

## Level of Knowledge about Tuberculosis among Type 2 Diabetes Mellitus Patients at the Endocrine Clinic Dr. Hasan Sadikin General Hospital Bandung

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### Abstract

**Background:** Diabetes Mellitus (DM) is one of the risk factors for tuberculosis (TB). Knowledge of TB is essential in prevention control for the person at risk. This study aimed to describe the level of knowledge about TB among DM patients.

**Methods:** A cross sectional study was performed involving 72 adult DM patients at the Endocrine Clinic, Dr. Hasan Sadikin General Hospital Bandung. The subjects were interviewed using a standardized questionnaire including socio-demographic information and knowledge about TB: manifestation of TB, transmission, treatment, DM-TB co-infections, and status acquiring TB information in the last 12 months. Knowledge was categorized as high, moderate and low if total scores were >75, 56–75 and <56 respectively. Data were presented descriptively as percentage and mean (SD) after testing for the normality of distribution.

**Results:** The mean of age of subjects was 56.6 years, and 55% were female. Most were unemployed (72.2%), had an education background lower than high school (75%), and lived in Bandung (91.7%). The mean score of knowledge was 54.4. Proportion of subjects based on the level of knowledge which is high, moderate and low, were 29.2%, 26.4%, and 44.4% respectively.

**Conclusions:** The level of knowledge about TB among Type 2 DM patients at the Endocrine Clinic Dr. Hasan Sadikin General Hospital Bandung was low. TB education program among DM patients needs to be improved.

**Keywords:** Diabetes Mellitus, knowledge, tuberculosis

### Introduction

Diabetes Mellitus (DM) is one of the risk factors of Tuberculosis (TB). Increasing DM prevalence is associated with increasing prevalence of TB cases.<sup>1,2</sup> Increasing DM prevalence occurred significantly in developing countries, including Indonesia, where TB is endemic.<sup>3,4</sup> In 2010, 285 million adults (aged 20-79 years) in the world were affected by DM and the prevalence was 6.4%. The prevalence will increase to 7.7%, affecting 439 million adult patients in 2030. In developing countries, there will be 69% increase in DM patients in adults.<sup>3</sup> The DM patients have two to five times risk toward TB infection compared to non-DM patients.<sup>5</sup> Increasing DM prevalence is a serious precaution in TB infection control.<sup>6</sup>

Awareness and knowledge of TB is essential in TB control strategies. Patients who have satisfactory knowledge of TB are

less likely to be delayed in seeking TB care.<sup>7</sup> Health education program in TB control should increase knowledge about the clinical manifestation, mode of transmission, role of sputum examination, curability of the disease and the availability of diagnostic and TB treatment services in health facilities. Awareness about the clinical manifestation of TB, transmission of TB, and misconception may affect population health-care seeking behavior.<sup>8</sup>

Studies about level of knowledge about TB among Bandung population are rarely performed. This study was conducted to describe the level of knowledge about TB among DM patients at the Endocrine Clinic, Dr. Hasan Sadikin General Hospital, Bandung.

### Methods

A cross sectional study was conducted at the

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Endocrine Clinic, Dr. Hasan Sadikin General Hospital Bandung between September–November 2015, after obtaining approval from the ethical committee of Dr. Hasan Sadikin General Hospital Bandung. The subjects were adult type 2 DM patients (aged 18 years or above) treated at the Endocrine Clinic Dr. Hasan Sadikin General Hospital Bandung between September–November 2015, and voluntarily joined the study after a written informed consent. Diabetic patients who had received TB treatment or were in the TB treatment period were excluded from the study. The minimal number of subject was 49.

Socio-demographics data and knowledge about TB were obtained by direct interview using a standardized questionnaire consisting of 12 questions. The questionnaire was formed using the frame from the questionnaire of the American International Health Alliance.<sup>9</sup> Topics of the questions were clinical manifestation of TB, transmission of TB, treatment of TB, TB-DM co-infection, and status of getting information about TB in the last 12 months. Furthermore, the questionnaire was tested for its validity and reliability. The reliability score (Chronbach’s alpha) was 0.962.

The score was 1 for a correct and 0 for a wrong answer. For multiple-answer questions such as clinical manifestation and transmission of TB, subjects may answer more than one answer, and the answer was correct if subjects mentioned minimal one correct answer. The final score was categorized into high, moderate and low if the total score was >75, 56-75 and <56 respectively according to Arikunto’s theory (2006). Data were presented descriptively as percentage (%) and central tendency (mean + SD) after testing for normality of distribution using Kolmogorov-Smirnov.

## Results

Half of the subjects were male, and the mean age was 56.6 years. The minimum and the maximum age was 31 and 82. Three-quarters of them were graduated from high school and lower. Most were unemployed while 9 out of 10 subjects lived in Bandung (Table 1).

The mean score of knowledge about TB among DM patients was 54.4; per category it was considered as low. The lowest and highest score was 0 and 100. Almost half of the subjects were with low level of knowledge about TB (Figure 1).

