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Risk Factors for the Incident of TBC in Primary School Age Children in the Rangkah and Pacar Keling Public Health Area, Surabaya

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ABSTRACT

TB or tuberculosis is a disease caused by Mycobacterium tuberculosis which mostly attacks the lungs, but can also affect other body organs. The cause of TB that influences a person's possibility of developing pulmonary tuberculosis is low body immunity (immunosuppression). This study aimed to analyze risk factors (nutritional status, medical history, smoking, place of residence) with the incidence of TB in elementary school children in the Rngkah and Pacar Keling Community Health Center area, Surabaya. The type of research was descriptive with a cross-sectional research design. Sampling was done using a sample quota of 200 grade 2 and grade 5 school children aged 6-12 years. Data variables include characteristics and nutritional status of school children at risk of TB. Bivariate data analysis in the form of nutritional status, risk of TB using the chi-square test, and multivariate analysis in the form of TB treatment and smoking using the logistic regression test. TB treatment was not significantly associated with the incidence of TB (OR = 0.65, CI 95%, p = 0.666). Smoking was not significantly related to the incidence of TB (OR = 4.163, CI 95%, p=0.572). Nutritional status was significantly related to the incidence of TB (p<0.001). Active smoking has a very high influence and nutritional status has a significant influence on the incidence of TB, so there is a need for closer monitoring of school children to reduce the incidence of TB.

Keywords: Characteristics, Nutritional Status, Children's TB

INTRODUCTION

TB or Tuberculosis is a disease caused by Mycobacterium tuberculosis which mostly attacks the lungs, but can also affect other body organs. Pulmonary TB is also a chronic infectious disease. The source of transmission is TB patients, especially patients who contain TB germs in their phlegm. Patients spread germs into the air in the form of phlegm splashes (droplet nuclei) when coughing or sneezing. Infection will occur if someone inhales air containing infectious phlegm (Pelosi et al., 2023; Rose & Singhal, 2024).

Based on 2022 WHO data, globally, an estimated 10.0 people fell ill with TB in 2019. This figure has been decreasing very slowly in recent years. There were an estimated 1.2 million TB deaths among HIV-negative people in 2019 (a decrease from 1.7 million in 2000), and an additional 208,000 deaths (range, 177,000–242,000) among HIV-positive people (a decrease from 678,000 in 2000) (World Health Organization, 2022). Nearly a quarter of the world's population is infected with Mycobacterium tuberculosis, around 89% of TB is suffered by adults, and 11% is suffered by children. Until now (the COVID-19 pandemic), TB is still the highest cause of death after HIV/AIDS and is one of the 20 main causes of death worldwide. Indonesia is ranked 3rd with the highest number of TB sufferers in the world after India and China (Tinartayu & Harrini, 2019)

TB child own percentage which enough big that is 17% in between case Which There is in Indonesia. Meanwhile, the estimated number of TB cases in

children was 63,113, or 62%. Around 101.160 case children which should found and treated which where's the discovery? And treatment of TB children is as big as 62% still has not yet reached the target which is 75%. The number of cases of TB in children in 2019 was estimated to be 63,113 or 62%. Around 101.160 cases the children should be found and treated where inventions and treatments TB children as big as 62% Still Also Not yet reach the target which expected that is 75%. In 2022, there will be enough cases of tuberculosis (TB) in children in the Surabaya city area. From data collected by Service Health City Surabaya as much 864 cases of Tuberculosis in children were found in the city of Surabaya, and 25 cases of tuberculosis in children among them happened in subdistrict Customs Beauty Surabaya (RI, 2023).

The causes of TB that influence a person's possibility of developing pulmonary TB are low immune system (immunosuppression), comorbidities with HIV, diabetes mellitus, direct contact with pulmonary TB sufferers, poor nutrition (malnutrition), and chemicals (alcohol, cigarettes, and drugs). (illegal drugs) and poverty and the condition of the housing environment (Farsida et al., 2023; Rika Oktania Sari & Bayu Prabowo, 2023).

