Original Research Article

Analysis of Sociodemographic Factors that Influence the Quality of Life of Tuberculosis Sufferers with Diabetes Mellitus in Medan City, 2023

Sikap Berliana Sitepu[1], Fazidah Aguslina Siregar[2], Etti Sudaryati[3]

[1,2,3]Master of Public Health Study Program, Faculty of Public Health, Universitas Sumatera Utara, Indonesia

Corresponding Author: Sikap Berliana Sitepu

ABSTRACT

The purpose of this research is to analyze sociodemographic factors that influence the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023. The approach in this research is cross sectional. The number of tuberculosis patients in Medan City who are still undergoing treatment from January to July 2023 is 357 patients. Sample for this research is 172 respondents. Data analysis used in this research used univariate, bivariate, and multivariate analysis. The results of the research show that education has a relationship with the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023. Age, gender, occupation, and income have no relationship on the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023. Age and education influence the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023. Gender, occupation, and income have no effect on the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023.

Keywords: Education, Age, Gender, Occupation, Income, Quality of Life

INTRODUCTION

Sustainable Development Goals (SDGs) are a global and national agreement committed to ensuring the welfare of society, consisting of 17 goals. SDGs agenda number three aims to provide a prosperous life and ensure health for all ages. SDGs target number three, the third point, contains a commitment to end the tuberculosis (TBC) epidemic by 2030 with the END TB Strategy which defines targets (2020-2025) and targets (2030-2035) for reducing cases and deaths due to TB disease. The target by 2030 is to reduce 90 percent of deaths due to TB and reduce the TB incidence rate by 80 percent. SDGs target number three, point four, also contains a commitment to reduce by one third premature deaths due to non-communicable diseases through preventive and curative efforts as well as seeking to improve mental health and well-being. The statement contained in the 1945 Constitution states that health is a basic human right and an element of welfare. Tuberculosis is a threat to humans that can attack individual health and has the nature of aerobic transmission. The high incidence of TB is one of the global priority programs because it is the leading cause of death in the world and in Indonesia it is one of the national priority programs. Tuberculosis is caused by the bacteria mycobacterium tuberculosis (MTb). The global incidence of TB is 10.4 million or equal to 120 cases per 100,000 population and TB incidents are mostly found in India, Indonesia, China, Philippines, and Pakistan. The Global Report Tuberculosis states that Indonesia ranks second in terms of cases of tuberculosis in the world in 2022.

Patients undergoing treatment have several responses in the body such as feeling nauseous, losing weight, and experiencing

physical weakness which ultimately affects the quality of life and success of the patient's treatment. A study conducted by Alfauzan and Lucya (2021) states that the quality of life of TB patients in Asia is relatively low, such as in Indonesia, China, Malaysia, Pakistan, Philippines, and India because it is influenced by physical and psychological conditions due to the pain felt by the patient which interferes with activities and also patients often experience anxiety.

Tuberculosis and diabetes mellitus (DM) are two public health problems. Uncontrolled diabetes mellitus will complicate the healing and successful treatment of TB and DM patients, becoming one of the risk factors for developing TB with three times the level of susceptibility.

DM is one of the susceptibility factors that supports TB infection through various mechanisms. Diabetes mellitus reduces the immunity of TB sufferers and causes a lengthening of the sputum conversion time, making relapse possible. DM sufferers have a higher risk of developing TB when compared to those who do not suffer from DM. If the prevalence of DM increases in an area, the prevalence of TB will also increase. Diabetes mellitus occurs due to increased blood sugar levels due to the pancreas being unable to produce insulin and is a metabolic disorder. DM patients have low body immunity, making it easier for individuals to become infected with bacteria or viruses, one of which is being infected with MTb because the insulin hormone does not work effectively in regulating blood sugar balance.

Diabetes mellitus is known as diabetes or diabetes in the community. Lung infections in DM sufferers occur due to malfunctioning of the body's defense mechanisms and immune cells. TB sufferers with DM are slightly more difficult to treat because they easily fail therapy and tend to die during therapy compared to individuals who do not suffer from DM. The link between TB and DM requires intervention in both diseases.

