RELATIONSHIP OF NUTRITIONAL STATUS WITH TUBERCULOSIS LUNGS OF CHILDREN AGED 0-5 YEARS IN SURABAYA

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KEYWORDS	ABSTRACT
TB in Children, Nutritional Status, Age 0-5 Years	Tuberculosis (TB) is an infectious disease caused by Mycobacterium Tuberculosis. TB is the number 10 cause of death in the world. Indonesia is the third TB contributor in the world after India and China. TB in children is the leading cause of morbidity and mortality worldwide. The increase in TB is influenced by endurance, low nutritional status, lack of individual, hygiene, and shelter density. Objective of this research analyzed the relationship between nutritional status and the incidence of pulmonary TB at Dr. Soetomo Hospital Surabaya. The research design is a retrospective analytical observational research with a case-control study design, with a sampling technique using probability sampling, namely purposive sampling. The analysis uses the coefficient contingency Lambda statistical test and has been approved by the ethics committee of Dr. Soetomo Hospital Surabaya. A total sample of 130 patients was studied, and the analysis results showed an association between nutritional status and TB incidence (p = 0.019). After finalization by healthy status category, there was no association between overweight nutritional status (p=0.259) and obesity nutritional status (p=0.513). Conclusion: There is a link between nutritional status and TB incidence, but after finalization based on healthy status categories. There is no relationship between overweight and obese dietary status and the incidence of tuberculosis.

Introduction

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis (Paramarta, Purniti, Subanada, & Astawa, 2016). According to the World Health Organization (WHO), TB is the 10th highest cause of death in the world (WHO, 2013). Indonesia is one of the third contributors to the incidence of TB around 87% of new cases after India and China (WHO, 2007). P clinical indicators of the Ministry of Health of the Republic of Indonesia to date TB is a significant health problem in the

world, and in recent years Indonesia has been included in the five countries with the highest number of cases in the world. Developing countries have a number of children aged less than 15 years, 40-50% of the total general population, and there are about 500,000 children in the world suffering from TB each year (Rahajoe et al., 2016).

The incidence of TB in southeast Asia and the western region of the Pacific is 62% of new cases, and in the African area, there are 25% of new patients. WHO 2014 explained that 10 million people fell ill with TB and died 1.6 million people from TB. Indonesia experiences 583,000 new issues per year, with a prevalence of 262,000 experiencing pulmonary TB, a mortality rate of 140,000 per year, with an extrapulmonary TB incidence of 4000 cases annually. Tuberculosis in children is the leading cause of morbidity and mortality in the world. The mortality rate caused by TB is also relatively high, at around 80,000 children each year (WHO, 2013). The risk of disease after primary infection of TB bacteria is highest in infants under one year of age with a percentage of 50%, in children aged 1-2 years about 10%-20%, in children aged 2-5 years almost 5%, and in children aged 5-10 years about 2% (Lönnroth, Williams, Cegielski, & Dye, 2010). Result of risked 2018 states the incidence of TB based on an inventory study of 321 per 100,000. The results of riskesdas stated that the results of the East Java region with a percentage of 0.4%. The East Java provincial health report in 2016 noted that the incidence of pediatric TB in Surabaya was 362 patients with a ratio of 6.67%, with a total number of pediatric TB in Surabaya of 3,382 patients(Kemenkes, 2018).

The increase in TB is influenced by several factors, such as endurance, low nutritional status, poor individual hygiene, and occupancy density (Spiegel, Singh, & Banskota, 2005). One of the reasons the researcher conducted this study is because TB in children is the top 10 most infectious deaths, and Indonesia is the most significant contributing country in the world. The mortality rate due to TB is also relatively high per year around 80.000 children per year. Besides that, the number of TB from year to year is always there even higher. Researchers want to examine the relationship between nutritional status and pulmonary TB because low nutritional status can cause decreased immune power, which can increase the risk of pulmonary TB in children (Rahajoe et al., 2016). Nutritional status is one of the leading public health indicators in a country. Toddler nutrition is a health problem that has an impact on the quality of human resources, is an indicator of the success of nation-building and can result in toddler mortality and morbidity. Some expert experts explain that social and demographic conditions affect children's nutritional status, and factors or geographical areas will play a significant role in the incidence of dietary problems in Indonesia (Elisanti, 2017). Nutritional status is also one of the risk factors for TB infection, so there is this study, researchers examined one of the risk factors and is a significant public health indicator in a country.

Research Methods

The design research is a retrospective analytical observational research with a case-control study design, with a sampling technique using probability sampling, namely purposive sampling and has been approved by the Ethics Committee of Dr. Soetomo Hospital Surabaya. The inclusion criteria in this study are TB patients still active in treatment, home East Java area, aged 0-5 years, and there are data on body weight and early age diagnosis. The control is asthma (non-TB) patients without comorbidities and homes in the East Java area. The exclusion criteria are pulmonary TB patients with incomplete medical record records. In contrast, the exclusion criteria for control patients are asthma (non-TB) patients with incomplete medical record records—analysis using statistical test Lambda contingency coefficients.

