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Original Research

Correlation Between History of Infectious Disease with Stunting in Toddler

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ABSTRACT

Stunting is a chronic nutritional problem caused by a long period of malnutrition. Prolonged malnutrition can decrease body resistance, making it susceptible to disease. This study aims to analyze the correlation of the history of infectious disease with stunting cases in toddlers at the Working Area of Sumberjambe Health Center. The research design used a correlation design with a cross-sectional study approach. The sample of this research was 376 toddlers. For the sampling technique, we used stratified random sampling. The research was conducted in May 2021 using questionnaire instruments. Analyze the data using the Spearman Rho test with an $\alpha = 0.05$. Result: Based on data analysis obtained from 376 respondents, 274 respondents (72.9%) experienced a history of diseases with frequent categories, and 102 respondents (27.1%) experienced a history of diseases with infrequency categories. This study concludes with a correlation between historical infectious diseases and stunting. Based on the results regarding health promotion, the prevention of recurrent or sustainable pain in toddlers needs to be improved to overcome the problem of stunting. Moreover, giving health promotion advice for mothers to provide exclusive breast milk and nutritious food and maintain food hygiene and shelter for children are essential to avoid stunting.

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Introduction

Toddlers are individuals in the age range of 0-60 months. The toddler period is critical because toddlers need nutrients from daily food with the exact quantity and good quality (Adriani & Wirjatmadi, 2014). Toddlers with poor nutritional status can impact growth and development disorders; one of them is stunting.

Stunting is a chronic nutritional problem caused by a long period of malnutrition and can impact growth disorders in children; that child's height is shorter than the standard age (Kementrian Kesehatan RI, 2018). Stunting is a long-term reflection of the inadequate quality and quantity of food consumed and frequent infectious diseases in childhood. Stunting is a nutritional problem that needs attention because it can affect the quality of human resources (Rahman, 2018).

The prevalence of stunting in Indonesia in 2018 was 30.8%, and in 2019 was 27.67% (Kementrian Kesehatan RI, 2019). This shows that the incidence rate is decreased. However, this incidence still includes a health problem because it exceeds the maximum standard value of the World Health Organization, which is 20% of the total number of toddlers in a country.

The prevalence of toddler stunting in East Java was 32.8% in 2018 and 26.86% in 2019. Jember district has the eighth rank in East Java with a prevalence of toddler stunting are 17.83% in 2017 and 11. 83% in 2018. One area with a prevalence of toddler stunting in Jember is Sumberjambe, with 20.42% in 2018, and in 2019 was 29.35% (Dinkes, 2019). The data shows that Sumberjambe is included as an area with a high rate of stunting, and that includes health problem for toddlers that needs to be handled immediately because the cut-off point of stunting should not be more than 20%. From the results of a preliminary study of toddler stunting at the Working Area of Sumberjambe Health Center, which consists of 9 villages, it was found that 7 of 9 toddlers stunting had a history of illness in the frequent category, and three children had an unfrequent category.

Stunting can have a destructive impact, both in the short and long term. The short-term effects of stunting are suboptimal cognitive, language, motoric development, susceptibility to disease (morbidity), increased mortality, and health costs (WHO, 2013). Based on results, research by Setiawan, Machmud, & Masrul (2018) shows that disease susceptibility can affect the incidence of stunting. Infectious diseases experienced by children have an impact on decreasing appetite that can impair nutrient absorption, direct loss of micronutrients, metabolism increased, loss of micronutrients due to increased catabolism, and impaired transport of nutrients to body tissues. The occurrence of disturbances in nutritional intake can be a growth disorder (Namangboling, Murti, & Sulaeman, 2017).

Several risk factors for stunting are infection factors. Based on the results of research by Pibriyanti, Suryono, & Luthfi (2019) showed that a history of infectious disease had a risk 12 times of stunting. Infectious diseases harm the nutritional status of toddlers. It will result in disorder growth and development. Contagious diseases that are frequently suffering children can deplete energy reserves in the body. If it lasts long enough, it can interfere with growth. Diseases which not deplete energy reserves, even if they stay for a long time, can interfere with growth because it eliminates the child's appetite (Fatimah & Wirjatmadi, 2018). The poor nutritional status experienced by children will affect the body's resistance to disease, which is low, so they are susceptible to infectious diseases(Desyanti & Nindya, 2017).

The infection factor, in this case, are the history of infectious disease. Research by Nurbaweana (2019) shows that toddlers stunting have a history of illness as much as 90%; meanwhile, non-stunting toddlers are 45%. Toddlers who often experience illness affect their growth (Fatimah & Wirjatmadi, 2018). Thoha's theory states that a toddler who often gets sick with infections not only affects his weight loss but can also affect the child's linear growth. (Desyanti & Nindya, 2017).