Healthy lifestyle and socio-economic patterns also play a role in the transmission of tuberculosis. In 2020, the Central Statistics Agency stated that there were 27.5 million people with poverty rates in Indonesia out of a total population of 271 million, and as many as 9.77 million people were unemployed. Poverty and unemployment rates are risk factors for increasing TB cases in community groups with middle to lower economic levels.

Research conducted by Rosdiani et al. (2017) stated that nutritional status is a risk factor for TB. One effort to prevent the increase in TB infections is to promote bacillus calmette guerin (BCG) vaccination with a target focus on neonates and toddlers. The BCG vaccine is known to trigger an adaptive immune system that is protective against TB pathogens. Research by Tjahjadi and Kaswandani (2021) states that the incidence of TB in children is high if there is no BCG scar tissue in the child.

Suriya's research (2018) stated that 66.7 percent of TB patients did not receive family support, 57.3 percent experienced depression and 62.5 percent had poor quality of life. The depression that arises is caused by the lack of family support and fear of worsening health and long-term treatment. Another study stated that 58.7 percent of TB patients had a moderate quality of life and 41.3 percent had a high quality of life.

The purpose of this research is to analyze sociodemographic factors that influence the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023.

RESEARCH METHODS

The approach in this research is cross sectional. Observations will be carried out by researchers at certain times or just one measurement so that an overview of the determinants in the target population is obtained (Murti, 1997).

Population is the entire research subject and must be clearly defined (Sastroasmoro and Ismael, 2018). The objects targeted for this research were all patients who were

declared to be suffering from tuberculosis disease with diabetes mellitus which was confirmed by rapid molecular tests, x-rays with positive results and diabetes mellitus examinations which were also found to be positive for diabetes mellitus. The number of tuberculosis patients in Medan City who are still undergoing treatment from January to July 2023 is 357 patients. Sample is part of the entire research target, namely part of the population (Ansori, 2020). Based on the research objectives related to the quality of life of tuberculosis patients with diabetes mellitus, the sample size calculation was adjusted to the Isaac and Michael formula with an error rate (d=5%) totaling 172 samples. Sampling technique uses random sampling by means of cluster sampling or often referred to as group or cluster sampling (Sugiyono, 2017). Samples will be taken by simple random sampling. The sample was taken from 30% of the total number of Community Health Centers in Medan City, namely 12 Community Health Centers, taking into consideration time constraints, area size and availability of research funds at the time of data collection. Data analysis used in this research used univariate, bivariate, and multivariate analysis. Univariate analysis is a

characteristic of variables with a categorical measurement scale which is described by the frequency distribution of each variable (Ghozali, 2021). Bivariate analysis is to measure the relationship between each independent variable and the dependent variable using the chi-square test with a significance level of 95 percent (Syahrum, 2012). Multivariate analysis was carried out to determine the determinants that have the most dominant influence using multiple logistic regression tests (Yusuf, 2016).

RESULTS
General Description
Medan City is the capital of North Sumatra Province and is the center of activities in this province. The geographical location of Medan City is at $3^0 27'$–$3^0 47'$ North Latitude and $98^0 35'$–$98^0 44'$ East Longitude and is at an altitude of 2.5–37.5 m above sea level. Based on its geographical location, Medan City borders Deli Serdang Regency to the north, west, south and east, while the sea border borders the Malacca Strait to the north. The area of Medan City is around 265.10 km^2 with a population of 2,460,858 people and a population density of 9,283 people per km^2.

Figure 1. Map of Medan City Area

Based on Minister of Health Regulation No. 75 of 2014, the Community Health Center is a technical implementation unit of the district or city health service which has the function of providing first level health services. The Community Health Center's working area is a maximum of one sub-district and in its implementation, it can be assisted by the Community Health Center Assistant, Mobile Community Health Center, Village Midwife Unit, and the Community.

