



THE ASSOCIATION BETWEEN EXCLUSIVE BREASTFEEDING AND THE OCCURRENCE OF STUNTING AMONG CHILDREN AGED 12-60 MONTHS IN COMMUNITY HEALTH CENTERS IN YOGYAKARTA CITY

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ABSTRACT

Background: Stunting is a condition of chronic malnutrition caused by suboptimal nutritional intake due to prolonged inadequate food consumption. Stunting, also known as being short, indicates a growth failure that occurs both before and after birth. The categorization of stunting based on the World Health Organization's (WHO) standard growth reference is a deficit in length or height for age with a Z-score < -2. Symptoms of stunting usually appear after the golden period of growth (2 years old). One of the contributing factors to stunting in toddlers is an imbalanced food intake. Exclusive breastfeeding is a critical component of nutritional intake to support a child's good nutritional status. It may contribute to the prevalence of stunting. **Methods:** This was a quantitative study with a cross-sectional research design. The data collection consisted of secondary data from stunting medical record records. The inclusion criteria of the study were children aged 12-60 months with complete data of anthropometric. Exclusion criteria were endocrine disorder, skeletal abnormalities, dysmorphic disorder, chronic disease, history of familial short stature, and constitutional delay of growth and puberty. Analysis of the data using Chi-square. **Results:** There is a relationship between exclusive breastfeeding and the occurrence of stunting in children aged 12-60 months at the Community Health Centre in Yogyakarta City with a p-value of 0.00 ($p < 0.05$). **Conclusion:** There is a correlation between exclusive breastfeeding and the occurrence of stunting among children aged 12-60 months in Community Health Centre in Yogyakarta City.

Keywords: Stunting, Exclusive Breastfeeding, children, community health center

INTRODUCTION

Stunting is a chronic nutritional problem resulting from a prolonged lack of adequate nutrition intake, leading to disrupted growth or short stature in children.¹ The prevalence of stunting among toddlers (under-five children) in Yogyakarta City has decreased in 2022 compared to 2021. The percentage dropped from 12.88% to 10.8%, with the absolute number of stunted toddlers decreasing from 1,433 children to 1,225 children. In 2022, the prevalence of stunting in Yogyakarta City has reached the set target, which is below 12%. Exclusive breastfeeding refers to providing breast milk to infants from birth to six months old without being supplemented by other liquids or foods. The percentage of exclusive breastfeeding among six-month-old infants in Yogyakarta City in 2022 reached 69.8%, a decrease of 2% compared to 2021. Despite the decline, the percentage of exclusive breastfeeding in Yogyakarta City still exceeds the national target for 2022, which is 50%.²

Exclusive breastfeeding fulfills a child's nutritional needs in the first year of life and protects them from illnesses. Children also receive essential nutrients from breast milk that support growth and development.³ Breast milk contains a balanced composition of nutrients such as protein, carbohydrates, fats, vitamins, and minerals, which is beneficial due to its frequency, absorption, and digestion tailored to the child's needs. Children who receive exclusive breastfeeding exhibit good body resilience, high intelligence levels, optimal physical growth, and rapid neurological and motor development.³

Stunting is a multifactorial occurrence that leads to a child having short stature. Contributing factors to stunting include lack of exclusive breastfeeding, low birth weight, poor maternal nutritional status during pregnancy, early or delayed introduction of complementary feeding (MP-ASI), and low socioeconomic conditions of parents.⁴ Children who do not receive exclusive breastfeeding experience an energy source deficiency, resulting in the utilization



of energy reserves such as fats and proteins that should be used for growth and development. Additionally, their immune system and albumin production weaken, making them more susceptible to chronic infectious diseases that hinder growth and development, ultimately leading to stunting. Breast milk also contains calcium and vitamin D, which support bone growth in children. Without exclusive breastfeeding, children are more vulnerable to bone deformities that can cause stunting.⁴

Stunting is predominantly found in children who do not receive exclusive breastfeeding. Most stunted children are toddlers or under the age of 5, with symptoms appearing around 1 year old.⁷ The occurrence of stunting and the percentage of exclusive breastfeeding in Yogyakarta City has piqued researchers' interest in analyzing the relationship between exclusive breastfeeding and the incidence of stunting in children aged 12 to 60 months at the Yogyakarta City Community Health Centers (Puskesmas).

