

Analysis the Relationship of Sociodemography and Knowledge of Diabetics Mellitus on the Pulmonary Tuberculosis Incidence

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Abstract: Indonesia ranks second highest with the highest number of TB incidents in the world, 391 per 100,000 inhabitants (WHO, 2017). International Diabetes Federation (2012) reported that DM sufferers risk 2.5 times to develop into pulmonary TB than those who do not DM. Research objectives to analyze the relationship of sociodemography and knowledge on the risk of Pulmonary TB. The study was case control and location of the research in 6 Puskesmas Medan city (Sering, Glugur Darat, PB Selayang, Sunggal, Medan Deli and Simpang Limun). Case samples are DM sufferers with Pulmonary TB and control samples are the DM sufferers who are following the TB treatment program in the health center, respectively 54 for case samples and control. Data was analyzed by chi-square test. The results showed no relationship between age ($p = 0.163$), gender ($p = 0.120$), education ($p = 0.234$), occupation ($p = 0.167$), knowledge ($p = 0.846$) on the pulmonary TB incidence in DM sufferers.

1 BACKGROUND

According to WHO (2013), TB disease is the second leading cause of death that has infected 9.4 million people and killed 1.7 million people worldwide each year. Indonesia ranks second highest with the highest number of TB incident cases in the world, at 391 per 100,000 population (WHO, 2017). There were 22,627 TB sufferers in North Sumatra Province in 2013.

Based on Rachmawati (2015) in the clinic of internal medicine Prof. Dr. Soerojo Magelang, the average fasting blood sugar level 75.3% is bad and postprandial sugar level 90.5% is also bad. All patients did not regularly check HbA1c levels.

Patients with Diabetes Mellitus (DM) are more at risk of suffering from pulmonary TB than without DM. Hyperglycemia in people with DM causes impaired neutrophil and monocyte function which affects chemostatic function, phagocytosis and decreased bacterial killing power. According to Reis-Santos et al. (2013), decreased immunologic response in a person will facilitate the development of infectious diseases including Mycobacterium tuberculosis.

Based on Magee's research (2011) shows that in countries with a high DM prevalence, it is also followed by a high TB prevalence. This has an impact on the increasing health burden. The International Diabetes Federation (2012) reports that people with DM are at a higher risk for developing pulmonary TB than those without DM, which is 2.5 times.

Based on data from the Central General Hospital (RSUP) of H. Adam Malik Medan, it is known that the number of people with type 2 diabetes have complications of pulmonary TB hospitalization in 2017 was 124 people.

So far there has been no research that explains the risk of pulmonary TB in patients with DM in puskesmas (health center). For that we need to know the factors that influence the risk of pulmonary TB in people with DM.

2 METHOD

This study is a longitudinal observational study with case-control design. Cases were DM patients with pulmonary TB while controls were DM patients

without pulmonary TB. The population of all adult DM sufferers (≥ 18 years old) registered at the Puskesmas Sering, Glugur Darat, PB Selayang, Sunggal, Medan Deli and Simpang Limun. The case population was all DM patients with pulmonary TB, while the control population was all DM patients without pulmonary TB.

Case samples are DM patients with pulmonary TB who are currently attending a TB treatment program/who have recovered and are registered at the Puskesmas Sering, Glugur Darat, PB Selayang, Sunggal, Medan Deli and Simpang Limun. The control sample was DM sufferers who were taking medication and were recorded at the health center. The sample size was calculated with following values based on a study: confidence level = 90%, power $(1-\beta) = 80\%$, case control ratio = 1:1, odds ratio = 3.19, obtained 108 samples, 54 each for case and control samples. Data collection techniques conducted interviews using a questionnaire that has been tested for validity and reliability and visited each patient's house according to the address recorded at the puskesmas.

The analysis was carried out using univariate analysis by presenting frequency distribution data of proportions from cases and controls. Bivariate analysis performed a chi-square test to assess the degree of significance (p) and OR to determine the influence of independent variables on the dependent variable.

3 RESULTS AND DISCUSSION

Based on the results of the study, the risk factors for pulmonary tuberculosis in diabetics can be seen on the Table 1. The proportion of respondents aged ≤ 60 years is higher in the case group as much as 70.4% and the control group as much as 55.6%, while respondents aged >60 years in the case group as much as 29.6% and the control group as much as 44.4%. Based on the results of the statistical test analysis p value = 0.163, which means there is no influence of age on the incidence of pulmonary TB in patients with DM. This is in line with Lusiani (2017) research who examined the risk factors for manifestation of pulmonary TB in patients with type 2 DM in Surabaya in 2017 stating that there was no significant effect between age on the incidence of pulmonary TB in DM patients ($p=1,0$).

