

# Malnutrition Risk Factors In TBC: A Case Study In Medan, Indonesia

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## Malnutrition Risk Factors In TBC: A Case Study In Medan, Indonesia

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### ABSTRACT

The purpose of the study was to discuss the causes of malnutrition in TB patients: A case study in Medan Indonesia, this research method is a case study from Luck, Jackson and Usher (2005), the results of this study are the factors that cause malnutrition in TB patient found from this study. are (1) elderly and pre-elderly TB patients, (2) TB patients with Diabetes Mellitus, (3) TB patients with HIV, (4) TB patients with Renal failure. The data from this study indicate the need for an assessment of the nutritional status of patients when TB is diagnosed. This is to increase awareness of the nutritional status of the patient since the patient was diagnosed with TB. In accordance with the results of this study, the assessment really needs to be emphasized in cases of TB with the elderly, TB with HIV, TB with Diabetes Mellitus and TB with Renal failure

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#### Kata kunci:

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### ABSTRAK

Tujuan penelitian untuk membahas penyebab malnutrisi pada pasien TB: Studi kasus di Medan Indonesia, metode penelitian ini adalah studi kasus dari Luck, Jackson and Usher (2005), hasil penelitian ini adalah faktor-faktor penyebab malnutrisi pada pasien ditemukan dari penelitian ini. adalah (1) pasien TB lansia dan pra-lansia, (2) pasien TB dengan Diabetes Mellitus, (3) pasien TB dengan HIV, (4) pasien TB dengan kegagalan pengobatan. Data dari penelitian ini menunjukkan perlunya penilaian status gizi pasien saat didiagnosis TB. Hal ini untuk meningkatkan kesadaran akan status gizi pasien sejak pasien terdiagnosis TB. Sesuai dengan hasil penelitian ini, pengkajian sangat perlu ditekankan pada kasus TB dengan usia lanjut, TB dengan HIV, TB dengan Diabetes Mellitus dan TB dengan kegagalan pengobatan.

### INTRODUCTION

Malnutrition in TB cases can be a factor causing death (Seid & Ayele, 2020). In TB patients, the causes of malnutrition are decreased appetite, side effects of drugs such as nausea and vomiting, increased metabolism of patients due to infection (Feleke, Feleke & Biadlegne, 2019). Malnutrition that occurs will worsen the TB infection which expands the damage to the patient's lungs and the emergence of extra-pulmonary TB. Greater organ damage and the appearance of other symptoms such as diarrhea and fluid and electrolyte imbalance in the patient will be the cause of death. On the other hand, malnutrition can also be a risk for someone to get TB infection (Gupta K, Gupta R, Atrja A, et al., 2009). Malnutrition can cause a decrease in the body's immunity which makes the body more susceptible to TB infection.

TB is still the number one infectious disease that causes death in Indonesia. The main cause of death in TB patients is

malnutrition. According to (Tedja, I, Sya AF, & Rumende, CM, 2014) in the case of tuberculosis patients who were hospitalized at Cipto Mangunkusum Hospital between January 2011 and September 2013, more than half of the number of pulmonary TB patients hospitalized were malnourished at baseline. treatment period. Research by Mallinda E., Af Z., Safira, M. (2016) at the Arifin Achmad Hospital Pekanbaru, 61.1% of patients with pulmonary TB who were hospitalized at the hospital had a Body Mass Index (BMI) which was classified as underweight and 86.1 % of the total sample has a high risk of malnutrition. This finding proves that the condition of malnutrition has occurred at the beginning of the patient infected with TB. Malnutrition conditions in patients can also be a factor causing patients to get TB infection. And furthermore, TB infection actually exacerbates the malnutrition that has been experienced and

the condition of malnutrition is also a factor in the aggravating TB infection experienced by the patient.

Nasution (2015) states that malnutrition and anemia are common conditions that are often encountered. Malnutrition is caused by inadequate intake, malabsorption and increased catabolism in TB patients. TB patients will experience decreased appetite. While anemia is caused by suppression of erythropoiesis and iron deficiency. Suppression of erythropoiesis is caused by the presence of inflammatory mediators that are produced in excess due to TB infection. Malnutrition and anemia are also contributing factors to relapse and death. (Gupta, KB., Gupta, R., Atreja, A., et.al., 2009) stated that malnutrition experienced by TB patients is protein energy deficiency (PEM) where tuberculosis patients generally have lower serum albumin. In addition to protein energy deficiency, TB patients generally experience deficiencies in micronutrients such as Zinc, Vitamin A, Vitamin D, Vitamin E, Vitamin C, Selenium, and Copper. In this study, the researchers wanted to explore the causes of malnutrition in TB patients and provide recommendations to prevent malnutrition and worsen infection in TB patients.

