

## Research Article

# The Effect of Tuberculosis on the Growth and Development of Children in Indonesia

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**Abstract.** A case study conducted at the Jatibening Community Health Center found 50 cases where tuberculosis affected the growth and development of toddlers in 2016, 62 in 2017 and 75 in 2018. This research aimed to examine the effect of tuberculosis on the growth and development of infants in UPTD Puskesmas Jatibening in 2019. Primary and secondary data were collected, and the Chi-square test was used for analysis. The results showed that tuberculosis had a significant effect on the growth and development of infants ( $p = 0.01$ ). It is recommended that health workers provide education to families to pay attention about nutrition for the growth of infants.

**Keywords:** toddlers, growth & tuberculosis (TB)

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## 1. Introduction

According to the [1] in the 2013 Annual report on global Tuberculosis control, 22 countries are categorized as high-burden countries for Tuberculosis [1]. WHO also estimates that there are 9 million tuberculosis cases per year worldwide in 2013, with 3 million deaths per year. Of all these deaths, 25% occurred in developing countries, one of which was Indonesia [2]. Tuberculosis (TB) infection is a major health problem in the world. One-third of the world's population is infected with tuberculosis bacteria. Indonesia is the fifth country with the highest TB cases in the world. The prevalence of all TB cases in Indonesia is 244 per 100,000 population and the incidence is 228 per 100,000 population. In the first quarter of 2016, the proportion of pediatric TB patients was 9.9%. Tuberculosis infection problems in children are more complex than in adult patients. Sources of TB transmission to children are adult TB patients who have close contact with toddlers, one of whom is a family member. TB patients with smear-positive provide the possibility of a greater risk of transmission than TB patients with smear-negative. Factors that influence the possibility of someone becoming a TB patient are low immune systems, including malnutrition. The presence of TB infection and malnutrition in toddlers can interfere with their growth.

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The West Java Provincial Government committed to eradicating Tuberculosis (TCB) by issuing Governor Regulation No. 12 of 2019 regarding regional action plans for TB prevention and control, which for the first time was socialized to the public at a commemoration event. The local government announced that the West Java Health Office had examined 8,369 residents in nine regencies/cities and found 873 people showing symptoms of TB and 41 others tested positive for TB germs.

Although the number of patients with Tuberculosis (TBC) in Bekasi City has decreased, the number of infectious diseases is still high. In 2015, the number of Tuberculosis (TB) sufferers reached 12,831 people, while in 2016 it reached 11,960 people. The Head of the Bekasi City Health Office, Kusnanto Saidi, said that this disease from the Mycobacterium Tuberculosis bacteria should be watched out for. Besides being able to cause death, prosis

Treatment of this disease also takes a long time up to more than a year. Kusnanto said the progress of healing for TB patients was quite good. In 2015, the cure for TB disease reached 74% of the target of 85%. Meanwhile, in 2016, the cure for TB disease was 84% of the 85% cure target. Although there were quite many suspected cases of TB, the progress of healing was quite good because officers routinely reminded patients to take medicine.

The number of patients with Tuberculosis (TB) in the Bekasi Regency is 4,804 people. This figure is based on data from the health department throughout 2017. This disease often affects children under five to adolescents aged 5-15 years. Meanwhile, TB is also suffered by women aged 22 years and men 19 years who are affected by TB disease.

The impact of Tuberculosis usually attacks the lungs, but up to a third of many toddlers are also infected with HIV/AIDS from their parents, then the disease in toddlers will quickly develop in the body. But it can also have an impact on other body parts such as tuberculosis of the lymph nodes, the membrane that covers the brain, joints, kidneys, and the membrane that covers the digestive organs (peritoneum).

According to [3], the risk factors that play a role in the incidence of pulmonary tuberculosis are grouped into 2 groups, namely population risk factors (gender, age, education, occupation, nutritional status) and environmental risk factors (occupancy density, natural ventilation, temperature, and humidity).

It is estimated that more than 200 million children under five in developing countries fail to reach their potential and optimal development due to problems of poverty, malnutrition, or an unsupportive environment, which affects children's cognitive, motor, emotional, and social development.

According to [4], development is the increase in abilities (skills) in complex body structures and functions in a predictable regular pattern, as a result of the maturation process. According to [5] growth in general is closely related to the problem with changes in size, many sizes, usually measured in terms of weight, length, bone age, and metabolic balance. Growth is an increase in the size and number of cells and intercellular tissue, an increase in physical size and structure, in a partial or total sense [6].

From the case studies conducted at the Jatibening Health Center UPTD, it was found that in 2016 there were 50 people affected by Tuberculosis in Growth and Development in Toddlers and in 2017 it was found that 62 people had Tuberculosis for growth and development in toddlers, in 2018 it was found that 75 people had Tuberculosis against Growth and development in Toddlers, in 2019 it was found that 93 people were affected by Tuberculosis against Growth in Toddlers. From the above phenomenon, the research is interested in examining the effect of the incidence of Tuberculosis (TBC) on Growth and Development in Toddlers in 2019.

## 2. Methods

### 2.1. Design

The research design used analytic with a cross sectional design in which data concerning the independent and dependent variables are measured simultaneously at the same time. By taking primary and secondary data through Denver regarding Tuberculosis (TBC) and Growth and Development in Toddlers.

### 2.2. Sample

The sample is a small part of the number and characteristics that exist in the population that are considered to be able to represent the population. The sample in this study were some who had tuberculosis and growth and development in toddlers as many as 50 respondents under five years old at Jatibening Public Health Center, Bekasi, Indonesia.

