

# ASSOCIATION OF EXTENDED BREASTFEEDING AND HOUSEHOLD ENVIRONMENTAL FACTORS WITH INFECTION RATES IN STUNTED TODDLERS: A STUDY IN DINOYO HEALTH CENTER'S OPERATIONAL AREA, MALANG CITY

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DOI: [10.5281/zenodo.10931636](https://doi.org/10.5281/zenodo.10931636)

## Abstract

**Introduction** :Stunting is a condition where children fail to thrive due to malnutrition for a long period of time and has an impact on the world, especially in almost every country. The prevalence of stunting in Indonesia in 2022 is 21.6%, although there has been a decline, it is still below the 2024 RPJM target of 14%. Apart from nutritional problems, stunting is also closely related to environmental factors. An unhealthy household environment can cause infections in toddlers. This study aims to determine the relationship between duration of breastfeeding and household environment on the incidence of infection in stunted toddlers in the Dinoyo Health Center working area, Malang City. **Method** :Observational research using a case-control study design with a purposive sampling technique which was carried out in January-February 2024 in the working area of the Dinoyo Health Center, Malang City. The sample size was 50 toddlers (25 cases and 25 controls). The control sample was stunted toddlers who had not experienced any infection in the last three months. Respondents are mothers of toddlers. The analysis used is a multiple logistic regression test. **Results** :Duration of breastfeeding < 6 months (p-value = 0.004) has a significant effect on the incidence of infection in stunted toddlers, while an unhealthy household environment (p-value = 0.322) has no significant effect on the incidence of infection in stunted toddlers in the Dinoyo Community Health Center working area. **Conclusion** :The duration of breastfeeding affects the incidence of infection in stunted toddlers in the Dinoyo Community Health Center working area, Malang City.

**Keywords**: Duration of Breastfeeding, Household Environment, Incidence of Infection, Stunting.

## INTRODUCTION

Stunting is a global health concern where children experience growth failure due to chronic malnutrition, particularly in the first 1000 days of their life, which includes the period from pregnancy to the first two years of life. Factors contributing to stunting include inadequate nutritional intake, repeated infections, and poor socio-economic conditions.

The impact of stunting is not limited to hindering physical growth but also affects brain development, leading to decreased cognitive abilities and academic performance, as well as higher health risks later in life. Globally, stunting is a key issue in the sustainable development agenda, demanding collaborative actions from various parties to prevent and address its causes.

In Indonesia, stunting is a serious and urgent public health issue. Despite progress in recent years, the prevalence rate of stunting in Indonesia remains one of the highest globally. Factors such as inequality in access to healthcare, insufficient nutrition education, poor sanitation, and inadequate access to clean water contribute to the high stunting cases in Indonesia.

The Indonesian government has acknowledged the gravity of this issue and launched various initiatives and programs to reduce stunting rates, including improving access to nutritious food, enhancing maternal and child healthcare services, and nutrition education campaigns. However, there is a research gap in understanding the influence of specific environmental factors and breastfeeding practices on stunting prevalence, particularly in areas with high stunting rates such as Puskesmas Dinoyo in Malang City.

Previous research tends to focus on general factors and interventions at the national or regional level, while the relationship between unhealthy household environmental factors and the duration of breastfeeding with infection occurrences in stunted toddlers at the local level remains under-explored.

This research offers novelty by examining these relationships in the Puskesmas Dinoyo area of Malang City, which has unique and specific conditions that can provide new insights into stunting reduction efforts. Understanding local dynamics, this research could offer recommendations that can be integrated into more effective and focused intervention strategies to combat stunting in that area. The researcher aims to investigate the relationship between the duration of breastfeeding, unhealthy household environments, and infection occurrences in stunted toddlers in Puskesmas Dinoyo's area, with the goal of providing recommendations to help reduce stunting rates in Indonesia.

Addressing stunting requires a holistic approach involving various sectors, not only health but also education, sanitation, and socio-economic development. Globally, international cooperation and support from international organizations are needed to share knowledge, resources, and best strategies to reduce stunting. Meanwhile, in Indonesia, it is crucial to implement integrated and localized approaches, encourage community participation, and ensure that interventions reach the most vulnerable groups. Through collective efforts and strong commitment, we can reduce the stunting burden and provide a brighter future for children in Indonesia and around the world.