There was similarity in age among the three groups (high, moderate, and low level

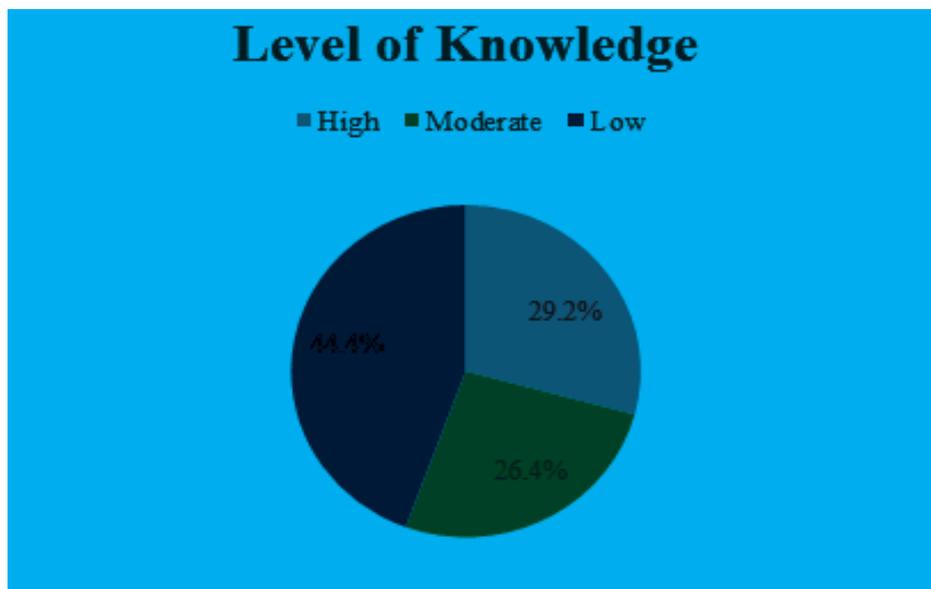
**Table 1 Characteristics of Subjects**

Characteristic	n=72 (%)
Gender, n (%)	
Male	32(44.4)
Female	40(55.6)
Age, mean ± SD	56.6± 9.7
Educational level, n (%)	
Primary School	16(22.2)
Junior High School	14(19.5)
Senior High School	24 (33.3)
Vocational training	6 (8.3)
University	12(16.7)
Employment, n (%)	
Employed	20(27.8)
Unemployed	52(72.2)
Residence, n (%)	
Bandung	66(91.7)
Outside Bandung	6(8.3)

of knowledge about TB). In the group of DM patients with good level of knowledge of TB, there were more males than females, meanwhile in other groups (moderate and low) they were dominated by females (around 60%). Based on educational level, subjects with moderate and low level of knowledge were dominated by groups of high school graduates and below. There were more unemployed subjects in the group of low level of knowledge about TB

This study elaborated the detail of knowledge about TB by inquiring about 5 different aspects: knowledge about clinical manifestation of TB, transmission of TB, treatment of TB, TB-DM information, and exposure to TB information in the last 12 months. Moreover, more than half of the subjects knew about the clinical manifestation of TB and transmission of TB. Three-quarter of the subjects were aware that TB is curable; half of them knew that the treatment of TB will be 6 months, but only one out of 10 of them recognized rifampicin as an anti-TB drug (Table 3).

Regarding TB DM co- infection, half of the subjects knew that persons with low immunity were vulnerable to TB, but only one out of three subjects knew that people with DM were vulnerable to TB. Knowledge about routine



**Figure 1 Proportion of Subjects based on the Level of Knowledge about TB**

control and DM treatment could reduce risk of getting infected with TB was known by only half of the subjects.

Only one-third of the subjects got

information about TB in the last 12 months. Almost 70% of subjects did not obtain information about TB in the last 12 months (Table 3).

**Table 2 Characteristics of Subjects and Level of Knowledge about Tuberculosis**

Characteristics	Level of Knowledge about Tuberculosis		
	High n (%)	Moderate n (%)	Low n (%)
Gender			
Male	13 (61.9)	8 (42.1)	11 (34.4)
Female	8 (38.1)	11 (57.9)	21 (65.6)
Age, mean ± SD	52.7±10.3	58.6±9.5	57.9±8.9
Educational level			
Primary School	1 (4.8)	4 (21.1)	11 (34.4)
Junior High School	3 (14.3)	3 (15.8)	8 (25)
Senior High School	7 (33.3)	6 (31.6)	11 (34.4)
Vocational training	1 (4.8)	4 (21.1)	1 (3.1)
University	9 (42.8)	2 (10.5)	1 (3.1)
Employment			
Employed	8 (38.1)	4 (21.1)	8 (25)
Unemployed	13 (61.9)	15 (78.9)	24 (75)
Residence			
Bandung	20 (95.2)	16 (84.2)	30 (93.8)
Outside Bandung	1 (4.8)	3 (15.8)	2 (6.3)