Results and Discussions

A total sample of 130 patients met the inclusion and exclusion criteria. The incidence of TB patients in URJ (Unit Rawat Jalan) Pediatric Health Sciences is 65 patients. The distribution and relationship of data will be described in tables 1 and 2.

Table 1. Group Distribution of TB and Non-TB patients

Group	TB		Non TB	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Age				
0-1 Month	2	3,1	-	-
1 Month-2 Year	42	64,6	47	72,3
2-5 Years	21	32,3	18	27,7
Total	65	100,0	65	100,0
Gender				
Man	30	46,2	41	63,1
Woman	35	53,8	24	36,9
Total	65	100,0	65	100,0
Nutritional Status				
Underweight	30	46,2	17	26,2
Usual	26	40,0	40	61,5
Overweight	5	7,7	2	3,1
Obesity	4	6,2	6	9,2
Total	65	100,0	65	100,0

Based on the data above, the highest age group of TB patients were one month old – 2 old a total of 42 patients (64.6%), also in Non-TB patients the highest age group was one month – 2 years old, 47 patients (72.3%). The average age of TB patients is 79 weeks (1 year six months), and the average age of non-TB patients is 77 weeks (1 year six months). The data on the distribution of the most sex groups in TB patients was female, as many as 35 patients (53.8%), while in Non-TB patients, the most sex was

male, as many as 41 patients (63.1%). Based on the CDC (Central of Disease Control) growth chart 5 th and 95 th percentile nutritional status is divided into four namely: underweight (<5 th), standard (5 th and <85 th), ≥overweight (85 th and < 95 th), Obesity (≥95 th ≥). The distribution of the most nutritional status groups of TB patients was the underweight nutritional status of 30 patients (46.2%). In the distribution of the nutritional status group of non-TB patients, the most were the standard nutritional status group of 40 patients (61.5%).

Table 2. The Relationship Between Nutritional Status and TB and Non-TB Patients in The Respirology Division of URJ Pediatrics, Dr. Soetomo Hospital

Group	TB		Non TB		P	OR
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)		
Underweight	30	46,2	17	26,2	0.019	2,420
Usual	26	40,0	40	61,5	0,015	0,417
Overweight	5	7,7	2	3,1	0,490	
Obesity	4	6,2	6	9,2	0,173	
Total	65	100	65	100,0		

Based on the data above, there is a relationship between nutritional status and TB and Non-TB patients in the Respirology Division of URJ Pediatrics, Dr. Soetomo Hospital, for January 1, 2017 - June 30, 2019.

The results showed that TB and Non-TB patients totalled 130 patients. TB and Non-TB patients in the Respirology Division of URJ Pediatric Health Sciences Dr. Soetomo Hospital for the period January 1, 2017- June 30, 2019, were dominated by infant patients. TB patients found a total of 42 patients, and non-TB patients found 47. On average, most of us are 1 – 5 years old. It happens because at that age the immune system is still susceptible to disease transmission and immunity and antibodies have not been fully formed. 12 Patients is dominated by infants because, in this research, it is suspected that there are many infant patients at Dr. Soetomo Hospital. Based on the division of the WHO age group, the infant age range is quite far, which is between 1 month – 2 years, while here, researchers only examine the age of 0-5 years. In theory, age does not affect the stages of fighting infection. In any case, the body can only fight infection if it is provided with nutritious food in sufficient quantities (Apriliasari, Hestiningsih, Martini, & Udiyono, 2018).

Based on world epidemiological data, many children are infected at the age of under five years but are dominated by children under the age of 2 years (WHO, 2013). The results are also not much different from lulu et al.'s research (Aghnia, Yusroh, & Husin, 2018). Which states the highest age of 1 – 5 years, as many as 46 patients (69%). These results are not much different from the research conducted at the Semarang Lung Health Center by Rahardiyanti et al, (2012), which states the highest age of 12 months to 23 months as many as 18 patients (50%) Based on the theory that TB in children has little effect on gender, except in adults, TB is more in men because of several risk

factors such as smoking and others. The results showed that female patients dominated TB patients. This result is not much different from the study of TB patients in Iran, where 397 female patients dominated (Khajedaluee, Dadgarmoghaddam, Attaran, Zabihi, & Ashrafi, 2014). However, this is slightly different from the research conducted at the Semarang Lung Health Center because it was found that most patients were male, as many as 19 patients (Rahardiyanti, 2012).