## 24 METHOD

The design of this research is a case study from Luck, Jackson and Usher (2005). This method is used to describe the phenomenon of risk factors for malnutrition in TB patients. The case study design of this research is descriptive exploratory in which the researcher uses retrospective data from medical data of patients diagnosed with TB and receiving treatment at Imelda Workers' Hospital in Indonesia. The unit of analysis used in this study is medical record data from TB patients from January to May 2020 at Imelda Indonesian Workers Hospital in Medan. The data explored were patient biodata sheets, medical resume sheets and assessment sheets for patient nutrition measurements.

The data collection carried out was the patient's age, the date when the patient was first diagnosed with TB at Imelda Workers' Hospital in Indonesia, the history of patient care at Imelda Workers' Hospital in Indonesia, medical diagnoses that were established at each treatment, measurement of the patient's nutritional status. This study uses total sampling,

namely all patients diagnosed with TB from January to May 2020 at Imelda Workers' Hospital in Indonesia as the sample. The number of samples obtained was 151 (one hundred and fifty-one) samples. The sample data were arranged descriptively using percentages. Patient data will be analyzed to obtain risk factors for malnutrition in TB. What is meant by malnourished patients in this study is based on the measurement results of Body Mass Index (BMI) found on the nutritional measurement assessment sheet in the patient's medical record. The categories used based on the adult BMI classification according to the Ministry of Health (2003) are: (1) malnutrition BMI less than 15.5 Kg/m<sup>2</sup>, (2) Thin BMI 15.6 – 18.4 Kg/m<sup>2</sup>, (3) Normal 18.5 – 25.0 Kg/m<sup>2</sup>, (4) Overweight 25.1 – 27.0 Kg/m<sup>2</sup>, (5) Obesity more than 27.0. Meanwhile, based on age, in this study the elderly are patients aged 60 years and over, and pre-elderly are 45-59 years old (Book of the Elderly, Directorate of Family Health).

Furthermore, the malnutrition risk factors obtained will be compared with various studies that are in accordance with the malnutrition risk factors from the results of this study. The results of this study will be able to provide recommendations to prevent malnutrition in TB patients and avoid exacerbation of infection in TB patients.

## Ethical Considerations

Ethical considerations in this study were first asked to the Institute for Research and Community Service (LPPM) of the University of Imelda Medan which is also responsible for the Institute for Research Ethics at the University of Imelda Medan NO. 008/LPPM-UIM/V/2021/e

## RESULTS AND DISCUSSION

Based on the data obtained, the researcher can classify the risk factors for malnutrition in TB patients. Table 01 showed that patients with age more than 60 years had a risk of experiencing malnutrition, where from the data it was found 12,5% of patients aged over 60 years were categorized as malnourished and 50% were categorized as thin. Table 02 showed that patients 5,9 % of patients aged 50-59 years were in the malnourished category and 0% were in the thin category.

**Table 1**  
**Nutrition Status TBC In Elderly (> 60 Years)**

No	NAME	IMT / BMT	INFORMATION / NUTRITIONAL STATUS	AGE
1	TBU60-1	17.7 Kg/m <sup>2</sup>	BB Kurang / Kurus	80
2	TBU60-2	20.0 Kg/m <sup>2</sup>	Normal	73
3	TBU60-3	19.8 Kg/m <sup>2</sup>	Normal	72
4	TBU60-4	17.3 Kg/m <sup>2</sup>	BB Kurang / Kurus	70
5	TBU60-5	22.6 Kg/m <sup>2</sup>	Normal	69
6	TBU60-6	25.3 Kg/m <sup>2</sup>	Kegemukan	69
7	TBU60-7	14.2 Kg/m <sup>2</sup>	Malnutrisi	66
8	TBU60-8	26.0 Kg/m <sup>2</sup>	Kegemukan	65
9	TBU60-9	17.5 Kg/m <sup>2</sup>	BB Kurang / Kurus	65
10	TBU60-10	17.7 Kg/m <sup>2</sup>	BB Kurang / Kurus	64
11	TBU60-11	17.6 Kg/m <sup>2</sup>	BB Kurang / Kurus	63
12	TBU60-12	18.2 Kg/m <sup>2</sup>	BB Kurang / Kurus	62
13	TBU60-13	18.3 Kg/m <sup>2</sup>	BB Kurang / Kurus	62
14	TBU60-14	22.2 Kg/m <sup>2</sup>	Normal	61
15	TBU60-15	27.3 Kg/m <sup>2</sup>	Obesitas	60
16	TBU60-16	15.4 Kg/m <sup>2</sup>	Malnutrisi	60