Stunting is a condition of growth failure in children due to long-term nutritional deficiency (Achadi, et al., 2020). Approximately 148.1 million children worldwide suffer from stunting, with 30.1% of children in Southeast Asia affected. According to Riskesdas data from 2022, Indonesia's stunting prevalence rate decreased to 21.6% from 24.4% in 2021, still below the 2024 RPJM target of 14%. Stunting remains a major nutritional issue prioritized by the Indonesian government and society.

The Indonesian Ministry of Health's Regulation no. 2 of 2020 on anthropometric standards for nutritional status assessment is used to evaluate stunting in children, with z-scores thresholds for measuring length/height for age. Values at  $-3$  SD and  $<-2$  SD are considered short for children, while  $<-3$  SD indicates very short children. Non-exclusive breastfeeding from 0-6 months is one factor influencing stunting (Susilowati, et al., 2016).

Breast milk is crucial for infants as it contains essential nutrients for growth and development and helps prevent diseases and reduce mortality risks (Kahn, et al., 2017). In 2022, the national rate of exclusive breastfeeding for infants aged 0-6 months was 67.96%, not meeting the government's 80% target. Exclusive breastfeeding rates in East Java and Dinoyo Health Center in Malang City were 50.95% and 51.18%, respectively.

Other factors contributing to stunting include environmental conditions (Rahmawati, et al., 2018). Poor quality drinking water, waste management, sanitation, and sewage disposal contribute to infectious diseases like diarrhea and respiratory infections, impacting nutrient absorption and potentially leading to weight loss and stunting (RI Ministry of Health, 2018). In 2022, Dinoyo Community Health Center in Malang City reported 1250 toddlers with respiratory infections and 470 with diarrhea. Stunted children often suffer more from infections due to lower immunity, affecting cognitive development and growth (Himawati, et al., 2020).

Exclusive breastfeeding can build immunity against infections, showing weight and length gains in exclusively breastfed infants from 3 to 6 months or more (Prawirohartono, 2021).

Environmental sanitation is crucial for human health, influenced by drinking water contaminated sources, community living environment quality, and disease spread possibilities. Poor sanitation has negative health impacts if not properly maintained (Rathomi & Nurhayati, 2019). The researcher is interested in studying the relationship between breastfeeding duration, unhealthy household environments, and infection occurrences in stunted toddlers at Puskesmas Dinoyo in Malang City.

## RESEARCH METHODS

This study employs a case-control design within an analytical observational framework to examine stunted toddlers aged 24-59 months in Dinoyo Health Center's operational area in Malang City. From June to October 2023, the total count of stunted toddlers was 57.

The research utilized two groups of samples: a case group and a control group, with the control group being selected subsequent to the case group. Upon meeting the inclusion criteria, the case group was paired with the control group at a 1:1 ratio, resulting in 25 toddlers each in both groups, summing up to 50 toddlers for the entire study sample.

The study's dependent variable is the occurrence of infections among stunted toddlers, while the independent variables are breastfeeding duration and the state of the household environment.

The research employed various data collection methods, including observation, direct measurements, and interviews using questionnaires.

The interviews were conducted with an observation sheet that assesses the standards of healthy living, validated and tested for reliability based on prior research at Kedungadem Community Health Center in Bojonegoro Regency. To analyze the data, the study utilized bivariate analysis and the Chi-square test, with a significance level set at a p-value of 0.05 or less to indicate a meaningful relationship.

This study aims to identify the risk level associated with the independent variables by determining the odds ratio (OR) value..