According to Yusuf & Nurleli (2018), a thin nutritional status results in TB patients 14.4 times more risk big suffering from an underweight nutritional status rather than non-TB patients. The odds Ratio for nutritional status fat shows that TB patients have a risk of 0.192 times bigger than non-TB patients. The p-value obtained is meaningful in a way that is p = 0.000 (p-value < 0.05) which means there is a connection between nutritional status with tuberculosis at the Jambi City Health Center. This matter caused because of the cooking process of food, lots of it is exposed to smoke from wood burn or biogas (manure cows) that are burned and lighting and ventilation bad, p This increases TB incidence.

According to Khoirunnisa et al (2023) significant relationship between nutritional status and with incidence of TB in children's school with a p-value of 0.00 3 (p-value < 0.05), because poor nutritional status will increase the risk of pulmonary tuberculosis, on the other hand, pulmonary tuberculosis (TB), contributes to poor nutritional status due to the course of the disease affecting the body's immune system.

Indicator success prevents the occurrence of TB in children that is lower incidence of TB in children as well as treating tuberculosis in children so that officer health and educators Work The same with agency health For cope problem the with method. Make people live healthy lives, continue to facilitate staff to always look for breakthroughs for accompanying the community towards a healthy Indonesia. Children's health at school has been regulated in Law Number 36 of 2009 concerning Health. In article 79 states that written health schools are held to increase the ability life Healthy students in a healthy living environment so that students can learn, grow, and develop harmoniously and to the maximum extent to become a human resource quality. These conditions require the assistance of Health Workers. Power Health in school must role active in promoting behavior life clean And healthy (PHBS), In addition to reaching students, can also provide education to parents of students as well as teachers and staff at school, so that the teaching and learning process can be carried out become more effective. In this context, the Surabaya Ministry of Health Polytechnic has a strategic role in conducting research that focuses on reducing the risk of TB in children through an approach that involves the role of parents based on social support. Given the high prevalence of TB in children and the complexity of handling it, comprehensive efforts are needed that not only involve health workers in schools but also strengthen the role of parents in preventing and treating TB.

RESEARCH METHOD

This research is descriptive in nature with a cross-sectional research design, carried out at SDN Rangkah 6, Tambak Sari 1 in the Rangkag Community Health Center area, and, Pacar Keling 1 and Pacar Keling 5 Primary Schools in the Pacar Keling Community Health Center area of Surabaya Surabaya. Sampling was done using a sample quota of grade 12 and school children. Class 5 with ages 6-12 years as many as 200 people. Primary data includes the child's age, education, parent's occupation, and the child's TB risk form collected by interview and direct examination using a questionnaire. Meanwhile, secondary data such as nutritional status uses direct measurements of body weight and height. The data that has been obtained from the data collection process will be converted into tables, then the data will be processed using software. The data analysis method uses the SPSS program to analyze bivariate variables in children, TB risk, and nutritional status using the chi-square test. Meanwhile, the confounding variables include TB treatment and the environment (passive smoking) using a logistic regression test. Then in a multivariate analysis to determine the highest risk of confounding variables, a multiple logistic regression test was carried out. The results of data analysis are presented in the form of tables and narratives

RESULT AND DISCUSSION

The results of research using a sample quota obtained a sample of 200 students. In the first part, the characteristics of children will be described, then parents of children at risk of TB will be described.

Table 1. Description of Data on Children at Risk of TB and Their Parents

Subject	Characteristics	Category	Frequency	Percentage
Child	Child Age	6	1	0.5
		7	16	8.0
		8	71	35.5
		9	21	10.5
		10	78	39.0
		11	13	6.5
		Total	200	100.0
Parent	Father's Education	basic education	41	21.9
		Secondary Education	124	66.3
		higher education	22	11.8
		Total	187	100.0
	Mother's Education	basic education	63	32.8
		Secondary Education	104	54.2
		higher education	25	13.0
		Total	192	100.0
	Father's occupation	Civil Servants (Non-Teachers)	3	1.6
		Teachers are not civil servants	1	.5
		Private employees	121	63.4
		Trader	24	12.6
		Laborer	29	15.2
		TNI/POLRI	3	1.6
		Household	10	5.2
		Total	191	100.0

	Mother's Job	Teachers are not civil servants	2	1.0
		Private employees	42	21.0
		Trader	16	8.0
		Laborer	4	2.0
		Household	132	66.0
		Total	196	98.0

The youngest child's age ranges from 6 years to 11 years. From Table 1 it can be seen that there are more people aged 8 and 10 years than other ages. The percentages are 35.5% and 39%. The table shows that the majority of fathers of children at risk of TB have secondary education (66.3%), while only 11.8% have higher education. Most mothers also had secondary education (54.2%), with a smaller percentage having tertiary education (13.0%). In terms of employment, the majority of fathers work in the private sector (63.4%), while the majority of mothers act as housewives (66.0%).