This research was carried out in 12 Community Health Centers in Medan City which have the highest number of tuberculosis sufferers with diabetes mellitus based on data from the Medan City Health Service, namely Medan Amplas Community Health Center, Glugur Darat Community Health Center, Matsum City Community Health Center, Community Health Mandala Center, Martubung Community Health Center, Medan Denai Community Health Center, Medan Johor Community Health Center, Padang Bulan Selayang II Community Health Center, Sentosa Baru Community Health Center, Suka Ramai Community Health Center, Tegal Sari Community Health Center, and Community Health Center Rengas Island.

Univariate Analysis

Table 1. Univariate Analysis

Sociodemographic Factors	n=172	%
Age		
≤45 Year	42	24.4
>45 Year	130	75.6
Gender		
Female	100	58.1
Male	72	41.9
Education		
High	88	51.2
Low	84	48.8
Occupation		
Work	57	33.1
Doesn't Work	115	66.9
Income		
≥ Regional Minimum Wage (RMW)	46	26.7
< Regional Minimum Wage	126	73.3

The total number of respondents in this study was 172 respondents, with details of 72 male respondents (41.9%) and 100 female respondents (58.1%). The majority of respondents belonging to the category of having higher education were 88 respondents (51.2%) and those in the low education category were 84 respondents (48.8%). The high education category is classified into respondents who have completed high school and college respectively at 34.3 percent and 16.9 percent, while those included in the low education category are those who have not completed elementary school, completed elementary school, and completed junior high school respectively. Respectively 3.5 percent, 12.8 percent, and 32.6 percent.

Most of the respondents were over 45 years old, namely 130 respondents (75.6%) and the remainder were aged 45 years and under, namely 42 respondents (24.4%). The majority of respondents were not working, namely 115 respondents (66.9%) and the remainder were working, namely 57 respondents (33.1%). Respondents who fall into the non-working category are respondents who do not work and housewives, namely 27.3 percent and 39.5 percent respectively. The working categories are those who have a profession as a trader or self-employed (20.3%), private employees (9.3%), and state or military civil servants (3.5%). The majority of respondents had incomes below the regional minimum wage for Medan City, namely 73.3 percent (126 respondents) and the remainder were equal to or above the regional minimum wage for Medan City, namely 26.7 percent (46 respondents).

Bivariate Analysis

Table 2. Bivariate Analysis

Variable	Quality of Life				Total		p	PR	95% CI	
	Good		Bad							
	n	%	n	%	n	%			Lower	Upper
Usia										
≤45 Year	27	64.3	15	35.7	42	100	0.206	1.247	0.942	1.651
>45 Year	67	51.5	63	48.5	130	100				
Gender										
Male	42	58.3	30	41.7	72	100	0.504	1.122	0.855	1.471
Female	52	52.0	48	48.0	100	100				
Occupation										
Work Tidak Doesn't Work	34	59.6	23	40.4	57	100	0,445	1.143	0.867	1.507
	60	52.2	55	47.8	115	100				
Income										
≥RMW	28	60.9	18	39.1	46	100	0.414	1.162	0.874	1.546
<RMW	66	52.4	60	47.6	126	100				
Education										
High	57	64.8	31	35.2	90	100	0.010	1.471	1.105	1.958
Low	37	44.0	47	56.0	82	100				

Education has a relationship with the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023.

Age, gender, occupation, and income have no relationship on the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023.

Multivariate Analysis

Table 3. Multivariate Analysis

Variable	P-Value	Determination Value
Age	0.206	P < 0.25
Gender	0.504	P < 0.25
Occupation	0.445	P < 0.25
Income	0.414	P < 0.25
Education	0.010	P < 0.25

Age and education influence the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023.

Gender, occupation, and income have no effect on the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023.

CONCLUSION AND SUGGESTION

The results of the research show that education has a relationship with the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023. Age, gender, occupation, and income have no relationship on the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023. Age and education influence the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023. Gender, occupation, and income have no effect on the quality of life of tuberculosis sufferers with diabetes mellitus in Medan City, 2023.