## RESULTS AND DISCUSSION

**Table 1: Frequency Distribution of Respondent Characteristics**

No	Variable	Amount N=50	Percentage (%)
1	Age (24-59 months)	50	100
2	Gender Man Women	30 20	60 40
3	Birth weight < 2500 grams ≥ 2500 grams	2 48	4 96
4	Length of Breastfeeding < 6 months ≥ 6 months	24 26	48 52
5	Household Environment Not healthy Healthy	20 30	40 60
6	Infectious Diseases Diarrhea-ARI ISPA No	5 20 25	10 40 50
	<b>Total</b>	<b>50</b>	<b>100</b>

Based on table 1, all 50 respondents (100%) were aged 24-59 months, according to gender, the most stunted toddlers were boys (60%), the birth weight of the babies was mostly normal (96%). For the duration of breastfeeding variable, it shows that respondents with duration of breastfeeding ≥ 6 months were 26 respondents (52%). Furthermore, the household environment variable for respondents who live in an unhealthy household environment is 20 respondents (40%), and the majority of stunted toddlers do not experience infectious diseases, 25 respondents (50%).

**Table 2: The relationship between duration of breastfeeding and the incidence of infection in toddlers Stunting**

Length of Breastfeeding	Infection		Not infection		Total		p-value	OR
	n	%	n	%	n	%		
< 6 months	17	70.8	7	29.2	24	48	0.004	8.526
≥ 6 months	8	30.8	18	69.2	26	52		

Respondents with duration of breastfeeding < 6 months experienced infections 70.8%, while respondents with duration of breastfeeding ≥ 6 months experienced infections 30.8%. Based on the results of statistical tests, the p-value was 0.004 (p-value < 0.05).

It can be interpreted that there is a relationship between the duration of breastfeeding and the incidence of infection with a value (OR=8.526) so that stunted toddlers with duration of breastfeeding < 6 months have an 8.526 times greater chance of experiencing infection than stunted toddlers with duration of breastfeeding ≥ 6 months.

**Table 3: Relationship between household environment and the incidence of infection in Stunted Toddlers**

Environment Household	Infection		Not Infection		Total		P-Value	OR
	n	%	n	%	n	%		
Unhealthy	14	70	6	30	20	40	0.322	2.008
Healthy	11	36.7	19	63.3	30	60		

63.3% of respondents lived in a healthy household environment and did not experience infection, while 70% of respondents who lived in an unhealthy household environment experienced infection. Based on the results of statistical tests, the p-value was 0.322 (p-value < 0.05). It can be interpreted that there is no significant influence between the household environment on the incidence of infection. The value (OR=2.008) shows that stunted toddlers in a household environment are 2.008 times more likely to experience infection.

**Table 4: Logistic Regression Test Results on Infection**

Variable	B	S.E	Wald	df	Sig.	Exp (B)	95%	
							Lower	Upper
Length of Breastfeeding	2.143	0.746	8.249	1	0.004	8.526	1.975	36.805
Household Environment	0.697	0.703	0.982	1	0.322	2.008	0.506	7.971

The effect of the duration of breastfeeding has a significant influence on the incidence of infection in stunted toddlers (p = 0.004) with a value (OR = 8.526) indicating that the duration of breastfeeding provides an 8,526 times greater risk of infection in toddlers. The risk probability can increase and decrease between 1,975 and 36.80 times.

The influence of the household environment does not have a significant effect on the incidence of infection in stunted toddlers (p=0.322) with a value (OR=2.008) indicating that the household environment provides a 2.008 times higher risk of infection in toddlers. The risk probability can increase and decrease between 0.506 to 7.791 times.

## DISCUSSION

### The Relationship between the Duration of Breastfeeding and the Incidence of Infection in Stunted Toddlers

The findings from this study indicate a notable correlation between breastfeeding duration and the prevalence of infections in stunted toddlers within the operational zone of Dinoyo Health Center, Malang City. This observation aligns with the findings of Kismul et al. (2018), who noted that breastfeeding enhances child survival rates and decreases the likelihood of diseases. Furthermore, breast milk, laden with growth hormones, plays a crucial role in the developmental process of a child's digestive system and provides a defense against various bacteria and viruses. Insufficient exclusive breastfeeding can lead to inadequate nutrition in the initial life stages, as highlighted by Chairunnisa (2020). The immediate adverse effects include disruptions in brain and physical development, as well as the onset of metabolic disorders. Over the long term, these issues could lead to diminished cognitive capabilities and weakened immunity, increasing susceptibility to illnesses (Cahyani et al., 2022).