Table 2. Data on Factors in the Incidence of TBC in School Age Children 6-12 Years

Subject	Factor risk	Category	Frequency	Percentage
	TB risk	TB risk	42	21
		No TB risk	158	79
	History of TB Treatment	Had TB	87	43.5
		No had TB	113	56.5
	Nutritional status	Malnutrition	147	73.5
		Normal	41	20.5
		Overweight	11	5.5
		Obesity	1	0.5
	Smoke	Passive	96	48
		Active	108	52
	Place stay	No Seedy	200	100
		Seedy	0	0

Table 2. Shows that child school with ages 6-12 years majority No The risk of TB is 158 people (79%), children neither does school Once 113 people (56.5%) received TB treatment. The majority of school children's nutritional status was malnourished, as many as 147 people (73.5%). The majority of children are active smokers as many as 108 people (52%) but the majority's residences are not dirty.

Table 3. Description of Data on Children at Risk of TB

Subject	Characteristics	Category	Frequency	Percentage
	TB risk	Unsuspected TB	38	19.0
		Suspected TB	162	81.0
		Total	200	100.0
	Latent TB	No	200	100.0

Table 3 shows that the majority of school children aged 6-12 years are at risk of TB as many as 162 people (81%), and the latent TB data does not indicate TB.

Table 4. Analysis Bivariate related Factors of TBC Incidence in School Age Children 6-12 Years

	TB diagnosis	CI 95%	P value

		Yes		No		OR			
		n	%	N	%		Lower	Upper	
Treatment History	Once	17	20	70	80	0.658	1,642	2,019	0.666
	Never	25	22	88	78				
Smoker	Passive	26	27	70	73	4,163	1,431	1,793	0.572
	Active	16	15	88	85				
Nutritional status	Not enough	31	21	116	79				<0.001*
	Normal	9	22	32	78				
	Overweight	2	18	9	81				
	Obesity	0	0	1	100				

Information :
*) p<0.005 is significant

Table 4 Shows that no TB treatment relates significantly to the incidence of TB (OR = 0.65, CI 95%, p = 0.666) As many as 17 people (20%) were at risk of TB while 70 people (80%) were not at risk of TB. The value is 0.65 which is significant that children who don't Once treatment can increase the incidence of TB in children compared to children receiving treatment. Smoker passive No relates significantly with the incidence of TB (OR = 4.163, CI 95%, p = 0.572) namely as many as 16 parent smokers active (15%) experienced risk of TB while 88 people (85%) did not experience TB risk. Nutritional status relates significantly to the incidence of TB (p<0.001).

Table 5. Relatedness Incidence of T BC in School Age Children 6-12 Years

Variable	R	Information
Treatment History	0.031	Correlation weak
Smoker	0.143	Correlation weak

Table 5 Information obtained shows that TB treatment and smoking have a weak correlation.

Table 6. Multivariate analysis of the relationship between TB incidence in school-aged children 6-12 years

Variable	Unstandardized Coefficient	Standardized Coefficient	Q	Pvalue
	t		ent	
	B	Std. Error	B	
Treatment History	-0.026	0.058	-0.031	-0.443	0.658
Smoker	1,117	0.057	0.143	2,040	0.043
R Square	0.021				
F	4,163				
Sig.F	0.043				

Table 6. Information obtained that TB treatment has a small effect of 0.025 on the incidence of TB in children. Every child who receives treatment once can reduce TB by 0.025. Smokers have a small influence of 1.117 on the incidence of TB in children. Every person who only smokes 1 cigarette can reduce the incidence of TB by 1,117.

Based on Table 1, information was obtained that the majority of school children aged 10 years, 78 (39%) were at risk of TB. The older the age and the more severe the disease, where the cough is more productive and able to produce mucus, it is necessary to be aware of the possibility of transmitting TB disease to older children (Wijaya et al., 2021).