TABLE 1: Distribution of Growth and Development Frequency in Toddlers at UPTD Jatibening Health Center in 2019

Number	Growth and development	Frequency	Percentage
1	It is not under	35	70,0%
2	In accordance	15	30,0%
	Total	50	100,0%

### 2.3. Procedure

This research was conducted at the Jatibening Health Center UPTD in the children's room on the 2nd week of July 2019. The population in this study were all toddlers who experienced tuberculosis on growth and development in toddlers as many as 50 respondents in the UPTD Puskesmas Jatibening Pondok Gede Bekasi. With a cross sectional design where the data concerning the independent and dependent variables are measured simultaneously at the same time.

### 2.4. Questionnaire for Data Collection

Collecting data using analytic with cross sectional design where data concerning independent and dependent variables are measured simultaneously at the same time. By taking primary and secondary data through Denver regarding Tuberculosis (TBC) and Growth and Development in Toddlers.

### 2.5. Data Analyst

Data analysis using SPSS computer program assistance. If value  $< \alpha$  (0.05),  $H_0$  is rejected and  $H_a$  is accepted, which means there is a relationship between the independent and dependent variables. If value  $> \alpha$  (0.05),  $H_0$  is accepted and  $H_a$  is rejected, which means there is no relationship between the independent and dependent variables.

## 3. Results

Based on table 1. regarding the distribution of the frequency of growth and development in toddlers at the at Jatibening Public Health Center in 2019, it shows that, out of 50 respondents who experienced appropriate growth and development, 15 people (30.0%) experienced inappropriate growth and development in toddlers as many as 35 people. (70.0 %).

TABLE 2: Distribution of Tuberculosis Frequency in Toddlers at UPTD Jatibening Health Center in 2019.

Number	Tuberculosis	Frequency	Percentage
1	Yes	30	60,0%
2	No	20	40,0%
	Total	50	100,0%

TABLE 3: The Effect of Tuberculosis on the growth and development of toddlers at the Jatibening Health Center UPTD in 2019

TBC	Growth and development				P-value
	It is not under	In accordance		Total	
Yes	30 100,0%	0 0,0%	30	100,0%	0,001
No	15 75,0%	5 25,0%	20	100,0%	
Total	15 30,0%	35 70,0%	50	100,0%	

Based on table 2. regarding the frequency distribution of Tuberculosis in toddlers at the UPTD Jatibening Health Center in 2019 it shows that, of the 50 respondents who experienced tuberculosis, 30 people (60.0%) and those who did not experience tuberculosis, as many as 20 people (40.0%).

Based on 3. above, it can be seen that of the 30 respondents who experienced Tuberculosis (TBC) the most experienced growth and development under toddlers as much as 0 (0.0%) and of the 15 respondents who experienced Tuberculosis (TB) the most experienced Growth and Development Inappropriate. as many as 5 people (25.0%).

From the cross-tabulation results, the results of the Pearson chi-square statistical test obtained a value of 0.001 or  $p < (0.05)$  the conclusion is  $H_0$  is rejected, and  $H_a$  is accepted, which means that there is a significant relationship between TB and Toddler Development at UPTD Jatibening Health Center in 2019.

#### 4. Discussion

The results of the analysis of the data obtained for two weeks at the UPDT Jatibening Health Center showed that in reality there was no significant effect of the incidence of Tuberculosis on growth and development in toddlers. This is evidenced by calculations performed by SPSS, where the Chi-square value is greater than 0.05. From the results of this study, it was found that the incidence of tuberculosis showed that, from 50 respondents who experienced tuberculosis as many as 30 people (60.0%) and who did not experience tuberculosis as many as 20 people (40.0%) while in growth and development 50 respondents experienced growth and development. 35 people (70.0%)

did not fit and 15 people (30.0%). But researchers in their research found that toddlers were exposed to Tuberculosis disease so that their growth and development were hampered. Of course, besides that, many important factors influence the occurrence of Tuberculosis on growth and development in toddlers. Accord

ing to [7], the events experienced in the growth and development of children are periods of acceleration and deceleration. Growth events in children can occur in changes in size, number, size at the level of cells, organs, and individuals, while developmental events in children can occur in changes in the shape and function of organ maturation ranging from social, emotional, and intellectual aspects. The growth and development of the brain cannot be improved if there is malnutrition in infancy. Therefore, toddlerhood is often referred to as the "golden period". If at this time experiencing malnutrition can cause physical and intellectual growth to be disrupted. In infancy, the development of the nervous system grows rapidly. Brain cells grow and mature chemically to become more active. Therefore, it is necessary to pay attention to all aspects related to the growth process.

According to [5], one of the most important aspects of a child's growth and development is the nutritional aspect. Furthermore, [7] states that the benefits of nutrition in the body are that it can help the growth and development of children, and prevent various diseases due to malnutrition in the body such as lack of energy and protein, anemia, iodine deficiency, zinc deficiency (Zn), vitamin A deficiency, as well as other nutritional deficiencies that can affect children's growth and development

From the results of the study, it can be seen that the effect of the incidence of tuberculosis on growth and development in toddlers, of the 30 respondents who experienced tuberculosis, the most who experienced growth and development in toddlers were 35 respondents (75.0%) and of the 15 respondents who did not experience tuberculosis, most did not. experiencing growth and development in toddlers as many as 15 respondents (100.0%).

The results of the Pearson chi-square statistical test obtained a value of 0.001 or < (0.05) the conclusion is  $H_0$  is rejected, and  $H_a$  is accepted, which means that there is a significant relationship between the effect of the incidence of Tuberculosis (TBC) on growth and development in toddlers UPTD Jatibening Health Center in 2019.

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## Conflict of Interest

No Conflict of interest.

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