Therefore, the absence of exclusive breastfeeding in the first six months poses a stunting risk and is associated with a higher incidence of infectious diseases in children. Non-exclusively breastfed infants under six months are more prone to infections like diarrhea (Kahn et al., 2017). Such children also face higher risks from microbe exposure in food or drinks since their digestive immune systems are not yet fully developed. Infectious diseases in children can significantly affect their health, leading to decreased appetite, impaired nutrient absorption, and increased catabolism, which collectively hinder growth and development (Lestari et al., 2018).

Providing breast milk for six months to up to two years can positively impact a child's growth trajectory. Breast milk, especially rich in colostrum and antibodies, supplies critical nutrients and infection resistance essential for a child's survival and well-being. Consequently, children with greater resistance to infections tend to have lower illness rates (Sunartiningsih, 2020).

### **The Relationship between the Household Environment and the Incidence of Infection in Stunted Toddlers**

The research findings reveal no significant connection between the household environment and infection rates in stunted toddlers within Dinoyo Health Center's service area in Malang City. These results align with the study by Slodia et al. (2022), which found no correlation between sanitation conditions and stunting rates. The study primarily involved mothers with toddlers, identifying nutritional intake as the pivotal factor influencing stunting, which is typically caused by prolonged nutritional deficiencies. During their growth phase, children require a balanced diet rich in essential nutrients like proteins, fats, carbohydrates, vitamins, and minerals. Factors such as poverty, socio-economic challenges, food scarcity, reduced purchasing power, and lack of hygiene can lead to inadequate nutritional intake in toddlers (Wati & Musnadi, 2022).

Additional research by Yanti et al. (2020) indicates that other elements contributing to stunting include maternal knowledge, parenting styles, nutrition, low birth weight, and economic status. The way parents raise their children plays a crucial role in preventing stunting, with significant impact on children's growth and development. This includes aspects like feeding practices, hygiene habits, health service utilization, and psychosocial stimulation (Adha et al., 2021). Malnutrition stems from insufficient or unbalanced food consumption or diseases that affect appetite or nutrient absorption. Infectious diseases can lead to loss of fluids and electrolytes, decreasing appetite and contributing to malnutrition. Anggraini & Rusdy's (2019) research supports the lack of association between sanitation and stunting, emphasizing maternal caregiving as a strong influence on stunting. Inadequate maternal care, such as poor nutrition, failure to prevent infectious diseases in toddlers, and child malnutrition, can lead to stunting (Nurdin et al., 2019).

However, these findings contrast with Maliga et al. (2022), who analyzed the 2014 Indonesian Family Life Survey and found a significant link between environmental cleanliness and infection rates in stunted toddlers. Similarly, a study by Shofifah et al. (2022) in the service area of the Kerkap Community Health Center, North Bengkulu Regency, identified a significant relationship between the household environment and stunting incidence, presenting a divergent perspective on the issue.

## CONCLUSION

The findings of this study underscore a significant connection between the duration of breastfeeding and the incidence of infections in stunted toddlers, as reflected by an odds ratio (OR) of 8.526. This relationship highlights the critical need for extended breastfeeding, beyond six months, to bolster nutritional support and disease resistance in early childhood, emphasizing the pivotal role of breastfeeding in a child's early development and health. Building on this foundation, it's imperative that future research delves into the nuanced dynamics between breastfeeding practices and child health, paving the way for informed policy enhancements and community-level strategies aimed at reinforcing breastfeeding support systems. Such concerted efforts are crucial for crafting holistic health interventions and long-term studies that can further elucidate the lasting benefits of optimal breastfeeding practices, ultimately contributing to the global endeavor to mitigate childhood stunting and foster a healthier future for the next generation.

**Ethics approval:** No. 10/EC/KEPK-S2/01/2024

### Competing interests

There are no conflicts of interest in this study.

### Acknowledgement

We would like to express our deepest gratitude to Brawijaya University and the Health Resources Development Agency of the Ministry of Health of the Republic of Indonesia for their support and valuable contributions to this research. Support from Brawijaya University has provided us with the necessary resources to carry out this research smoothly, while the Ministry of Health not only provided access to vital data and information but also generously provided financial support, which was crucial to the success of our study. Without the help and support of these two esteemed institutions, our research would not have been possible. We hope that the results of this research can make a useful contribution to the advancement of science and public health in Indonesia.

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