METHODS

The population for this study consists of all children aged 12-60 months with complete data of anthropometric within the coverage areas of Mantrijeron Community Health Center, Kotagede 1 Community Health Center, Kotagede 2 Community Health Center, Danurejan 1 Community Health Center, and Danurejan 2 Community Health Center in Yogyakarta City. The exclusion criteria of this study are endocrine disorder, skeletal abnormalities, dysmorphic disorder, chronic disease, history of familial short stature, and constitutional delay of growth and puberty. Univariate analysis was conducted to determine the distribution of general characteristics of the research subjects, the frequency distribution of Exclusive Breastfeeding, and the frequency distribution of stunting occurrences. Bivariate analysis was carried out to examine the relationship between Exclusive Breastfeeding and the incidence of stunting among children aged 12-60 months in Yogyakarta City Community Health Centers. This is a quantitative study with a cross-sectional research design. The data collection consists of secondary data from stunting medical record records. Analysis of the data using the Chi-square method with the Statistical Package for the Social Sciences (SPSS).

RESULTS

Based on the collected data from Mantrijeron Community Health Center, Danurejan 1 Community Health Center, Danurejan 2 Community Health Center, Kotagede 1 Community Health Center, and Kotagede 2 Community Health Center, a total of 113 children met the inclusion and exclusion criteria for the study.

Characteristics of Research Subjects

Based on Table 1, the frequency distribution of gender among 113 children aged 12-60 months at the Yogyakarta City Community Health Center revealed that there were 57 male children (50.4%) and 56 female children (49.6%). Out of the total 113 children aged 12-60 months at the Yogyakarta City Community Health Center, the age distribution was as follows: 35 children (31%) were aged 12-24 months, 63 children (55.8%) were aged 25-48 months, and 15 children (13.3%) were aged 49-60 months. From the results of the study conducted on 113 children aged 12-60 months at the Yogyakarta City Community Health Center, it was found that 57 (50.4%) children were exclusively breastfed, while 56 (49.6%) children were not exclusively breastfed. Based on the distribution table of these 113 children, it was determined that there were 65 children (57.5%) with stunting and 48 children (42.5%) without stunting in the Yogyakarta City Community Health Center.

Table 1. Characteristics of Research Subjects

| Characteristics | Frequency (n) | Percentage (%) |
|--------------------------------|---------------|----------------|
| Gender | | |
| Male | 57 | 50.4 |
| Female | 56 | 49.6 |
| Age | | |
| 12-24 Months | 35 | 31.0 |
| 25-48 Months | 63 | 55.8 |
| 49-60 Months | 15 | 13.3 |
| Exclusive Breastfeeding | | |
| Non- Exclusive Breastfeeding | 56 | 49.6 |
| Exclusive Breastfeeding | 57 | 50.4 |
| Nutritional Status | | |
| Non- Stunting | 48 | 42.5 |
| Stunting | 65 | 57.5 |
| Total | 113 | 100.0 |



Table 2. The Association Between Exclusive Breastfeeding and Stunting Incidence among Children Aged 12-60 Months in Yogyakarta City Community Health Centers

| Exclusive Breastfeeding | Nutritional Status | | | | Number | | Chi-square P | OR (CI 95%) |
|-----------------------------|--------------------|------|----------|------|--------|-------|-----------------|---------------------|
| | Non-stunting | | Stunting | | n | % | | |
| | n | % | n | % | | | | |
| Non-Exclusive Breastfeeding | 12 | 21.4 | 44 | 78.6 | 56 | 100.0 | 0.00 | 0,159 (0.069-0,367) |
| Exclusive Breastfeeding | 36 | 63.2 | 21 | 36.8 | 57 | 100.0 | | |
| Total | 48 | 42.5 | 65 | 57.5 | 113 | 100.0 | | |