According to Mardiati & Fitri (2023), the incidence of tuberculosis occurs more frequently in the group of children

aged over 5 years. Age plays one of the most important roles in determining the development of childhood diseases. Infected babies have a 50% risk of developing the disease. Meanwhile, children aged 1 - 2 years have a risk of 20% - 30%, children aged 3 - 5 years have a risk of 5%, children aged 5 - 10 years have a risk of 2% and the risk for adults is 5%. Children are also more likely to develop severe forms of TB, such as TB meningitis or miliary TB. So children still have a higher risk of being infected with TB than adults (Asyfiradayati, 2021). Meanwhile, this research has differences with Siregar (2019) where the incidence of tuberculosis occurs more frequently in the children's age group. Thus, it is necessary to monitor the age of school children using KMS which has been carried out by Health officers so that they can monitor the growth and development of school children.

Based on Table 1, information was obtained that the majority of fathers' education was secondary, 124 people (66.3%) and the majority of mothers were middle school, 104 people (54.2%) were at risk of TB. Education is a planned effort so that individuals or society can do what is taught by educational behavior. If a person with a high level of education becomes ill, they will increasingly need health service facilities as a place for treatment for themselves and their family. The more an individual has a high level of education, the more they will realize that health is an important thing for life so they will be motivated to visit better health service facilities. Apart from that, the individual will more easily receive information and increase the knowledge they have and vice versa (Dhanny & Sefriantina, 2022). Apart from that, a low level of education will result in low knowledge, this includes clean and healthy living behavior (PHBS). One of the clean living behaviors that is often ignored by TB sufferers who have a low level of education is frequently expelling phlegm and spitting anywhere (Absor et al., 2018) .

According to Oktavia et al (2019), the OR value obtained was 3.94 (CI95% 1.34-11.6). Parents who have a low level of education can increase the risk of developing pulmonary TB by 3.94 times (3.94%) compared to people with higher education. In a population with a 95% confidence level, people with low education increase the risk of developing pulmonary TB by 1.34 times to 11.6 times. Thus, education is needed regarding the prevention of pulmonary TB in addition to carrying out PHBS in the surrounding environment to prevent the incidence of pulmonary TB with the assistance of health workers.

Based on Table 1, information was obtained that the majority of fathers' jobs were private sector employees, 121 people (63.4%), and the majority of mothers were households, 132 people (66%) were at risk of TB. The type of work determines the risk factors that each individual must face. If workers work in a dusty environment, exposure to dust particles in the exposed area will cause problems with the respiratory tract. Chronic exposure to polluted air can increase morbidity, especially the occurrence of symptoms of respiratory disease and generally pulmonary TB (Yani et al., 2018). Work can also influence the use of health services, a person's work will also reflect the amount of information received, and this information will influence a person in making decisions about utilizing existing health services, providing nutritious food, a healthy home environment, and maintaining health status (Khoirunnisa et al. al., 2023; Laia, 2021). This matter can be influential for physical, spiritual, and social so that when the No is fulfilled so can lower health status Where Power stands body decreases so the easily attacked pulmonary TB disease (Rizal et al., 2021). Different matter Laia's (2021) research shows work No influences the incidence of pulmonary TB because type work No gives rise to influence big to 6 growth and reproduction Mycobacterium tuberculosis that can give

rise to disease tuberculosis lungs, though type work determines level income that will be influence family in choose place stay. However, a lot of other factors are intermediaries No There is a connection between type work with an incidence of pulmonary TB.

According to Octavia et al (2019) show that The OR was 1.48 (CI 95% 0.55-3.84). People who work can increase the risk of developing pulmonary TB by 1.5 times (150%) compared to people who don't work. In a population with a 95% confidence level, working people increase the risk of developing pulmonary TB by 0.55 times to 3.8 times (45% to 380%). In conclusion, the p-value is 0.62 > α 0.05, meaning there is no statistically significant relationship between work and the incidence of pulmonary TB. Thus, there is a need for education regarding food modifications so that nutrition is met by training cadres together with health workers.

