	No	82	70	35	30	117	100
	Yes	13	20	60	80	73	100
Smoking behavior	Smoking	53	70	20	30	73	100
	No smoking	42	40	75	60	117	100
Dwelling density	High	63	80	12	20	75	100
	Low	32	30	83	70	115	100
Income	<Rp150,000	60	70	26	30	86	100
	≥Rp150,000	35	30	69	70	104	100
Nutritional Status	Underweight	49	70	19	30	68	100
	Normal	37	40	62	60	99	100
	Overweight	9	40	14	60	23	100

2. Multivariate Analysis
Female gender (OR= 0.33; 95% CI= 0.11 to 0.98; p= 0.046) decreased the risk of TB and it was statistically significant. Low education (OR= 8.47; 95% CI= 3.01 to

23.80; p<0.001), did not get BCG immunization (OR= 8.86; 95% CI= 3.28 to 23.94; p<0.001), smoking (OR 6.69; 95% CI= 2.20 to 20.38; p=0.001), high dwelling density (OR= 10.35; 95% CI= 4.06 to 26.41;

p<0.001), and poor nutritional status (OR= 3.44; 95% CI= 0.85 to 14.03; p= 0.085)

increased the risk of TB and it was statistically significant.

Table 2. The Results of Multivariate Analysis

IndependentVariable	OR	95% CI	p
Female Gender	0.33	0.11 to 0.98	0.046
Low Education	8.47	3.01 to 23.80	<0.001
No BCG immunization	8.86	3.28 to 23.94	<0.001
Smoking	6.69	2.20 to 20.38	0.001
High Dwelling Density	10.35	4.06 to 26.41	<0.001
Poor nutritional status	3.44	0.85 to 14.03	0.085
Normal nutritional status	0.77	0.21 to 2.86	0.698

DISCUSSIONS

1. The relationship between age and pulmonary TB

The result of this study showed that TB sufferers in Deli Serdang were mostly > 50 years old. A study done by Ogboi et al. (2010) in Nigeria stated that there was a relationship between age and pulmonary tuberculosis patients. However, a study conducted by Zubaidah and Setyaningrum (2015) on the characteristic of pulmonary TB sufferers who used anti-tuberculosis drugs (ATD) in Indonesia showed that more productive ages were more likely to suffer from pulmonary TB.

Age >50 years old was more susceptible to pulmonary tuberculosis because the age group of > 50 years old has very high mobility so it was more likely to be exposed to the Micobacterium tuberculosis, in addition, the re-active bacteria (endogenous reactive) could occur inthe elderly (Ogboi et al., 2010; Paramani, 2013)

2. The relationship between gender and TB

The result of this study showed that female gender decreased the risk of TB and it was statistically significant. This was in accordance with WHO (2002) and Lazulfaet al. (2016), which stated that the most common frequency of pulmonary TB was in men compared to women. Men were more susceptible to TB due to the smoking habit, where cigarettes contained toxic com-

pounds that damage the airways which could interfere the health of smokers so that they were more susceptible to TB. Dotulong et al. (2015) stated that men drink alcohol more often which could reduce the body's immunity so that they were more susceptible to pulmonary TB disease.

3. The relationship between occupation and TB

Riza and Sukendra (2017), showed that individuals who worked were more likely to suffer from pulmonary TB than those who did not work. Employments which have the risk of developing pulmonary TB were those that were exposed to a lot of materials that made people easier to get infected with TB germs (Noah, 2006).

4. The relationship between education and TB

The result of this study showed that low education increased the risk of TB and it was statistically significant. The result of this study was in line with a study done by Sutanta (2014), which stated that the higher the level of education, the lower the risk of pulmonary TB.

The level of education would affect someone's knowledge. Poor level of knowledge would inhibit the eradication of pulmonary TB (Sandra et al., 2017).

5. The relationship between BCG immunization status and TB

The result of this study showed that someone who did not get BCG immuniza-

tion increased the risk of TB and it was statistically significant. The result of this study was in line with a study done by Riani and Machmud (2018), which stated that BCG vaccine was associated with TB incidence. The BCG vaccine was given to children to provide protection by forming immunity to dangerous and deadly pulmonary TB disease.

6. The relationship between smoking and TB

The result of this study showed that smoking behavior increased the risk of TB andit was statistically significant. The result of this study was in line with a study done by Riza and Sukendra (2017), which stated thatthe longer a person smoke, the more severe the incidence of pulmonary TB.

7. The relationship between dwelling density and TB

The result of this study showed that high dwelling density increased the risk of TB andit was statistically significant. The result of this study was in accordance with a study done by Mawardi and Indah (2004) which stated that dwelling density which did not fulfill health requirements was more susceptible to TB.

8. The relationship between nutritional status and TB

The result of this study showed thatpoor nutritional status increased the risk of TB and it was statistically significant. The result of this study was in accordance with a study done by Yuniar (2017), which stated that Malnutrition would lead to a weakening of the immune system against the disease.

TB was more likely to attack low socio-economic groups because low income was directly related to a person's purchasing power to buy nutritious food and residence that fulfilled the health requirements. Therefore, individuals with low income levels were more vulnerable to have pulmonary TB (Oktavia et al. 2016).

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