Table 3. The Association Between Gender and Stunting Incidence among Children Aged 12-60 Months in Yogyakarta City Community Health

| Gender | Nutritional Status | | | | Number | | Chi-square P |
|--------|--------------------|-------|----------|-------|--------|-------|-----------------|
| | Non-stunting | | Stunting | | n | % | |
| | n | % | n | % | | | |
| Male | 24 | 42,10 | 33 | 57,90 | 57 | 100.0 | 0.936 |
| Female | 24 | 42,87 | 32 | 57,13 | 56 | 100.0 | |
| Total | 48 | 42.5 | 65 | 57.5 | 113 | 100.0 | |

Analysis Bivariate

Based on Table 2, the data analysis results of 113 children aged 12-60 months in Yogyakarta City Community Health Centers reveal the following categories for the non-stunted category, there are 12 children (21.4%) who are not stunted and not exclusively breastfed and 36 children (63.2%) who are not stunted and receive exclusive breastfeeding. In the stunted category, there are 44 children (78.6%) who are stunted and not exclusively breastfed and 21 children (36.8%) who are stunted and receive exclusive breastfeeding. The statistical test results yielded a chi-square value with a p-value of 0.00 ($<\alpha$ 0.05) and an odds ratio probability of 0.159. These results indicate the conclusion that there is a relationship between exclusive breastfeeding and the occurrence of stunting among children aged 12-60 months in Yogyakarta City Community Health Centers. Based on table 3, there is no association between gender and nutritional

status (stunting). The probable confounding factors of this studies were education of the parents especially mother, sosio-economic status of the patients, and nutritional status of mother.⁸

DISCUSSION

Our research yielded the results of an analysis of the general criteria of research subjects based on gender. Most of the subjects were boys, totaling 57 children (50.4%). Kotagede Community Health Centers 1 and 2 contributed 42 children out of a total of 73 children aged 12-60 months, who had met the inclusion and exclusion criteria. Among these, 22 were boys. Danurejan Community Health Centers 1 and 2 contributed 49 children out of a total of 79 children aged 12-60 months, who had met the inclusion and exclusion criteria. Among these, 24 were boys. Mantrijeron Community Health Centre contributed 22 children out of a total of 31 children aged 12-60 months, who had met the inclusion and



exclusion criteria. Among these, 11 were boys. This distribution contrasts with the gender distribution of the population in Yogyakarta City, where females constitute 51%, while males make up 49%².

Our research also produced results from an analysis of the general criteria of research subjects based on age. Most of the subjects were in the age range of 25-48 months, totaling 63 children (55.8%). Kotagede Community Health Centres 1 and 2 had a distribution of ages in the 25-48 months range, comprising 21 children. Danurejan Community Health Centres 1 and 2 had a distribution of ages in the 25-48 months range, comprising 29 children. Mantrijeron Community Health Centre had a distribution of ages in the 25-48 months range, comprising 11 children. Children aged 25-48 months at Community Health Centre Yogyakarta City undergo at least 8 weight measurements per year, at least 2 height measurements per year, a minimum of 2 developmental monitoring sessions per year, and receive vitamin A capsules twice a year. Consequently, children aged 25-48 months tend to have a more comprehensive history of growth measurements and monitoring for stunting screening.²

The bivariate analysis results revealed a correlation test with a p-value of 0.00 and an odds ratio of 0.159. Therefore, it can be concluded that there is a relationship between exclusive breastfeeding and the occurrence of stunting in children aged 12-60 months at the Yogyakarta City Community Health Center. The results of our study found that there were 44 (78.6%) children who did not receive exclusive breastfeeding and experienced stunting. The study conducted by Campos⁸ elucidated the relationship between exclusive breastfeeding and the occurrence of stunting, considering the nutritional content of breast milk that can protect against stunting in children. The study highlighted the important nutritional components in breast milk crucial for a child's growth and development, including breast milk protein which plays a significant role in the growth and development of bodily cells. These proteins subsequently influence the formation of muscle tissues and vital organs in children.⁸

