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PREVALENS DIABETES MELLITUS DAN TUBERKULOSIS PARU

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Abstrak

Tuberkulosis paru adalah penyakit menular yang disebabkan oleh Mycobacterium tuberculosis. Insidens kumulatif di Indonesia tahun 2012 adalah 189 kasus per 100.000 populasi dan angka kematiannya sebesar 27/100.000. Faktor risiko penyakit tuberkulosis paru antara lain adalah riwayat diabetes mellitus yang dapat mengakibatkan meningkatnya kerentanan terhadap bakteri tuberkulosis atau memperpanjang waktu pengobatan tuberkulosis. Tujuan dari penelitian ini adalah menggambarkan karakteristik responden, riwayat penyakit penyerta (Diabetes Mellitus) dan status merokok di antara pasien tuberkulosis paru di Semarang Utara. Penelitian ini adalah studi observasional dengan desain potong lintang. Penelitian ini dilakukan di Semarang Utara dengan jumlah sampel sebanyak 60 responden. Analisis data menggunakan chi-square test. Hasil penelitian menunjukkan ada hubungan antara riwayat Diabetes Mellitus dengan tuberkulosis paru (26,7%), p value = 0,038, OR=5,092; 95%CI= 0,981- 26,430. Dapat disimpulkan bahwa prevalens tuberkulosis paru dan Diabetes Mellitus sebesar 16,7% dan Diabetes mellitus berhubungan dengan insidens tuberkulosis paru.

PREVALENCE DIABETES MELLITUS AND PULMONARY TUBERCULOSIS

Abstract

Pulmonary TB is an infectious disease caused by Mycobacterium tuberculosis. The incidence of pulmonary TB in Indonesia 2012 was 189 cases in 100,000 populations and the mortality rate was 27/100,000. There are several risk factors of pulmonary TB, e.g. history of diabetes mellitus that causes an increased susceptibility to pulmonary TB germs and smoke. The purposes of this study were to describe the characteristics of respondent, history of co-morbid disease (Diabetes Mellitus) and status of smoking among adult patient of Pulmonary TB in North Semarang Sub District. The type of this study is observational analysis with cross sectional design. The study was conducted in North Semarang with 60 samples. The data analysis was performed by distribution of frequency and chi-square test. The results showed was a relationship between history of Diabetes Mellitus and pulmonary TB (26.7%), p value = 0.038, OR=5.092; 95%CI= 0.981- 26.430. It can be conclude that the prevalence of Tuberculosis and Diabetes Mellitus was 16.7% and Diabetes mellitus have a relationship with the incidence of pulmonary TB.

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Introduction

Pulmonary TB is an infectious disease caused by Mycobacterium tuberculosis. Usually the most common infection is the lungs but can affect other organs. This disease can be transmitted from person to person via droplets from infected persons with pulmonary TB (WHO, 2011). Pulmonary TB still remains a significant health problem for the people around the world. Approximately 75% of TB patients are people in the productive age group (WHO, 2011). The incidence of pulmonary TB in Indonesia 2012 was 189 cases in 100,000 population and the mortality rate was 27/100,000. In Semarang city year 2011, the numbers of smear-positive patients were 557 people.

There are several diseases as co-morbidities tuberculosis disease such as HIV / AIDS, acute hepatitis, chronic liver disorders, kidney disorders, and diabetes mellitus (Simbolon, 2007; Randy A, 2011). Research conducted by Tanjung obtain the result that of 733 patients with pulmonary TB, the patient also 11.7% had diabetes mellitus, 9.28% had high blood pressure, 2.7% had liver disorders, 1.9% had heart disorders, and 0.9% had renal abnormalities (Tanjung, 1998). Patients with diabetes mellitus have a risk 2-3 times more often for pulmonary tuberculosis disease. Indra Janis's research result in 2008 shown that from 46 patients with lung TB DM, DM controlled with pulmonary TB was 35 patients (76.1%) and pulmonary TB with DM uncontrolled was 11 patients (23.9%) (Wang, 2009).

Pulmonary TB and smoking are the two significant and inter-related public health problem (Minto, 2009; Simbolon, 2007; Sugiarto, 2004). Smoking may interfere with the effectiveness of most of the defense mechanism of respiration. Smoking can stimulate the formation of mucous and reduce the movement of cilia therefore there is accumulation of mucous and increasing risk of bacteria growth, including mycobacterium tuberculosis, that can cause infection (Orme, 2001).

From the results of previous studies in different countries showed that smoking had a relationship with the incidence of pulmonary TB. There was a relationship between smoking and pulmonary tuberculosis (Minto, 2009). The risk of TB infection in smokers is increasing 1.77 to 1.9 times than nonsmokers. The aims of the study are to describe the characteristics, the history of Diabetes Mellitus and the smoking status of adult pulmonary tuberculosis patient in Semarang.

Method

The type of this study is observational analysis with cross sectional design. The study was conducted in North Semarang. The population in this study is people aged 15 years or older who live in the District of North Semarang at least one year from January to December in 2012. Samples were 60 people calculated using sample size software to obtain minimal sample size.

Primary data obtained directly through interviews with respondents using questionnaires, smear examination and measurement of blood sugar. The data analysis was performed by distribution of frequency and chi-square test.

Result and Discussion

The results showed most of respondents were in productive age (16-50 years old), were married, have a middle income, almost equal in sex and educational background. Approximately 75% has an occupation with a greater risk for pulmonary TB (Table 1).

The differences in age groups have an equal opportunity to experience pulmonary TB. This is because in these age groups have the same chance of contact with the exposure factors that already exist in the surrounding environment (Sugiarto, 2004). Researchers also assume that the incidence of pulmonary TB can occur in all age groups, when the source is transmitting the surrounding environment. Lower body resistance, unhealthy housing environment, can cause people to be easily infected with pulmonary TB disease, regardless of age group.