The results of this study indicate that transmission of pulmonary TB can be at risk in the age group ≤ 60 years or >60 years in people with DM. This is in accordance with the nature of pulmonary TB which can be transmitted directly from sputum of TB patients with Acid Fast Bacilli Positive (AFB+) by spreading TB germs into the air in the form of sputum droplets (droplet nuclei). Based on data from the Ministry of Health (2018), it is found that pulmonary TB sufferers occur in all age groups ranging from infants to the elderly.

Table 1: Relationship of sociodemography on the incidence of pulmonary TB in patients with DM.

Sociodemography	Respondent Status				OR (90% CI)	p
	Case		Control			
	f	%	F	%		
Age						
≤ 60	38	70,4	30	55,6	1,90 (0,92-4,19)	0,163
>60	16	29,6	24	44,4		
Gender						
Male	28	51,9	19	35,2	1,98 (0,92-3,96)	0,120
Female	26	48,1	35	64,8		
Education						
Low	17	31,5	24	44,4	0,54 (0,26-1,13)	0,234
High	37	68,5	30	55,6		
Occupation						
Not working	29	53,7	37	29	0,53 (0,21-1,39)	0,167
Working	25	46,3	17	25		
Total	54	100	54	100		

By sex, know that the proportion of respondents based on male sex is higher in the case group by 51.9% and in the control group by 35.2% while female respondents tend to be low in the case group by 48.1% and high in the control group by 64.8%. Based on the results of the statistical test analysis, the value of $p=0.120$ means that there is no influence of sex on the incidence of pulmonary TB in patients with DM. The results of this study are in line with the study of Nasr et al. (2016) in Egypt stating that there was no significant effect of sex on the incidence of pulmonary TB in DM patients ($p=0.86$). The results of this study indicate that pulmonary TB is an infectious disease that can attack anyone without knowing the sex and have the same opportunity in people with DM.

Based on education it can be seen that the proportion of respondents with higher education is higher in the case group by 68.5% and in the control group by 55.6%, while respondents with low education in the case group by 31.5% and in the control group by 44.4%. Based on the results of the statistical analysis test p value = 0.234 which means there is no influence between education on the incidence of pulmonary TB in patients with DM. This is in line with the research of Hapsari (2017) who conducted a study in Tambaksari District, Surabaya, which stated that there was no relationship of education on the incidence of pulmonary TB in patients with DM ($p = 0.608$).

This is different from the results of Juwatiningsih's research (2013), which states that the variable that influences the risk of pulmonary TB infection in patients with DM is the level of education (OR = 203,83) with a p value <0.05. Based on work, it can be seen that the proportion of respondents not working in the case group was 53.7% and in the control group was 68.5%, while the respondents who worked in the case group were 46.3% and in the control group by 31.5%. Based on the results of the statistical analysis test, the value of

$p=0.167$ means that there is no relationship of work on the incidence of pulmonary TB in patients with DM. This is different from the study of Hapsari (2017) which states that there is a work effect on the incidence of pulmonary TB in patients with type 2 DM ($p = 0.022$) and DM patients who do not work have a risk of 3,297 suffering from pulmonary TB compared with patients with type 2 diabetes mellitus who work. Work is a measure of socioeconomic level and a person's health problems, because work is a source of income that affects a person's socioeconomic and nutritional status. Fulfillment of nutrition that is not good allows the condition of a person's body will be vulnerable to disease and reduce the body's immune status. In poor environmental conditions, a person with poor nutritional status will be vulnerable to contracting infectious diseases, especially pulmonary tuberculosis. Whereas in this study the work had no effect on the occurrence of TB in patients with DM, possibly because the respondents were those seeking treatment at the puskesmas using BPJS so that they were in the socioeconomic group and relatively homogeneous nutritional status both in cases and controls.

From the Table 2; the proportion of respondents with low knowledge in the case group is 40.7% and in the control group is 44.4%, while respondents who are knowledgeable in the case group are 59.3% and in the control group are 55.6%.

Based on the results of the statistical test analysis p value = 0.846 which means there is no influence between knowledge on the incidence of pulmonary TB in patients with DM. This shows that between high and low knowledge have the same chance of TB occurrence. In this study respondents who suffer from DM are patients who seek treatment at the Health Center where they get the same information from puskesmas staff about the knowledge and risk of TB that can arise due to suffering from DM.

Table 2: Relationship of knowledge on the incidence of pulmonary TB in patients with DM.

Knowledge	Respondent Status				OR (90% CI)	P
	Case		Control			
	f	%	f	%		
Low	22	40,7	24	44,4	0,85 (0,41-1,74)	0,846
High	32	59,3	30	55,6		
Total	54	100	54	100		

4 CONCLUSION

The results showed that there was no gender relationship on the incidence of pulmonary TB in DM patients ($p = 0.120$), there was no effect of education on the incidence of pulmonary TB in DM patients ($p = 0.234$), there was no occupational relationship on the incidence of pulmonary TB in DM patients ($p=0.167$), there was no relationship of knowledge on the incidence of pulmonary TB in patients with DM ($p = 0.84$).

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