

# Correlation Between Exclusive Breastfeeding, Frequency and Quantity of Complementary Feeding With Stunting Among Toddler in Puru Village, Suruh District, Trenggalek Regency

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**Submission date:** 16-Sep-2025 12:13PM (UTC+0700)

**Submission ID:** 2211476724

**File name:** 202411110819272\_MJMH5\_0869\_compressed\_-\_cahaya\_adina.pdf (90.43K)

**Word count:** 4904

**Character count:** 25343

## ORIGINAL ARTICLE

# Correlation Between Exclusive Breastfeeding, Frequency and Quantity of Complementary Feeding With Stunting Among Toddler in Puru Village, Suruh District, Trenggalek Regency

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## ABSTRACT

**Introduction:** Stunting is still a health issue in Indonesia. The main factors causing stunting in Toddlers are exclusive breastfeeding and complementary feeding. Stunting is the highest nutritional issues in Trenggalek. Stunting prevalence in Puru Village of Trenggalek is 12.41%. The aim of this research is to study the correlation between exclusive breastfeeding, frequency, and quantity of complementary feeding with stunting among toddlers in Puru Village, Suruh District, Trenggalek. **Materials and methods:** This research uses observational analytics with a cross-sectional design. The total sample taken is 58 of 137 total population of toddlers by purposive sampling in February 2023. The inclusion criteria are toddlers aged 6 to 59 months. Toddlers who are sick or suffer from birth defects were excluded. **Results:** There was a relation between exclusive breastfeeding and stunting ( $p\text{-value}=0.019$ ). Toddlers who are not exclusively breastfeeding are 77 times higher risk of stunting than toddlers who are exclusively breastfeeding because Odds Ratio value is 77. It means exclusive breastfeeding reduces the risk of stunting. There was a relation between frequency of complementary feeding with stunting ( $p\text{ value}=0.000$ ). Frequency of complementary feeding is being protective factor of stunting which Odds Ratio value is 0.38. There was a relation between quantity of complementary feeding with stunting ( $p\text{ value}=0.000$ ). Toddlers do not get the right quantity of complementary feeding according to age have a 3 times greater risk of stunting (Odds Ratio value is 3). **Conclusion:** There was a relation between exclusive breastfeeding, frequency, and quantity of complementary feeding with stunting.

*Malaysian Journal of Medicine and Health Sciences* (2024) 20(SUPP9): 8-13. doi:10.47836/mjmhs20.s9.2

**Keywords:** Stunting, Exclusive breastfeeding, Complementary feeding, Frequency of complementary feeding, Quantity of complementary feeding

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## INTRODUCTION

Stunting is low height for age ( $<2SD$ ), characterized by delayed growth in children which fails to achieve normal and healthy height for their age (1). Globally, every year 3.1 million children under five die from improper nutrition practices. Of the total 83.6 million stunted children in Asia, 33.3% are from South Asia, while the region with the lowest stunting rate is East Asia, which is 5.3% (2). When they are toddlers, the family often doesn't realize it, then after 2 years it becomes visible and has an impact on cognitive abilities and long-term productivity, and can even result in death (3). Several causes of stunting are poverty, inappropriate parenting behavior, and often suffering from repeated infectious

diseases due to poor hygiene and sanitation (4).

Based on The United Nation Children's Fund (UNICEF), the prevalence of stunting in the under-five population globally reaches 22.3% (148.1 million) in 2022 (5). Based on these data, Africa and Southeast Asia were the countries that have the highest number of stunting cases (2). Based on a study in rural Hunan Province, China in 2022, the prevalence of stunting among the 5529 children under 6 years of age was 4.4% (6). The study in Nanta South Municipality, Ghana in 2019 shows that the prevalence of stunting among the 240 children 1 to 5 years of age was 12.5% (7).

Based on data of the Indonesian Nutrition Status Survey (SSGI), the prevalence of stunted toddlers in Indonesia is still a public health problem if the prevalence of stunting is 20% or more. Based on data from SSGI in 2021, the prevalence of stunting in Indonesia is 24.4% and East Java Province is in 21st place with a stunting prevalence

of 23.5%. The prevalence of stunting in Trenggalek Regency from 2018 to 2021 tends to decrease. In 2022, Trenggalek Regency determined 15 stunting locus villages with a target of 11.35% with a total of 3,506 stunted toddlers. The prevalence of stunting in Puru village is 12.41%, this prevalence has still not reached the target set for 2022. Based on data from SSGI in 2021, the highest nutritional problem in Trenggalek Regency is stunting compared to other nutritional problems such as wasted and underweight (8). So, since 2019, Trenggalek Regency has been included in the national stunting locus.