The reciprocal interactions between nutritional disorders and infectious diseases can coincide and interact. Suppose this negative interaction occurs for a long and does not get intervention immediately. In that case, it can reduce food intake and interfere with nutrient absorption, increasing the risk of stunting in

toddlers (Permatasari & Sumarmi, 2018). Therefore, the nurse can play an active role in the prevention and treatment of stunting, including in providing information about stunting and as the best nurse can give care provider for toddler stunting.

Based on the description above, we aim to research the correlation between cases in toddlers at the Working Area of Sumberjambe Health Center.

Method

This research has already received ethical standards from the University of Muhammadiyah Jember's ethics commission with letter 014/KEPK/FIKES/V/2021. This study used a correlation design with a cross-sectional study approach with 6352 toddlers and their mothers consisting of 9 villages as a population. A sample of 376 toddlers was obtained from the calculation using the Slovin. The inclusion criteria determined the sample selection; there are children aged 2-5 years who had experienced diarrhea, ISPA, or helminthiasis. The exclusion criteria were mothers of toddlers who could not read and write.

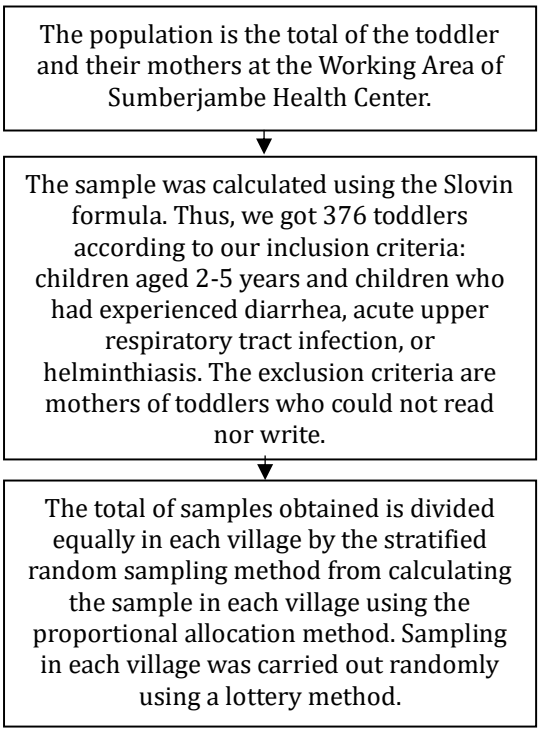

Figure 1. Sampling Process

The research was implemented in May 2021 at the Working Area of Sumberjambe Health Center using a questionnaire consisting of general and special data. General data include the mother's age, mother's last education, and family income. Specific data consists of 15 statements arranged by the researchers: about the history of illness experienced by toddlers for at least the last one month. The results of the questionnaire validity test are 0.5, which are classified as valid categories and the questionnaire reliability results are 0.7, including moderate reliability. Two alternative answers are yes and no. Each answer 'yes' will be given a score of 1, and the answer 'no' will be a score of 0. History of illness is categorized as infrequent if the obtained score of 0-8 and a frequent category if the score is 9-15. Data analysis used the Spearman Rho test with a value of = 0.05.

Results and Discussion

The research results consist of general data and special data. General data includes maternal age, mother's last education, and family income. Specific data consisted of a history of illness and the incidence of stunting in toddlers. The results of the study are presented as follows:

General Data

Table 1. Frequency Distribution of Mother's Toddler Based on Age (n=376)

	Mean	Standard Deviation	Min-Max	95% CI
Mother's Age	28.43	6.73	18 - 56	27.75 - 29.12

Table 1 shows that the average mother's age of a stunting toddler is 28.43, with a standard deviation of 6.73. The highest mother's toddler age was 56, and the lowest was 18. From the interval estimation results, it was found that 95% believed the mean score for the mother's age was between 27.75 to 29.12.

The parents' age when they have one child is also relatively young so that their stamina is still excellent, while for the third child or more, the parents' age is relatively young, and their energy is decreasing. Parents' age and physical stamina will also affect their children's upbringing (Aryu, 2018).

Table 2. Frequency Distribution of Mothers Toddlers Based on Mother's Last Education (n=376)

Mother's Last Education	Frequency	Percentage (%)
College	12	3.2
Senior High School/ Equivalent	41	10.9
Junior High School/ Equivalent	115	30.6
Elementary School /Equivalent	208	55.3
Total	376	100

Based on table 2 shows that the 376 mothers consist of mothers with tertiary education amount 12 respondents (3.2%), high school education amount 41 respondents (10.9%), junior high school education amount 115 respondents (30.6%), and elementary education is the education with the highest total are 208 respondents (55.3%).