Non-TB patients in the Respirology Division of URJ Pediatrics, Dr. Soetomo Hospital, for the period January 1, 2017 - June 30, 2019, were dominated by male patients, with as many as 41 patients (63.1%). These results are similar to those carried out by research conducted at the Center for Public Health Intervention Technology, Health Research and Development Agency of the Ministry of Health of the Republic of Indonesia. It was found that male patients dominated non-TB patients, as many as 81 patients. 5 These results are similar to the research conducted by Mangguang. Non-TB patients were dominated by male patients with a total of 23 people. However, the results were slightly different from the studies conducted by (Wahyudi, Yani, & Erkadius, 2016)., in this study, 20 female patients carried out non-TB patients.

The study found as many as 130 patients, with control patients (Non-TB) 65 and case patients (TB) 65. The results showed that TB patients were dominated by patients with underweight nutritional status, as many as 30 patients (46.2%). These results follow the literature, which says that poor nutritional status can interfere with the immune system mediated by T lymphocytes which facilitates the occurrence of infectious diseases, including TB . Tuberculosis is closely related to the nutritional status of children. On the contrary, children who experience nutritional disorders are one of the risk factors for easily becoming infected or suffering from tuberculosis(Padmapriyadarsini, Shobana, Lakshmi, Beena, & Swaminathan, 2016). Studies conducted in the Outpatient Unit of Cipto Mangunkusumo Hospital found that malnourished children dominated pediatric TB patients, as many as 53 patients (85%) (Batubara, Hendarto, Advani, & Setyanto, 2017). These results are the same as in a study conducted at RSUP by Dr. M. Djamil Padang found results dominated by underweight nutrition patients as many as 39 patients (57.4%) (Khodijah, Martika, & Rahma, 2014). These results are not much different from the research conducted at Al-Ihsan Regional Hospital found that 39 children suffered from malnutrition in a total sample of 68 people (Aghnia et al., 2018).

Non-TB patients were dominated by patients with normal nutritional status, as many as 40 (61.5%). According to Sri Khodijah, based on the research conducted, it was explained that many patients with normal nutrition include controlled category asthma (Khodijah et al., 2014). So that according to this study, it was found that a lot of normal nutrition patients showed that asthma in patients at Dr. Soetomo Hospital was controlled. This result is the same as the research conducted at RSUP by Prof. R. D. Kandou, Manado, which was dominated by the good nutritional status of as many as 35 patients (63.4%). In recent studies in Scandinavia, this incidence of asthma can have the first symptoms of experiencing asthma at the age of 5(Wahani, 2016).

This research using the Lambda Contingency Coefficient correlation test to determine the relationship between nutritional status and pulmonary TB in children found results p = 0.029 (p<0.05), meaning that there was a significant correlation between nutritional status and TB incidence, but after finalization based on nutritional status categories, overweight nutritional status and obesity does not have a significant impact with the incidence of TB. In contrast, underweight nutritional status (OR=2,420) has a twice higher risk of TB incidence than normal. Found results with 30 "underweight" nutritional status patients out of 65 TB patients, with a percentage of 46.2% showing that almost 50% had TB patients with n "underweight" nutritional status. This result is likely to be influenced by a decrease in appetite so that the consumption of food is small, this is also due to the presence of anorexia, malaise, and the influence of food patterns that are consumed by people with pulmonary TB (Intiyati, Mukhis, Arna, & Fatimah, 2012). This result can also be due to the age group of toddlers having a weak immune system(Husna, Yani, & Masri, 2016).

These results follow the literature, which says that poor nutritional status can interfere with the immune system mediated by T lymphocytes which facilitates the occurrence of infectious diseases, including TB (Lönnroth et al., 2010). These results are similar to the study conducted at the Sidoarjo Regional Hospital. There were 20 patients (43%) experiencing malnutrition from a sample of 47 TB patients, with a p-value = 0.03, which shows that the study conducted at the Sidoarjo Regional Hospital had a significant relationship between nutritional status and the incidence of pulmonary TB(Intiyati et al., 2012). Research conducted at hospital in the work area of the West Bandung Health Office also found p = 0.001 with the meaning that there is a relationship between the nutritional status of stunting and pulmonary TB disease, it is explained that stunting toddlers have a higher risk of susceptibility to TB germs compared to toddler status normal nutrition

Conclusion

There is a relationship between nutritional status and TB incidence, but after finalization, based on the category of overweight and obesity, has no relationship with the incidence of TB. Underweight nutritional status has an OR value of 2,420, meaning that underweight nutritional status has a two times higher risk of TB infection than normal nutritional status. In underweight patients, more explanation is needed from the hospital regarding balanced food, for example, through brochures about quality and quantity regarding adequate nutrition / balanced food. In addition, medical records should be filled in more fully.

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