**Table 2**  
**Nutrition Status TBC In Pre - Elderly ( 50-59 Years)**

No	NAME	IMT / BMT	INFORMATION / NUTRITIONAL STATUS	AGE
1	TBU50-1	23.4 Kg/m <sup>2</sup>	Normal	59
2	TBU50-2	21.2 Kg/m <sup>2</sup>	Normal	59
3	TBU50-3	21.3 Kg/m <sup>2</sup>	Normal	59
4	TBU50-4	20.3 Kg/m <sup>2</sup>	Normal	58
5	TBU50-5	24.8 Kg/m <sup>2</sup>	Normal	57
6	TBU50-6	25.3 Kg/m <sup>2</sup>	Kegemukan	57
7	TBU50-7	25.3 Kg/m <sup>2</sup>	Kegemukan	57
8	TBU50-8	24.5 Kg/m <sup>2</sup>	Normal	55
9	TBU50-9	20.4 Kg/m <sup>2</sup>	Normal	54
10	TBU50-10	23.1 Kg/m <sup>2</sup>	Normal	53
11	TBU50-11	14.2 Kg/m <sup>2</sup>	Malnutrisi	52
12	TBU50-12	25.7 Kg/m <sup>2</sup>	Kegemukan	52
13	TBU50-13	25.7 Kg/m <sup>2</sup>	Kegemukan	52
14	TBU50-14	23.8 Kg/m <sup>2</sup>	Normal	51
15	TBU50-15	25.0 Kg/m <sup>2</sup>	Normal	51
16	TBU50-16	25.6 Kg/m <sup>2</sup>	Kegemukan	51
17	TBU50-17	25.6 Kg/m <sup>2</sup>	Kegemukan	51

**Table 3**  
**Nutrition Status TBC In patients with Diabetes Mellitus**

No	NAME	IMT / BMT	Category
1	TBDM-02	17.3 Kg/m <sup>2</sup>	Malnutrisi
2	TBDM-43	15.2 Kg/m <sup>2</sup>	Malnutrisi
3	TBDM-01	20.4 Kg/m <sup>2</sup>	Normal
4	TBDM-03	23.9 Kg/m <sup>2</sup>	Normal
5	TBDM-04	23.8 Kg/m <sup>2</sup>	Normal
6	TBDM-05	20.4 Kg/m <sup>2</sup>	Normal
7	TBDM-06	22.4 Kg/m <sup>2</sup>	Normal
8	TBDM-07	19.8 Kg/m <sup>2</sup>	Normal
9	TBDM-09	19.8 Kg/m <sup>2</sup>	Normal
10	TBDM-10	22.4 Kg/m <sup>2</sup>	Normal
11	TBDM-11	23.8 Kg/m <sup>2</sup>	Normal
12	TBDM-12	20.8 Kg/m <sup>2</sup>	Normal
13	TBDM-13	19.8 Kg/m <sup>2</sup>	Normal
14	TBDM-14	20.8 Kg/m <sup>2</sup>	Normal
15	TBDM-15	20.4 Kg/m <sup>2</sup>	Normal
16	TBDM-17	23.8 Kg/m <sup>2</sup>	Normal
17	TBDM-18	22.6 Kg/m <sup>2</sup>	Normal
18	TBDM-19	21.5 Kg/m <sup>2</sup>	Normal
19	TBDM-20	20.3 Kg/m <sup>2</sup>	Normal
20	TBDM-23	25.7 Kg/m <sup>2</sup>	Normal
21	TBDM-25	24.5 Kg/m <sup>2</sup>	Normal
22	TBDM-26	24.5 Kg/m <sup>2</sup>	Normal
23	TBDM-27	23.6 Kg/m <sup>2</sup>	Normal