Stunting is caused by two factors, namely direct and indirect, one of the direct causes of stunting is not given exclusive breastfeeding. Exclusive breastfeeding provides various benefits for mothers and babies because breast milk is a natural food for babies, practical, economical, easy to digest, has an ideal composition of nutrients according to the needs and digestive abilities of babies, and breast milk supports the growth of babies, especially height since the calcium in breast milk more efficiently absorbed than its substitutes (9). Regulation of the Republic of Indonesia Number 33 of 2012 regarding Exclusive Breastfeeding is the provision of breast milk without adding or replacing it with other food or drinks given to babies from birth for six months (10).

At age 6 months, start giving complementary foods from 6 months and continue breastfeeding until the child is two years old (11,12). Introducing complementary foods early can influence the growth and development of children, which can affect their nutritional status, resulting in stunting, severe stunting, and underweight (13). Children who receive their first complementary food before six months of age are 6.83 times more likely to experience stunting compared to children who receive their first complementary food at the appropriate age (14). This is in line with Masuke et al, (2021) research that showing that children who received a low minimum eating frequency were 2.9 times more likely to be stunted (13). The children who did not receive the recommended daily meal frequency were 4.5 times more likely to be stunted. That is 2 times for 6-8 months and 3 times for 9-11 months, 3 times for children aged 12-23 months for children who are breastfed, and 4 times for children who are not breastfed (13). Based on the references, the objective of this research is to determine the relationship between exclusive breastfeeding, frequency, and quantity of complementary feeding with stunting.

## MATERIALS AND METHODS

### Samples

This study was designed as observational analytics with a cross-sectional study. The population in this study was

137 toddlers aged 6-59 months in the Puru Village, Suruh District, Trenggalek Regency. The number of samples in this study was 58 toddlers aged 6-59 months in Puru Village, Suruh District, Trenggalek Regency. Sampling in this study is by non-probability sampling using purposive sampling techniques, namely sampling based on certain considerations that have been determined by researchers based on predetermined characteristics or characteristics of the population (15). The participants of this study were stunted and non-stunted toddler who met the inclusion and exclusion criteria. The inclusion criteria was toddler aged from 6 until 59 months, the toddler's parents could answer the questions, and willingness to sign informed consent to participate in the study. The exclusion criteria was toddlers who are sick, the parents of toddlers who have communication problem such as deaf or speech impaired, it does not remember giving breastmilk, and it does not record in the Child and Mother Health's book.

The instruments used in this study were Exclusive Breastfeeding and Food Recall questionnaire sheets, Child and mother's book, and Microtoise. The Child and mother health's book is used to see the last measurement of the height of toddlers to find out the nutritional status of toddlers whether they suffer from stunting or not based on the height per age formula indicator and to find out whether toddlers are weighed regularly. Microtoise is used to measure height. The exclusive breastfeeding questionnaire contains questions related to exclusive breastfeeding. Food Recall questionnaire sheets is used to find out and collect the data of frequency and quantity of complementary feeding that consumed by toddlers every day.

### Statistical analysis

Statistical analysis of correlation between exclusive breastfeeding with stunting incidents used the Chi Square Test. Relation between the frequency of complementary feeding with stunting incidents used Mc Nemar Test. Relation between the quantity of complementary feeding with stunting incidents was analyzed using the Mc Nemar Test. The analysis of the data was done with IBM SPSS Statistic. A p-value <0.05 was considered statistically significant.

### Ethical Clearance

This study was approved by Research Ethics Committee, Faculty of Health Bhakti Widyata Health Science Institute No. 01/FKes/TK/2023. Permission from the local government and the local health authority were also obtained prior to conduct this study. In accordance with the basic principles of bioethical research, the survey team explained the details of the study, emphasized that participation was voluntary, collected data safely, and ensured confidentiality of the data. The written consent was obtained from study participants.