Based on the research results above, the suggestions for this research are:

1.Community Health Centers are expected to provide input to health workers that quality of life is very important to pay attention to in supporting patients to complete their treatment. Public Health Centers and health workers can provide assistance through counseling and strengthening communication, information, and education to tuberculosis sufferers with diabetes mellitus which may affect the success of treatment for tuberculosis patients with diabetes. The above information also needs to be conveyed to the patient's family and the community in the work area of the Community Health Center. It is also hoped that chronic disease management program activities and internal networking activities between tuberculosis and diabetes mellitus sufferers will be maximized. It is also hoped that the Community Health Center will initiate the formation of a community of patients who have completed treatment or who are tuberculosis survivors to participate in providing social support for patients who

are currently undergoing treatment to maximize the success of treatment and improve the quality of life of patients suffering from tuberculosis with diabetes mellitus.

2.For the government to consider action plans for non-communicable disease activities to be integrated with the national tuberculosis control plan directed at health workers and clinicians with the aim of developing coordinated management of the two diseases.

3.For the community to be able to take preventive measures independently, not only to avoid tuberculosis and diabetes mellitus, but also from other diseases through efforts to implement healthy living behavior, get enough and regular rest, manage stress and carry out regular health checks to a health care facility. The public needs to carry out early detection of tuberculosis and diabetes mellitus patients so that primary prevention methods can be started earlier, for example by routinely controlling blood sugar levels and recognizing the signs and symptoms of the disease.

4.For future researchers to consider other research designs to obtain stronger causal relationships between factors that influence quality of life, both in developing research on previously unknown risk factors for the sake of disease prevention and control.

REFERENCES
1. Alfauzan, & Vita Lucya. (2021). Gambaran Kualitas Hidup pada Penderita Tuberkulosis di Asia: Literature Review. *Jurnal Ilmiah Keperawatan (Scientific Journal of Nursing), 7*(3), 65-70. https://doi.org/10.33023/jikep.v7i3.810.
2. Ansori, M. (2020). *Metode Penelitian Kuantitatif*. Airlangga University Press.
3. Ghozali, I. (2021). *Aplikasi Analisis Multivariate dengan Program IBM SPSS 26*. Edisi 10. Badan Penerbit Universitas Diponegoro.
4. Murti, B. (1997). *Prinsip dan Metode Riset Epidemiologi*. Yogyakarta: Gadjah Mada University Press.
5. Rosdiani, L., Purbaningsih, W., & Yunus, A. (2017). Status Nutrisi Berperan dalam Kejadian. *Bandung Meeting on Global Medicine & Health (BaMGMH), 1*(1).
6. Sastroasmoro, S., & Ismael, S. (2018). *Dasar-dasar Metodologi Penelitian Klinis*. Jakarta: CV. Sagung Seto.
7. Sugiyono, (2017). *Metode Penelitian Kuantitatif dan Kualitatif*. Bandung: Alfabeta.
8. Suriya, M. (2018, Juli). Faktor-Faktor yang Berhubungan dengan Kualitas Hidup Pasien TB Paru di Rumah Sakit Khusus Paru Lubuk Alung Sumatera Barat. *Jurnal Keperawatan Abdurrab*.
9. Syahrum. (2012). *Metodologi Penelitian Kuantitatif*. Bandung: Cipta. Pustaka.
10. Tjahjadi, A. K., & Kaswandani, N. (2021). Hubungan Jaringan Parut Bacillus Calmette-Guerin dengan Kejadian Tuberkulosis Ekstraparu pada Anak di Rumah Sakit Cipto Mangunkusumo Kiara Tahun 2015-2017. *Sari Pediatri, 22*.
11. Yusuf, A. Murni. (2016). *Metode Penelitian: Kuantitatif, Kualitatif, dan Penelitian*. Jakarta: Prenadamedia Group.

******