No	NAME	IMT / BMT	Category
24	TBDM-28	25.0 Kg/m <sup>2</sup>	Normal
25	TBDM-29	21.3 Kg/m <sup>2</sup>	Normal
26	TBDM-31	21.3 Kg/m <sup>2</sup>	Normal
27	TBDM-32	22.2 Kg/m <sup>2</sup>	Normal
28	TBDM-33	24.5 Kg/m <sup>2</sup>	Normal
29	TBDM-34	19.5 Kg/m <sup>2</sup>	Normal
30	TBDM-35	20.4 Kg/m <sup>2</sup>	Normal
31	TBDM-36	21.8 Kg/m <sup>2</sup>	Normal
32	TBDM-37	23.1 Kg/m <sup>2</sup>	Normal
33	TBDM-39	25.0 Kg/m <sup>2</sup>	Normal
34	TBDM-40	22.5 Kg/m <sup>2</sup>	Normal
35	TBDM-41	25.0 Kg/m <sup>2</sup>	Normal
36	TBDM-42	19.8 Kg/m <sup>2</sup>	Normal
37	TBDM-44	19.5 Kg/m <sup>2</sup>	Normal
38	TBDM-45	21.5 Kg/m <sup>2</sup>	Normal
39	TBDM-16	26.0 Kg/m <sup>2</sup>	Kegemukan
40	TBDM-21	25.3 Kg/m <sup>2</sup>	Kegemukan
41	TBDM-22	25.3 Kg/m <sup>2</sup>	Kegemukan
42	TBDM-24	25.7 Kg/m <sup>2</sup>	Kegemukan
43	TBDM-30	25.7 Kg/m <sup>2</sup>	Kegemukan
44	TBDM-08	27.3 Kg/m <sup>2</sup>	Obesitas
45	TBDM-38	27.3 Kg/m <sup>2</sup>	Obesitas

**Table 4**  
**Nutrition Status TBC In HIV**

No	NAME	IMT / BMT	Category
1	TBHIV-01	15.2 Kg/m <sup>2</sup>	Malnutrisi
2	TBHIV-02	11.7 Kg/m <sup>2</sup>	Malnutrisi
3	TBHIV-03	13.5 Kg/m <sup>2</sup>	Malnutrisi
4	TBHIV-04	14.2 Kg/m <sup>2</sup>	Malnutrisi
5	TBHIV-05	13.7 Kg/m <sup>2</sup>	Malnutrisi
6	TBHIV-06	17.5 Kg/m <sup>2</sup>	BB Kurang / Kurus
7	TBHIV-07	17.6 Kg/m <sup>2</sup>	BB Kurang / Kurus
8	TBHIV-08	22.3 Kg/m <sup>2</sup>	Normal

No	NAME	IMT / BMT	Category
9	TBHIV-09	21.4 Kg/m <sup>2</sup>	Normal
10	TBHIV-10	20.8 Kg/m <sup>2</sup>	Normal
11	TBHIV-11	20.8 Kg/m <sup>2</sup>	Normal
12	TBHIV-12	20.8 Kg/m <sup>2</sup>	Normal
13	TBHIV-13	22.3 Kg/m <sup>2</sup>	Normal
14	TBHIV-14	19.5 Kg/m <sup>2</sup>	Normal
15	TBHIV-15	20.1 Kg/m <sup>2</sup>	Normal
16	TBHIV-16	26.0 Kg/m <sup>2</sup>	Kegemukan



**Table 5.**  
**TB patients with Renal failure (relapse)**

No	NAME	IMT / BMT	INFORMATION / NUTRITIONAL STATUS
1	TBR-01	13.5 Kg/m <sup>2</sup>	Malnutrisi
2	TBR-02	15.4 Kg/m <sup>2</sup>	Malnutrisi
3	TBR-03	12.8 Kg/m <sup>2</sup>	Malnutrisi
4	TBR-04	15.2 Kg/m <sup>2</sup>	Malnutrisi
5	TBR-05	17.7 Kg/m <sup>2</sup>	BB Kurang / Kurus
6	TBR-06	23.2 Kg/m <sup>2</sup>	Normal
7	TBR-07	23.4 Kg/m <sup>2</sup>	Normal
8	TBR-08	19.5 Kg/m <sup>2</sup>	Normal
9	TBR-09	23.1 Kg/m <sup>2</sup>	Normal
10	TBR-10	25.0 Kg/m <sup>2</sup>	Normal
11	TBR-11	20.3 Kg/m <sup>2</sup>	Normal

Table 3 showed that patients with DM had a risk of experiencing malnutrition, where from the data it was found that 4,45% of patients with DM were categorized as malnourished. Table 4 showed that patients with HIV, where from the data it is found that 31.25% of patients with HIV are categorized as malnourished and 12.5 % are categorized as thin. Table 5 showed that patients with treatment crows were 36.3 % of patients with Relapse are categorized as malnourished and 9 % are categorized as thin.