## RESULTS

### The Overview of the Research Location

This research was carried out in Puru Village, which is one of the villages located in Suruh District, Trenggalek Regency, East Java Province. Geographically, Suruh Village is located in the southwest of the country, located between 111° 24'-112° 11' E and 7° 53'-8° 34' E. Suruh District is at an altitude of 154 m above sea level. Suruh District has an area of 4,989 ha, consisting of 281 ha of paddy land, 4,590 ha of dry land, and 118 ha of other land. Most of the area of Suruh District is a hilly area and Puru Village is the highest plateau with an altitude of 656 m above sea level. Based on data from BPS in 2021, the number of residents in Puru Village is 846 men and 801 women. Puru Village is divided into five hamlets, namely, Ponggok Hamlet, Banaran Hamlet, Krajan Hamlet, Gebang Hamlet, and Jajar Hamlet.

### 16 Characteristics of Toddlers in Puru Village

Based on Table I, it is known that the most of the gender of toddlers are female, there are 32 toddlers with a percentage of 55.2% and 26 male toddlers with a percentage of 44.8%. Toddlers aged >24 months old are 31 toddlers with a percentage of 53.4%, this number was higher than that of toddlers aged < 24 months old, which are only 27 toddlers with a percentage of 46.6%.

Table I: Characteristics of Toddlers in Puru Village

| Characteristic                          | n  | %    |
|---|----|------|
| <b>Gender of Toddlers</b>               |    |      |
| Male                                    | 26 | 44.8 |
| Female                                  | 32 | 55.2 |
| Total                                   | 58 | 100  |
| <b>Age of Toddlers</b>                  |    |      |
| < 24 months                             | 27 | 46,6 |
| > 24 months                             | 31 | 53,4 |
| Total                                   | 58 | 100  |
| <b>Nutritional Status</b>               |    |      |
| Normal                                  | 28 | 48,3 |
| Stunting                                | 30 | 51,7 |
| Total                                   | 58 | 100  |
| <b>Exclusive Breastfeeding Practice</b> |    |      |
| Exclusive Breastfeeding                 | 27 | 46,6 |
| No Exclusive Breastfeeding              | 31 | 53,4 |
| Total                                   | 58 | 100  |
| <b>Frequency of Complementary Foods</b> |    |      |
| Age Appropriate                         | 51 | 87,9 |
| Not Age Appropriate                     | 7  | 12,1 |
| Total                                   | 58 | 100  |
| <b>Quantity of Complementary Foods</b>  |    |      |
| Age Appropriate                         | 51 | 87,9 |
| Not Age Appropriate                     | 7  | 12,1 |
| Total                                   | 58 | 100  |

Source: Primary Data, 2023

The nutritional status of toddlers is the majority in

stunting status, there are 30 toddlers with a percentage of 51.7%, while those in normal status are 28 toddlers with a percentage of 48.3%. Toddlers who received exclusive breastfeeding are 27 toddlers with a percentage of 46.6%, while those who did not are 31 toddlers with a percentage of 53.4%. Toddlers aged 6-59 months who received appropriate frequency of complementary foods for their age are 51 toddlers with a percentage of 87.9% while those who did not are 7 toddlers with a percentage of 12.1%. Toddlers aged 6-59 months who received the appropriate quantity of complementary foods for their age are 51 toddlers with a percentage of 87.9% while those who did not are 7 toddlers with a percentage of 12.1%.

### The relation between exclusive breastfeeding and stunting

Based on Table II, 9 toddlers received exclusive breastfeeding but in stunting status with a percentage of 15.5%. Toddlers who received exclusive breastfeeding and they did not have experience stunting are 18 toddlers with a percentage of 31%. Toddlers who are not exclusively breastfed and in stunting status are 21 toddlers with a percentage of 36.2%. Toddlers who are not exclusively breastfed but do not experience stunting are 10 toddlers with a percentage of 17.2%.

Table II: The Relation between Exclusive Breastfeeding and Stunting Incidents in Toddlers in Puru Village

| Exclusive Breast-feeding     | Stunting     |       |          |       | Total |       | P-Value |
|------------------------------|--------------|-------|----------|-------|-------|-------|---------|
|                              | Not Stunting |       | Stunting |       |       |       |         |
|                              | n            | %     | n        | %     | n     | %     |         |
| Exclusive Breast-feeding     | 18           | 31%   | 9        | 15,5% | 27    | 46,6% | 0,019   |
| Not-Exclusive Breast-feeding | 10           | 17,2% | 21       | 36,2% | 31    | 53,4% |         |
| Total                        | 28           | 48,3% | 30       | 51,7% | 58    | 100   |         |

16 Source: Primary Data, 2023

Based on the Chi-square test, the result of the p-value is 0.019. This means that there is a relation between exclusive breastfeeding with stunting status. The toddlers who don't receive exclusively breastfeeding are 77 times higher risk of stunting than the 21 toddlers who receive it (Odd Ratio is 77). This means exclusive 21 breastfeeding can reduce the risk of stunting. The exclusive breastfeeding can decrease the risk of stunting.