Breast milk also contains approximately 3.8 grams/100 mL of fat, which serves as energy for metabolic activities and provides essential fatty

acids such as linoleic acid and alpha-linolenic acid. These fatty acids are necessary for cell membrane formation, hormone synthesis, and proper nervous system function⁹. Fat also plays a role in the absorption of fat-soluble vitamins such as vitamins A, D, E, and K, which are crucial for various physiological functions of the body, such as bone growth and immune system support. A deficiency in fat can hinder the absorption of these vitamins, consequently leading to stunting in children.⁷

Breast milk contains the main carbohydrate lactose, which serves as a primary source of energy alongside fat. Research conducted by Ottolini¹¹ states that no specific study establishes a significant link between carbohydrate deficiency and stunting. However, it is mentioned that carbohydrates in the form of glucose are utilized by the body as fuel to carry out various bodily functions, including tissue and organ growth. When a child lacks carbohydrates, the body will use stored energy, such as protein. The utilization of protein as an energy source can hinder the growth and development of tissues, organs, bones, and the nervous system. Furthermore, carbohydrates play a role in nutrient absorption, including complex B vitamins and iron, both of which require carbohydrates for absorption within the body. In conclusion, a deficiency in carbohydrates in children can disrupt the absorption of other nutrients and potentially lead to stunting.⁹

Breast milk contains vitamins and minerals that play a crucial role in preventing stunting in children. Deficiencies in certain vitamins and minerals can lead to growth and developmental disruptions, contributing to stunting.¹⁰ There's vitamin A for bone growth and immune system support, iron for hemoglobin production that carries oxygen to growing muscles and bones, and zinc for the growth and development of bone and muscle cells, calcium is also present in breast milk for bone mineralization and development, there's vitamin D that aids in calcium absorption, and there are B-complex vitamins such as B12 and folic acid for DNA synthesis and red blood cell formation.¹¹

Breast milk also contains immune factors that can protect children against stunting. Research by Goudet¹² mentions that breast milk contains immune substances such as immunoglobulin A (IgA), immunoglobulin G (IgG), and immunoglobulin M (IgM), which protect the baby's digestive tract from



infections. Infections in the digestive tract can disrupt nutrient absorption and lead to stunting. Breast milk also contains immune cells, including B cells for humoral immunity and T cells for cellular immunity. These cells function to produce antibodies like IgA, maintain a healthy gut microbiome, activate the immune system, and regulate immune responses. In conclusion, both breast milk's immune factors play a crucial role in protecting children from infections and diseases that can increase the risk of stunting. Deficiencies in growth factors present in breast milk, such as epidermal growth factor and insulin-like growth factor, also contribute to disruptions in the growth and development of body cells, ultimately affecting overall growth and potentially leading to stunting.¹²

The study conducted on children aged 12-60 months at the Yogyakarta City Community Health Center indicates that among children who were exclusively breastfed, 21 (36.8%) were still stunted, and among children who were not exclusively breastfed, 12 (21.4%) did not experience stunting. This demonstrates that stunting is influenced by various complex factors and is not solely dependent on exclusive breastfeeding. Several other factors that can contribute to stunting include suboptimal exclusive breastfeeding due to simultaneous formula feeding, history of low birth weight, chronic infections, maternal nutritional status during pregnancy, history of complementary feeding (MP-ASI), and parental height.⁴ Most non-stunted children who were not exclusively breastfed are attributed to factors such as varying genetic predispositions among individuals, rendering some children more resilient to stunting despite not being exclusively breastfed. Environmental factors also play a role, including access to proper sanitation, clean water, and nutritious food, which support healthy growth and development. Additionally, the appropriate introduction of complementary foods during the complementary feeding phase (MP-ASI) and support from the surrounding environment contribute to providing adequate care and attention to the child. This includes stimulation for cognitive and emotional development, ultimately reducing the risk of stunting.¹³