Based on Table 2, information was obtained that the nutritional status of the majority of school children was malnourished, 147 people (73.5%) were at risk of TB. Tuberculosis is closely related to lack of nutritional intake and a low immune system. If there is a continuous disturbance in the immune system and it gets worse, it will cause a decrease in nutritional status which is characterized by reduced food intake caused by nausea, vomiting and malabsorption (Wahidah et al., 2023) . Nutritional status is an important factor in the occurrence of Tuberculosis. The body is able to fight infection if it is accompanied by consuming food in amounts that suit the body's needs (Siddalingaiah et al., 2023) (Rika Oktania Sari & Bayu Prabowo, 2023) . Nutritional status can measure the ability to fight bacterial infections from tuberculosis. If a child has good nutrition, the child is able to prevent the spread of disease in his lungs (Mardiati & Fitri, 2023; Pelosi et al., 2023; Rose & Singhal, 2024) . On the other hand, malnourished children can suffer from pulmonary tuberculosis because the surface of the cavity is attacked by many bacteria, one of which is tuberculosis bacteria. (Wijaya et al., 2021) . Low nutritional status and the inability to increase body weight during therapy are closely related to the risk of death, recurrence of tuberculosis, inadequate response to therapy, severity of tuberculosis and/or the presence of comorbidities (Saraswati et al., 2018) . Nutritional status is the condition of the body which can be seen based on the degree of nutritional needs in the body and can be measured through anthropometry, namely body weight and height. The condition of the body experiencing nutritional deficiencies can affect a person's immune system (Rika Oktania Sari & Bayu Prabowo, 2023; Rose & Singhal, 2024)

According to Oktavia et al (2019), the OR is 16.7 (CI 95% 4.95 - 56.39). Respondents with poor nutritional status had a 16.7 times increased risk of developing pulmonary TB compared to respondents with normal/excessive nutritional status. In a population with a 95% confidence level, people with poor nutritional status have an increased risk of 4.95 times to 56.39 times developing pulmonary TB compared to respondents with normal/excessive nutritional status. In conclusion, with a p value of 0.001 < α 0.05, this means that there is a statistically significant relationship between nutritional status and the incidence of pulmonary TB. Thus, there is a need for direct monitoring and providing education regarding the importance of growth and development so that children can concentrate when school learning takes place

Based on Table 2, information was obtained that the majority of active smokers around school children were 108 people (52%) at risk of TB. According to Danny & Sefriantina (2022), someone with the status of an active smoker is at risk of suffering from pulmonary TB 10,889 times greater than other factors outside of smoking. There is a relationship between smoking status and the incidence of pulmonary TB

because respondents with smoking status in the active smoker category are more likely to suffer from pulmonary TB, namely 29%. This is by the theory which states that the more nicotine consumed, the higher the risk of developing high-risk diseases caused by smoking such as pulmonary TB (Firnadi et al., 2022). This is because nicotine can accumulate in the liver, kidneys, fat, and lungs. Nicotine is toxic to nervous tissue, causing an increase in systolic and diastolic blood pressure, tachycardia, and others.

According to Rizal et al (2021), it shows that children with passive smoking status (exposed to nearby smokers) are more likely to suffer from pulmonary TB, namely 45.2%. One of the risks of pulmonary TB disease is exposure to cigarette smoke experienced by passive smokers. The more often a person is exposed to cigarette smoke, the higher the risk of developing pulmonary TB (Absor et al., 2018; Mardiati & Fitri, 2023; Oktavia et al., 2019; Pelosi et al., 2023; Rose & Singhal, 2024; Siregar, 2019), This caused Because air exposed to cigarette smoke contains substances chemistry hazardous products produced by combustion cigarette (Yani et al., 2018). Thus, education on family-related dangers must be shared with children so they can prevent happened incidence of TB.

CONCLUSION

1. The majority of school children's nutritional status is malnourished, 147 people (73.5%) are at risk of TB and nutritional status is significantly related to the incidence of TB ($p<0.001$
2. The history of TB treatment is not significantly related to the incidence of TB (OR = 0.65, CI 95%, p = 0.666), and reducing the incidence of TB in school children can be done by treating it by making healthy living society, towards a healthy Indonesia.
3. The majority of smokers around school children are active smokers 108 people (52%) risk of TB and smoking is not significantly related to the incidence of TB (OR = 4.163, CI 95%, p=0.572.

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