Highly educated mothers usually find it easier to change their behavior to maintain health. The level of family education, especially the mother's education, can be a factor that influences the nutritional status of children and their families. Undernourished toddlers can also be due to parental attention to poor child nutrition. The lack of nutritional status of children can cause children to get sick (Hanum, 2019).

Table 3. Frequency Distribution of Mothers Toddlers Based on Family Income (n=376)

Income	Frequency	Percentage (%)
<1,000,000	281	74.7
1,000,000–1,500.00	72	93.9
>1,500,000	23	6.1
Total	376	100

Based on table 3 shows that family income <1,000,000 amount 281 respondents (74.7%), family income from 1,000,000 – 1,500,000 amount 72 respondents (93.9%) and family income > 1,500,000 amount 23 respondents (6.1%). From this data, the majority of family incomes are 1,000,000 - 1,500,000.

Low family income will affect the choice of food consumed so that it becomes less varied and small, especially in foods that function for children's growth, such as sources of protein, vitamins, and minerals, thereby increasing the risk of malnutrition. This is one of the factors that cause stunting (Kusuma, 2018).

Special Data

Table 4. Distribution of Toddler Frequency based on History of infection Disease (n=376)

History of Infection Disease	Frequency	Percentage (%)
Unfrequent	102	27.1
Frequent	274	72.9
Total	376	100

Based on the results of research on the total sample of 376 respondents, it can be seen that the majority of the toddler who became respondents experienced a history of disease with a frequent frequency are 274 respondents (72.9%) and toddlers with a history of infrequently disease are 102 respondents (27.1%).

Frequent and prolonged illness can cause loss of appetite, absorption, metabolic disorders, and behavioral changes, which can affect the nutritional status of toddlers. The lack of nutritional status can affect the incidence of illness or prolong recovery duration (Mkhize & Sibanda, 2020). Toddlers who often get sick need more nutritional intake for the healing process. The infections that toddlers often experience can deplete energy reserves in the body. If it lasts long enough, it can interfere with growth due to loss of appetite for toddlers, and malnutrition experienced by toddlers will affect the body's resistance to disease, which is low so that they are susceptible to infectious diseases (Ariani, 2017). Based on this, it can be concluded that toddlers with a frequent history of illness are more likely to stunt.

In line with research Nurbaweana (2019) states that toddlers stunting have a history of illness more often than non-stunting toddlers. A history of infectious diseases can affect a child's growth because when a child is sick, the child's immune system will weaken, and the child will become more susceptible to disease so that the child's growth will be disrupted. (Nofiandri & Ali, 2021). Also supported by research Putri, Irawan, & Mukono (2021) states that a low frequency of illness will reduce the risk of stunting because

a healthy toddler's body can grow without obstacles.

Table 5. Incidence of Stunting in Toddlers (n=376)

Stunting Incident	Frequency	Percentage (%)
Stunting	256	68.1
Non- Stunting	120	31.9
Total	376	100

The results showed that most of the toddlers who got stunting were 256 respondents (68.1%), while 120 respondents (31.9%) included non-stunting toddlers. This indicates that the stunting problem at the Working Area of Sumberjambe Health Center is high.

Stunting is a chronic malnutrition problem caused by inadequate nutritional intake for a long time due to feeding that does not match dietary needs. Stunting occurs when the fetus is still in the womb and only appears when the child is two years old. Malnutrition at an early age increases infant and child mortality, causes sufferers to get sick quickly, and have poor posture when adults age (Purwanti & Ratnasari, 2020).

The frequency and duration of illness in children provide the risk of possible stunting. There is a reciprocal correlation between nutritional status and the incidence of infection. Toddlers with poor nutritional quality can cause infections due to low immune systems, making them susceptible to disease. On the other side, if infectious diseases occur frequently, a person will get malnutrition due to a decreased appetite (Malisa, 2020).

A research study by Nur et al. (2021) stated that a history of disease in the last three months significantly correlated with height/age. The incidence of infection will directly affect the metabolism of nutrients in the body, including inhibiting the absorption of nutrients; then, the incidence of infection in children will affect the child's appetite so that both of these things will have an impact on the nutritional status of children or stunting.