The findings of this study are consistent with the research conducted by Sampe¹⁷ which emphasizes the crucial role of breastfeeding in the growth and

development of toddlers. The study highlights that breast milk contains multifunctional nutrients that are highly beneficial for bone growth and child development, including calcium which is more efficiently absorbed compared to breast milk substitutes or formula milk. Breast milk also provides nutrients with a composition, quantity, digestibility, and absorptive capacity that are well-suited for infants, particularly lactose and oligosaccharides that enhance infant digestion by promoting the growth of beneficial bacteria in the intestines. In comparison, cow's milk has a higher total protein content, especially in terms of casein, but this type of protein can curdle in the stomach and takes longer for babies to digest. Conversely, breast milk doesn't pose this issue due to its low casein content, facilitating easier and more efficient digestion in infants.⁶

In a study with similar findings Nurfadillah¹⁸ this study indicated that the occurrence of stunting is higher in children who do not receive exclusive breastfeeding compared to those who receive exclusive breastfeeding. The research mentioned the functions of breastfeeding for children, which go beyond nutrition and have a protective effect against infections and diseases. Frequent infections in children can disrupt nutrient absorption and hinder growth. The study highlighted that breast milk contains antibodies such as IgA, lactoferrin, T cells, and B cells that can protect children from infections and expedite recovery if they experience illnesses.⁷

The research we conducted yielded results showing that out of the total 57 children who were exclusively breastfed, 36 (63.2%) did not experience stunting. This demonstrates that proper exclusive breastfeeding can contribute to reducing the prevalence of stunting. There is a correlation between appropriate exclusive breastfeeding and the occurrence of stunting in toddlers. Adequate breastfeeding by mothers helps maintain balanced nutrition for children, ensuring their growth proceeds normally.¹⁶ Exclusive breastfeeding for 6 months plays a crucial role in meeting the nutritional needs of infants during their growth period. Therefore, it is important for mothers to exclusively breastfeed their infants from birth to 6 months and continue breastfeeding until the child is 2 years old to ensure their nutritional needs are well met.¹⁷ Similar to the efforts and targets set by the



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Yogyakarta City Government to address stunting, it is expected that the community will cooperate to achieve the goal of "zero stunting" by the year 2024.²

Limitations of this study were no specific data about the occupation of the parent's patients so we could not predict the socio-economic status of patients, no data about the education of the parents of patients, and no data whether the parents even got the information about stunting or not.

CONCLUSION

Based on the research conducted at the Community Health Center (Puskesmas) in Yogyakarta City from December to March, it can be concluded that there is a relationship between exclusive breastfeeding and the occurrence of stunting among children aged 12-60 months in Yogyakarta City.