### The relation between frequency of complementary feeding with stunting

Based on Table III, that the 25 toddlers received the appropriate frequency of complementary food for their age in stunting status with a percentage of 43.1% and 26 toddlers who did not experience stunting with a percentage of 44.8%. Toddlers who didn't receive the appropriate frequency of complementary food for their age in stunting status are 5 toddlers with a percentage

of 8.6%, while 2 toddlers are normal with a percentage of 3.4%.

**Table III: The Relation between Frequency of Complementary Feeding with Stunting Incidents in Toddlers in Puru Village**

| Frequency of Complementary Feeding | Stunting |       |          |       |       |       | P-Value |
|------------------------------------|----------|-------|----------|-------|-------|-------|---------|
|                                    | Normal   |       | Stunting |       | Total |       |         |
|                                    | n        | %     | n        | %     | N     | %     |         |
| Appropriate                        | 26       | 44,8% | 25       | 43,1% | 51    | 87,9% | 0,000   |
| Not-appropriate                    | 2        | 3,4%  | 5        | 8,6%  | 7     | 12,1% |         |
| Total                              | 28       | 48,3% | 30       | 51,7% | 58    | 100   |         |

Source: Primary Data, 2023

Based on the McNemar test, the result of the p-value is 0.001. It means that there is a relation between the frequency of complementary food with stunting status. Toddlers who don't receive an appropriate frequency of complementary food are 0,38 times higher risk of stunting than the toddlers who receive it (Odd Ratio is 0,38). It means an appropriate frequency of complementary food can reduce the risk of stunting.

#### The relation between quantity of complementary feeding with stunting

Based on Table IV, 28 toddlers received an appropriate quantity of complementary food for their age in stunting status with a percentage of 48.3%, and 23 toddlers who did not experience stunting with a percentage of 39.7%. Toddlers who didn't receive the appropriate quantity of complementary food for their age in stunting status are 2 toddlers with a percentage of 3.4%, while 5 toddlers are normal with a percentage of 8.6%.

**Table IV: The Relation between Quantity of Complementary Feeding with Stunting Incidents in Toddlers in Puru Village**

| Portion of Complementary Feeding | Stunting |       |          |       |       |       | P-Value |
|----------------------------------|----------|-------|----------|-------|-------|-------|---------|
|                                  | Normal   |       | Stunting |       | Total |       |         |
|                                  | n        | %     | n        | %     | N     | %     |         |
| Appropriate                      | 23       | 39,7% | 28       | 48,3  | 51    | 87,9% | 0,000   |
| Not-appropriate                  | 5        | 8,6%  | 2        | 3,4%  | 7     | 12,1% |         |
| Total                            | 28       | 48,3% | 30       | 51,7% | 58    | 100   |         |

Source: Primary Data, 2023

Based on the McNemar test, the result of the p-value is 0.001. It means that there is a relation between the quantity of complementary food with stunting status. Toddlers who don't receive the appropriate quantity of complementary food are at a 3 times higher risk of stunting than the toddlers who receive it (Odd Ratio is 3). It means the appropriate quantity of complementary food can reduce the risk of stunting.

## DISCUSSION

### The relation between exclusive breastfeeding and stunting

Based on the results of this study, it was found that there was a significant relationship between exclusive breastfeeding and the incidence of stunting. This is in line with research before that children aged 10 to 24 months who are not exclusively breastfed have a risk of stunting 1,282 times compared to children who are exclusively breastfed, so that a history of exclusive breastfeeding is a factor associated with stunting events (9,10).

In agreement with previous study, breastfed has protective effect on stunting when compared to those who were never breastfed (16). Coinciding with previous study in Bangladesh, the result have shown significantly lower stunting prevalence among exclusive breastfeeding children (17). Exclusive breastfeeding in children under two years old from poorer and wealthier households were less likely to be stunted than non-exclusively-breastfed children under two years old (18). The breastmilk's immune-protective factors help strengthen the child's immature immune system, reducing infectious disease, which have been identified as leading risk factors for stunting (20).

The results of this research are also by the results of Puspitasari's research which states that there is a relationship between exclusive breastfeeding and the incidence of stunting in Candipuro Village. Another research conducted by Lidia (2018) found a significant relationship between exclusive breastfeeding and the incidence of stunting in toddlers at the Limapuluh Community Health Center (9).