Table 6. Correlation between History of Infection Disease and Incidence of Stunting in Toddlers (n=376)

Independent Variable	Dependent Variable	*p-value*	r
History of Infection Disease	Stunting incident	0.000	0.686

Table 6 shows the test results with the spearman rank and obtained a significance of 0.000 < (α = 0.05) with a count of 0.686, which is included in the strong category (0.6 - 0.8). This correlation showed positive, meaning higher childhood illness history, then higher the risk of getting stunting. With this, it can be concluded that H1 is accepted, which means that there is a significant correlation between a history of infectious disease and the incidence of stunting in toddlers at the Working Area of Sumberjambe Health Center.

Stunting is a clinical form of impaired growth due to adaptation mechanisms that occur during infection. A child is told to have a history of infection and at risk of stunting if the infection recurs at least once a month and lasts at least three days per sick period. Infection can cause the child not to feel hungry and not want to eat. This disease also consumes a certain amount of protein and calories that should be used for growth. The incidence of repeated infections with a long duration is one factor that depletes children's nutrition so that growth becomes sluggish and the prevalence of stunting increases (Hasdianah, Siyoto, & Yuly, 2019).

Toddlers who suffer from illness for a longer duration are at greater risk of stunting and are more likely to experience sequelae due to common infections that will weaken the toddler's physical condition (Sahitarani, Paramashanti, & Sulistiyawati, 2020). Toddlers who eat food with poor hygiene practices can increase the child's risk of developing infectious diseases. This infectious disease is usually characterized by impaired appetite and vomiting, so these toddlers' intake isn't fulfilled. Conditions like this will have alarming implications for the growth of toddlers. Undernourished children are more susceptible to infectious diseases (Desyanti & Nindya, 2017).

Infectious diseases that occur continuously will have an impact on growth patterns. Infection can reduce food intake, interfere with nutrient absorption, cause

direct loss of nutrients, increase metabolic needs or decrease catabolic processes of nutrients so that it will affect consumption patterns which in turn will affect the nutritional status of children. If this condition lasts for a long time, it will affect the child's linear growth (Dewi & Adhi, 2016).

Infectious diseases and nutritional disorders are often found together, and their relationship affects each other. There is a reciprocal relationship between nutritional intake and the incidence of infection. Lack of intake is closely related to the high incidence of infectious diseases because malnourished children may experience a decrease in body resistance and the presence of infectious diseases causes children to have no appetite. As a result, food and drink shortages enter the body, so children suffer from malnutrition (Angkat, 2018).

This research is in line with the study of Nurbaweana (2019), which shows a correlation between a history of infectious disease and the incidence of stunting. Stunting toddlers have a history of illness more often than non-stunting toddlers. The infection had toddlers can affect not feeling hungry and not wanting to eat, which results in a lack of nutrition and slow growth due to infection in the long term. Low food intake can reduce immunity in the body so that the body is prone to infections that cause malnutrition or vice versa; an infected body will interfere with the absorption of nutrients so that the body will experience malnutrition.

Children who get enough food but often get sick can suffer from malnutrition. Likewise, in children who do not get enough to eat, their immune system will weaken and be susceptible to disease. Low disease resistance will reduce the body's capacity to fight disease (Ariani, 2017).

This is in line with research by Aisyah, Tarigan, & Azizah (2021), which states that there is a correlation between the incidence of infectious disease and stunting. Toddlers who rarely get sick have a good appetite, so they have a robust immune system, and their nutritional intake is adequate because no factors interfere with the child's appetite. There are no diseases that deplete the child's protein and calories.

The researcher assumes that the high stunting rate of children is due to a history of infectious diseases suffered during infancy. A history of infectious disease is one-factor influencing stunting in toddlers. This high incidence of stunting is due to the high history of illness in toddlers. Infection can be associated with nutritional disorders, affecting appetite, causing food loss due to vomiting/diarrhea, or affecting food metabolism. Thus, toddlers with a history of frequent illness need more nutritional coverage to recover the nutritional needs lost during illness.

Conclusion

Based on the results of the study, it can be concluded that there is a correlation between a history of infectious disease and the incidence of stunting in toddlers at the Working Area of Sumberjambe Health Center.

Suggestion

1. Health Workers
   Midwives, nurses, and nutritionists as health service providers can collaborate to provide socialization about the prevention of stunting with health education on how to prevent and handle toddlers who often get the illness.
2. Public Health Center
   Public health centers can be more proactive in handling stunting cases by improving health programs like prevention and control of stunting, especially health promotion for preventing infectious diseases in toddlers.
3. Public Health Office
   The health office can optimize intervention programs focused on the First 1000 Days of Life (HPK) and stunting treatment with simulation, care, and sustainable education.
4. Next Researcher
   Next, researchers can use the results of this study as a reference for further research about stunting by providing interventions about the history of infection disease like a health promotion in the treatment and prevention of recurrent disease.

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