REFERENCES

1. Indrawati S. Hubungan Pemberian ASI Eksklusif dengan Kejadian Stunting pada Anak Usia Kejadian Stunting pada Anak Usia 2-3 Tahun di Desa Karangrejek. *Fak Ilmu Kesehat Di Univ _Aisyiyah Yogyakarta* [Internet]. 2016;6-7. Available from: <http://digilib.unisayogya.ac.id/2480/1/dira> Naskah Publikasi .pdf
2. Profil Kesehatan Yogyakarta. *Profil Kesehatan Kota Yogyakarta*. 2023;1-23.
3. Abeway S, Gebremichael B, Murugan R, Assefa M, Adinew YM. Stunting and Its Determinants among Children Aged 6-59 Months in Northern Ethiopia: A Cross-Sectional Study. 2018;
4. Eidelman AI, Schanler RJ. Breastfeeding and the use of human milk. *Pediatrics*. 2012;129(3).
5. Millward DJ. Nutrition, infection and stunting: The roles of deficiencies of individual nutrients and foods, and of inflammation, as determinants of reduced linear growth of children. *Nutr Res Rev*. 2017;30(1):50-72.
6. Beal T, Tumilowicz A, Sutrisna A, Izwardy D, Neufeld LM. A review of child stunting determinants in Indonesia. *Matern Child Nutr*. 2018 Oct;14(4).
7. De Onis M, Branca F. Childhood stunting: a global perspective. 2016;
8. Wulan M, Salma WO, Sudayasa IP. Risk Factors Of Stunting In Children Aged 12-59 Months In The Working Area Of The Langara Puskesmas District, Konawe Islands, 2022. *J Kedokt Diponegoro (Diponegoro Med Journal)*. 2023;12(6):356-61.
9. Campos AP, Vilar-Compte M, Hawkins SS. Association Between Breastfeeding and Child Overweight in Mexico. *Food Nutr Bull*. 2021;42(3):414-26.
10. Vonaesch P, Tondeur L, Breurec S, Bata P, Nguyen LBL, Frank T, et al. Factors associated with stunting in healthy children aged 5 years and less living in Bangui (RCA). *PLoS One*. 2017;12(8).
11. Boix-Amorós A, Collado MC, Van't Land B, Calvert A, Le Doare K, Garssen J, et al. Reviewing The Evidence On Breast Milk Composition and Immunological Outcomes. *Nutr Rev*. 2019;77(8):541-56.
12. Ottolini KM, Schulz EV, Limperopoulos C, Andescavage N. Using nature to nurture: Breast milk analysis and fortification to improve growth and neurodevelopmental outcomes in preterm infants. *Nutrients*. 2021;13(12).
13. Goudet SM, Bogin BA, Madise NJ, Griffiths PL. Nutritional interventions for preventing stunting in children (Birth to 59 months) living in urban slums in low-and middle-income countries (LMIC). *Cochrane Database Syst Rev*. 2019;2019(6).
14. Putri MG, Irawan R, Mukono IS. the Relationship of Vitamin a Supplementation, Giving Immunization, and History of Infection Disease With the Stunting of Children Aged 24-59 Months in Puskesmas Mulyorejo, Surabaya. *Media Gizi Kesmas*. 2021;10(1):72.
15. Prendergast AJ, Humphrey JH. The stunting syndrome in developing countries. *Paediatr Int Child Health*. 2014;34(4):250-65.
16. Manggala AK, Kenwa KWM, Kenwa MML, Sakti AAGDPJ, Sawitri AAS. Risk factors of stunting in children aged 24-59 months. *Paediatr Indones*. 2018;58(5):205-12.
17. Akombi BJ, Agho KE, Hall JJ, Merom D, Astell-Burt T, Renzaho AMN. Stunting and severe stunting among children under-5 years in Nigeria: A multilevel analysis. 2017;



JURNAL KEDOKTERAN DIPONEGORO
(DIPONEGORO MEDICAL JOURNAL)

Online : <http://ejournal3.undip.ac.id/index.php/medico>

E-ISSN : 2540-8844

DOI : [10.14710/dmj.v13i1.40723](https://doi.org/10.14710/dmj.v13i1.40723)

JKD (DMJ), Volume 13, Number 1, January 2024 : 37 – 43

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18. Sampe SA, Toban RC, Madi MA. Hubungan Pemberian ASI Eksklusif Dengan Kejadian Stunting Pada Balita Pendahuluan. 2020;11(1):448–55.
19. Nurfadillah. Hubungan Pemberian ASI Eksklusif dengan Kejadian Stunting pada Balita Usia 2-5 Tahun di Puskesmas Barombong. Skripsi [Internet]. 2018; Available from: <https://repository.unair.ac.id/103022/>
20. Dake SK, Solomon FB, Bobe TM, Tekle HA, Tufa EG. Predictors of stunting among children 6-59 months of age in Sodo Zuria District, South Ethiopia: A community based cross-sectional study. BMC Nutr. 2019;5(1):1–7.
21. Haskas Y. Gambaran Stunting di Indonesia. J Ilm Kesehat Doagnosis. 2020;15(2):154–7.