**Table 3 Satisfaction Distribution Based on Dimensions of Service Quality**

Questions	Answer	
	Correct n (%)	Incorrect n (%)
Clinical Manifestation of TB		
One main manifestation of TB	41 (56.9)	31 (43.1)
Transmission of TB		
TB is infectious	51 (70.8)	21 (29.2)
TB is transmitted by droplet/sputum	48 (66.7)	24 (33.3)
Treatment of TB		
TB is curable	53 (73.7)	19 (26.3)
Treatment of TB is minimum 6 months	33 (45.8)	39 (54.2)
Rifampicin as anti-TB drug	9 (12.5)	63 (87.5)
Time to stop TB treatment	26 (36.1)	46 (63.9)
TB DM co-infection		
Person with low immunity level is vulnerable to TB	41 (56.9)	31 (43.1)
Control and DM treatment reduces risk of getting TB	37 (51.4)	35 (48.6)
DM patients is vulnerable to TB	27 (37.5)	45 (62.5)
TB patients with DM is more difficult to recover	26 (36.1)	46 (63.9)
Acquiring TB information in last 12 months	22 (30.6)	50 (69.4)

## Discussion

This study found that DM patients' level of knowledge about TB was limited. The mean score of knowledge about TB among DM patients was 54.4; per category it was considered as low. The proportion of subjects based on the level of knowledge about TB which was high, moderate and low, were 29.2%, 26.4%, and 44.4% respectively. The fact that only one-third of subjects obtained information about TB in last 12 months, might explain the low level of knowledge about TB in this study. This level of knowledge was comparable to 59% newly-diagnosed pulmonary TB patients in Nigeria<sup>10</sup>, and 64% in Sudan<sup>11</sup> that have unsatisfactory knowledge of TB. Similar to the study in Tanzania<sup>12</sup>, this study showed that the majority (70%) of subjects were with unsatisfactory knowledge of TB.<sup>12</sup> The higher level of knowledge of the Nigeria<sup>10</sup> study could be explained by the higher level of education among the subjects. The correlation further explained in the Tanzania study, apparently was not explored in this study.

Questions about the clinical manifestation of TB and transmission of TB were answered

correctly by more than half of the subjects. Less than half of the subjects were aware about the duration of treatment, and only one-tenth of them knew that rifampicin as an anti-TB drug. Furthermore, only one-third of them knew about the time to stop TB treatment. Similar to this findings, subjects of previous study in Tanzania<sup>12</sup> also responded poorly to questions concerning general management of TB including duration of treatment and drug side effects.

Regarding the knowledge of TB-DM co-infection, more than half subjects did not know that DM patients were vulnerable to TB. It is contrary to the fact that DM patients have more risk toward TB infection compared to non-DM patients.<sup>5</sup> A research in Indonesia<sup>6</sup> found a strong association between DM and TB in young and non-obese subjects and it was supported by another study in Korea.<sup>13</sup> Almost two-third of DM patients in this study was unable to correctly answer the question that TB patients with DM are more difficult to recover than TB patients without DM. In fact, DM has a negative effect on TB treatment and is associated with lower performance status.<sup>14,15</sup>

Furthermore, knowledge about the clinical

manifestation, mode of transmission, role of sputum examination, curability of the disease and the availability of diagnostic and TB treatment services in health facility are associated with health seeking behavior.<sup>8</sup> Patients with lack of knowledge about TB were more likely to be delayed in seeking patients care.<sup>7,10</sup> Indeed, early diagnosis and effective treatment are the best way to control TB infection.

This study found that only one-third of DM patients were being exposed to information about TB in the last 12 months. Besides, the TB education program among DM patients should be intensified, especially in Indonesia because Indonesia is in the top ten for countries in numbers of people with DM.<sup>3,16</sup> The TB control program should include educational intervention using alternative media with suitable modification to reach all sectors.<sup>17</sup> Effectiveness of the TB education program was proven by a study in India<sup>17</sup> which explained the information, education and communication (IEC) campaign about TB has positive impacts on increasing awareness and improving self-reporting of the general population.

This study has several limitations. The subjects of this study were taken only at the Endocrine Clinic of Dr. Hasan Sadikin General Hospital Bandung and were not compared to any other place. The phenomenon of differences between the study subjects and general population cannot be captured properly. This study was conducted without considering about factors associating the level of knowledge and the association between knowledge and attitude. Further studies are needed to compare the knowledge of TB among diabetic patients treated in hospital and primary health care, to analyze the factors associated with the level of knowledge, and to find the association between knowledge and attitude.

In conclusion, the level of knowledge about TB among DM patients at the Endocrine Clinic of Dr. Hasan Sadikin General Hospital Bandung is low. Almost half of the diabetic patients are with low level of knowledge about TB, one third is high and a quarter of them was moderate. The TB control programs for educating DM patients should be improved.

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