Women in the reproductive age are more susceptible to pulmonary tuberculosis and are more likely affected by pulmonary TB disease rather than men of the same age group. Tuberculosis is an infectious disease that at-

Table 1. The characteristic, history of Diabetes Mellitus and status of smoking of the respondent in Semarang 2012

Variable	f	%
Age		
Productive age (16-50)	40	66,7
Elderly (>50)	20	33,3
Gender		
Male	35	58,3
Female	25	41,7
Education background		
Low	34	56,7
High	26	43,3
Occupation		
Risk of pulmonary TB	45	75
Lower or none	15	25
Income		
<= 500000	16	26,7
600000-1500000	38	63,3
>1500000	6	10
Marital status		
Married	45	75
Single	15	25
Status of Diabetes Mellitus		
DM	10	16,7
Not DM	50	83,3
Smoking status		
Yes	30	50
No	30	50

tacks the most vicious and often kills women. The new cases of Tuberculosis in Indonesia attacked most women in the most productive age and woman's death from tuberculosis more than deaths due to pregnancy, childbirth and postpartum. In contrary, the number of patients with pulmonary TB as much as 51.88% in men slightly more than women 48, 12%, so these results suggest that gender both men and women have the same risk of developing pulmonary TB (Supriyono, 2003). Researchers also considered that the occurrence of pulmonary TB both men and women have an equal opportunities affected pulmonary TB, because TB is contagious and attacks the lungs of people with the condition of worsening nutrition and unhealthy housing, regardless of their sex.

People with low education will limited the information about the symptoms and treatment of tuberculosis. Health education should be done to the problem Tuberculosis through television, newspapers, radio, schools, etc.) so that people understand the modes of transmission of the disease and how to prevent it. The lacking of level of education and knowledge will cause pulmonary TB patients do not understand the importance of regular medical treatment. Once the researchers also considered that the level of one's education can affect the behavior of individuals or communities on the incidence of pulmonary TB. Health education is expected to create public attitudes to healthy living.

There were 90% of TB patients in the world attack the group with weak or poor socioeconomic (Achmadi, 2005). Likewise, the results showed that 3 or 4 months of work will be lost because someone is ill TB. This could potentially cause the loss of 20-30% of household income in a year. When someone dies from TB, then the family will lose about 13-15 years of income due to the head of his family died of tuberculosis. People who are low socioeconomic or poor, causing malnutrition, living in places that are not healthy and cannot maintain of good health, became ill. This greatly affects the spread of disease, especially pulmonary TB.

The prevalence of pulmonary TB and Diabetes Mellitus was 16.7%. Respondents who had Diabetes Mellitus (DM) were found more in respondent who had infected pulmonary Tb (26.7%) than in non-pulmonary TB patients (6.7%). While in respondents who do not have Diabetes Mellitus (DM), the number of patients who suffer from pulmonary TB (73.3%) was less than the non-patients (93.3%). Results of test calculations with chi square statistic obtained p = 0.038; OR = 5.092, 95% CI = 0.981 to 26.430 which indicates that a history of diabetes mellitus associated with adult pulmonary TB incidence in districts of North Semarang. The risk was 5.091 times greater than people with no history of diabetes mellitus (Table 2).

The increasing risk pulmonary tuber-

Table 2. The relationship between status of DM and smoking with Status of pulmonary TB

Variables	Pulmonary TB		Not pulmonary TB		Total		p value	OR (95%CI)
	f	%	f	%	f	%		
Status of Diabetes Mellitus (DM)							0,038	5,091 (0,98-26,43)
DM	8	26,7	2	6,7	10	16,7		
Not DM	22	73,3	28	93,3	50	83,3		
Smoking status							0,001	1,31 (1,28 – 5,1)
Yes	16	53,3	14	46,67	30	50		
No	14	46,67	16	53,3	30	50		

culosis in Diabetes Mellitus patient might be caused by a defect in alveolar macrophages or T lymphocytes. There was an increase in the number of mature alveolar macrophages in patients with active pulmonary TB (Wang, 2009). Possible causes of the increasing of pulmonary TB in people with diabetes mellitus may be a defect in the function of immune cells and host defense mechanisms. Underlying mechanisms of this are still not understood until now, although there have been a number of hypotheses about the role of cytokines as a molecule that is important in human defense mechanisms against TB. In addition, there is also a reduced bactericidal activity of leukocytes in patients with diabetes mellitus, especially in those who had bad blood sugar control (Jeon, 2008). Diabetes Mellitus can increase the frequency and severity of an infection. It is caused by abnormalities in cell-mediated immunity and phagocyte function associated with hyperglycemia, including reduced vascular.

The prevalence of respondent who smoke and had pulmonary tuberculosis was 50%. In this study, the status of smoking not significantly associated with pulmonary TB. It may happen because the respondents live in similar environment (areas with high residential density), and also most smokers have a cigarette type, smoking status and duration of smoking were similar. Most smokers smoke cigarettes with filter and have been smoking in the long term. Most of (80%) of respondents who smoked had become smokers more than 5 years and more than 50% of respondents who smoke are heavy smokers who consumed> 10 cigarettes per day. It shows that the respondents already had a very high exposure to cigarette for a long time.

Conclusion

The prevalence of Tuberculosis and Diabetes Mellitus was 16.7% and Diabetes mellitus have a relationship with the incidence of pulmonary TB. It is suggested for pulmonary tuberculosis patients to keep in diet and exercise to decrease blood sugar in term to prevent from prolonging tuberculosis medicine.

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