## DISCUSSION

Based on the risk factors for malnutrition obtained in this study, the researcher will explain the risk factors for malnutrition by comparing the research results according to each risk factor, as follows:

### 1. TB patients with elderly and pre-elderly age

From the results of this study, it was found that 10,6 % of patients were elderly. aged 60 years and over, 11,3 % were pre-elderly, aged 50-59 years. As many as 12,5% of patients aged 60 years and over are categorized as malnourished, 50 % are categorized as thin. Furthermore, as much as 5,9 % of pre-elderly patients were categorized as malnourished and 0% thin. Rajagopalan & Yoskhikawa (2000) stated that the elderly and pre-elderly groups are a high-risk group for TB infection are a group as a source of TB transmission. This is because the clinical signs and symptoms of TB in the elderly and pre-elderly are often similar to conditions of a decrease in various physiological functions of the body's organs. Thus, in this group, the diagnosis of TB is often delayed. In addition, TB therapy in the elderly and pre-elderly often causes side effects of TB drugs (OAT) which causes the drug to be discontinued. Thus, the elderly population with TB is vulnerable to Renal failure and various other problems such as malnutrition or worsening of symptoms. Provision of adequate nutritional support is needed for the elderly with tuberculosis.

### 2. TB Patients with Diabetes Mellitus

From the results of the study, it was found 29,9 % of patients had Diabetes Mellitus. And from TB patients with Diabetes Mellitus 4,45% of patients were categorized as malnourished, and 0% were categorized as thin. According to Menon, S., Rossi, R., Nshimyuukiza, et.all (2016), DM conditions will reduce body immunity by decreasing interferon gamma and macrophages. Decreased immunity and TB infection will cause nutritional problems that will cause severe protein

energy deficiency and further aggravate nutrition. DM conditions will be more aggravated in the elderly population. Therefore, patients with DM should be excluded from populations with high rates of TB infection. And if you have an infection, it is necessary to prevent the occurrence of malnutrition problems that will worsen TB infection.

### 3. TB patients with Human Immunodeficiency Syndrome (HIV)

From the results of the study, it was found that 10,6 % of patients had HIV. And of TB patients with HIV, it was found that 31.25% were categorized as malnutrition, and 12.5 % were categorized as thin. Darnton-Hill, I., & De Pee, S., (2010), stated that the very high TB infection in the community, especially in Africa, South Asia and Southeast Asia, was further exacerbated by the increasing number of HIV cases in these areas. Furthermore, HIV and malnutrition also add to the high rate of infection in TB. So the factors of malnutrition, HIV and TB are complex problems, which exacerbate TB both in increasing cases and exacerbating morbidity and mortality.

### 4. TB patients with Treatment Failure (relapse)

From the results of the study, it was found that 7,3 % of patients experienced treatment failure. it was found that 36.3 % were categorized as malnutrition, and 9 % were categorized as thin. Zachariah, R. & Harries, A.D., (2002) states that patients with malnutrition have a higher risk of mortality. Patients with treatment failure or incomplete and re-active TB have the risk of experiencing malnutrition due to incomplete and latent TB germs in the body. Sudarsono (2020) mentions Drug-Resistant TB (RO TB) occurs when drug-sensitive TB patients receive inadequate treatment or drop out of treatment, causing mutations in Mycobacterium tuberculosis to become resistant to anti-TB drugs. Drug-resistant TB is more difficult to treat and therefore will increase the number of malnourished TB patients.

## CONCLUSIONS AND RECOMMENDATIONS

The factors causing malnutrition in TB patients found from the study were (1) elderly and pre-elderly TB patients, (2) TB patients with Diabetes Mellitus, (3) TB patients with HIV, (4) TB patients with Renal failure. The data from this study indicate the need for an assessment of the nutritional status of patients when TB is diagnosed. This is to increase awareness of the nutritional status of the patient since the

patient was diagnosed with TB. In accordance with the results of this study, the assessment really needs to be emphasized in cases of TB with the elderly, TB with HIV, TB with Diabetes Mellitus and TB with Renal failure. Patients can be malnourished before the patient is infected with TB which will become more severe with the presence of TB, or patients can be malnourished after getting TB infection. Therefore, nutritional screening is very important to determine the initial nutritional status of the patient as well as to prepare to help the patient develop a diet according to the patient's needs. Proper nutritional planning according to the patient's needs will also help reduce the side effects of TB treatment,

especially nausea and vomiting so that patients can be helped to complete their treatment.

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#### Conflict of Interest Statement

The authors declare that there is no potential conflict of interest in connection with the writing and publication of this article

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