### The relation between frequency of complementary feeding with stunting

Based on the results of this study, there is significant relationship between the frequency of complementary feeding administration and the incidence of stunting in toddlers 6-59 months in Puru village. This is in line with research before that there was a significant relationship between frequency of complementary feeding with stunting and there is a 2 times greater risk of experiencing stunting in children who are given complementary feeding with the wrong frequency (11,12). The frequency of complementary feeding is given according to the stages of development and growth of infants aged 6 till 24 months. The frequency of complementary feeding in children aged 6 till 24 months should be as frequency as possible so that nutritional needs can be met. Similarly, in agreement with previous studies in Tanzania and Gambia, appropriate complementary feeding practices such as low minimum meal frequency, had higher risks

of stunting, wasting, and underweight (13,14,21). The minimum meal frequency and minimum adequate diet were linked to stunting (22).

The results of this research are also in line with the results of Ismarina's research, there was a significant relationship between the timing of complementary feeding, type of complementary feeding, the texture of complementary feeding, frequency of complementary feeding, a portion of complementary feeding with the incidence of stunting in under-five children ( $p=0.000$ ) (23). The children who receive complementary feeding with a frequency below the minimum limit tend to be at greater risk of stunting than the children who receive complementary feeding with the appropriate frequency (11). The frequency of giving complementary feeding is given according to the development and growth stages of babies aged 6 till 24 months. The frequency with which children eat complementary feeding should be as frequent as possible because the children can consume food little by little while their calorie and other nutritional needs must be met. Without a variety of feeding frequencies and breast milk ingredients, babies and children are at risk of experiencing nutritional deficiencies, which can lead to be stunting.

#### The relation between portion of breastfeeding complementary food with stunting

In this study, there is significant relationship between the quantity of complementary feeding per meal with the incidence of stunting in toddlers 6 till 59 months. This is in line with the research before that the quantity of complementary feeding that is not in accordance with the standard is at 3.6 times greater risk of having stunted children compared to the appropriate amount of complementary feeding (12). According to World Health Organization, the amount of food per day depends on the energy needs of each age, the child's stomach capacity, and the energy density of the food. Toddlers need nutritional intake that organization in accordance with their age because the older they get, the more intake and nutrients needed (11). If toddlers lack in quantity of complementary feeding can cause a lack of energy intake which impact on increasing obstacles (24,25). Similarly, in agreement with previous studies in Tanzania and Cambodia, the quantity of food given and meal frequency needs to be increased, because the children with low dietary diversity were more likely to be stunted (13,21). The quality and quantity of complementary feeding are important to sustain linear growth in Cambodian children (22).

The results of this research are also in line with the results of Ismarina's research, namely there was a significant relationship between the timing of complementary feeding, type of complementary feeding, the texture of complementary feeding, frequency of complementary feeding, portion of complementary feeding with the incidence of stunting in under-five children ( $p=0.000$ ) (23). According to World Health Organization, the

amount of food per day depends on the energy needs of each age, the capacity of the child's stomach, and the energy density of the food. Toddlers need nutritional intake that is appropriate to their age because the older they get, the more food and nutrition they need (24). If the toddlers are deficient in providing portions of food, this can result in a lack of energy intake, which will cause the body to conserve energy, thereby impacting barriers to weight gain and linear growth (25).

#### CONCLUSION

Our study demonstrate that exclusive breastfeeding, frequency and quantity of complementary feeding were significantly associated with stunting. The toddlers who are not exclusively breastfeeding and they do not get the right quantity of complementary feeding have higher risk of stunting. The frequency of complementary feeding is being protective factor of stunting. However, the limitations of this study might have had the sample size too small and an recall bias and social desirability bias. Since it was a cross-sectional study, causal inferences between variables cannot be investigated. Further and long-term studies with a higher number of participants are necessary to investigate the impact of exclusive breastfeeding and complementary food with stunting.

#### ACKNOWLEDGEMENT

The local government and health authorities of Puru Village, Suruh District, Trenggalek Regency, for their cooperation and assistance in gathering data for this research.

All the mothers and families who participated in this study, for their willingness to provide valuable information and support, making this research possible.

To everyone who has contributed to the completion of this research in any way, your efforts and kindness are deeply appreciated. May this work contribute to the better understanding and prevention of stunting among toddlers in the region.

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