

# Relationship between Early Initiation Breastfeeding, Exclusive Breastfeeding, Complementary Feeding, and Nutritional Education with Nutritional Status of Children under Three years

Relación entre el inicio precoz de la lactancia materna, la lactancia materna exclusiva, la alimentación complementaria y la educación nutricional con el estado nutricional de los niños menores de tres años

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## SUMMARY

**Introduction:** Nutritional status according to the height-to-age index was influenced by many factors, such as maternal or child factors. Now, the government's nutrition program focuses on the problem of malnutrition in toddlers, especially stunting. The study aimed to determine the relationship between a history of early initiation breastfeeding, exclusive

breastfeeding, complementary feeding, and nutrition education with the nutritional status of toddlers according to height-to-age index.

**Methods:** The study had a cross-sectional design, and 356 samples were selected systematically and randomly from children under three years old. Data on the history of early initiation breastfeeding, exclusive breastfeeding, complementary feeding, and nutrition education were collected by interviewing toddlers' mothers using a questionnaire, and anthropometric measurements collected data on toddlers' nutritional status. The Chi-Square test was conducted to evaluate the relationships among variables, with a significance value  $<0.05$ .

**Results:** There was a significant relationship between the history of exclusive breastfeeding and the nutritional status of toddlers according to the height-to-age index ( $p = 0.032$ ). There was no significant relationship between early initiation breastfeeding, the time of giving the first complementary feeding, the origin and type of complementary feeding, and nutrition education about breast milk and complementary feeding with the nutritional status of toddlers ( $p > 0.05$ ).

**Conclusion:** Nutrition education initiatives should be strengthened to improve moms' knowledge and activate community health cadres in accompanying toddler families related to child nutrition and health problems. Healthy nursing practices and clear guidance on exclusive breastfeeding can enhance child nutrition.

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## RESUMEN

**Introducción:** *El estado nutricional según el índice de talla para la edad estuvo influenciado por muchos factores, como factores maternos o infantiles. Ahora, el programa de nutrición del gobierno se enfoca en el problema de la desnutrición en los niños pequeños, especialmente en el retraso del crecimiento. El objetivo del estudio fue determinar la relación entre el antecedente de inicio temprano de la lactancia materna, lactancia materna exclusiva, alimentación complementaria y educación nutricional con el estado nutricional de los lactantes según índice talla-edad.*

**Métodos:** *El estudio tuvo un diseño transversal y se seleccionaron 356 muestras sistemáticamente al azar de niños menores de tres años. Los datos sobre la historia del inicio temprano de la lactancia materna, la lactancia materna exclusiva, la alimentación complementaria y la educación nutricional se recopilaron mediante entrevistas a las madres de los niños pequeños mediante un cuestionario. Los datos sobre el estado nutricional de los niños pequeños se recopilaron mediante mediciones antropométricas. Se realizó la prueba de Chi-Cuadrado para evaluar la relación entre variables, con valor de significación  $<0.05$ .*

**Resultados:** *Hubo una relación significativa entre el antecedente de lactancia materna exclusiva y el estado nutricional de los lactantes según el índice talla-edad ( $p = 0.032$ ). No hubo relación significativa entre el inicio temprano de lactancia materna, el momento de dar la primera alimentación complementaria, el origen y tipo de alimentación complementaria, así como la educación nutricional sobre leche materna y alimentación complementaria con el estado nutricional de los lactantes ( $p > 0.05$ ).*

**Conclusión:** *Las iniciativas de educación nutricional deben fortalecerse para mejorar el conocimiento de las madres, activar cuadros de salud comunitarios en el acompañamiento de las familias de niños pequeños relacionados con la nutrición infantil y los problemas de salud. Las prácticas saludables de enfermería y una orientación clara sobre la lactancia materna exclusiva pueden mejorar la nutrición infantil.*

**Palabras clave:** *Salud infantil, estado nutricional, atención a la salud, desnutrición, lactancia materna.*

## INTRODUCTION

Stunting is a chronic malnutrition disorder in which children are shorter in stature than others

their age (1-2). It can cause developmental abnormalities and have long-term consequences in adulthood (3-4). Early childhood stunting has been demonstrated in studies to impact cognitive development and cause developmental delays negatively. It also impacts motor abilities and social connections (5,6). Stunting is caused by various factors, including family circumstances, poor nutrition, breastfeeding patterns, and infectious diseases (7). In Indonesia, maternal height, preterm birth, and low family income contribute to toddler stunting. Stunting must be addressed to promote healthy growth and development in children (8-10).

Stunting affects an estimated 162 million children under five worldwide, posing a substantial public health concern (11). In Indonesia, the prevalence of stunting among children under five is 29.9 %, indicating a severe problem (12). Within Central Java, regions such as Banyumas have recorded a prevalence of 13.87 % for children with short nutritional status and 15.53 % for children with deficient nutritional status (13). This suggests that many youngsters are not reaching optimal growth and development. According to the 2021 Indonesian Nutrition Status Study (SSGI), the nationwide prevalence of stunting in children under five is 24.4 %, with Central Java Province accounting for 20.9 % and Banyumas Regency accounting for 21.6 % (14). These figures underscore the ongoing problem of stunting, which has surpassed the World Health Organization's (WHO) 20 % threshold. As a result, the Ministry of Health has prioritized stunting, with strategic plans to lower stunting cases to 14.0 % and wasting cases to 7.0 % by 2024. These aims highlight the necessity of addressing Indonesia's high prevalence of stunting, which now ranks second among the Association of Southeast Asian Nations (ASEAN) countries in stunting cases (15).

Breastfeeding characteristics contributing to stunting include delayed initiation and non-exclusive breastfeeding before six months. Inadequate complementary feeding practices originate from low food quality, incorrect feeding procedures, and insufficient food and water hygiene. Central Java Province has an early initiation breastfeeding rate of 85.0 %, with Banyumas Regency at 65.6 %. Research in Banten found a link between early initiation

breastfeeding and stunting in children aged 0-24 months, with those who did not receive early initiation breastfeeding having an 11-fold higher risk of stunting (16). The prevalence of exclusive breastfeeding in Central Java infants aged 0-6 months is expected to be 72.5 %, reaching 65.2 % in the Banyumas District (17). Toddlers with a history of non-exclusive nursing are 8.2 times more likely to be stunted (18). Supplemental feeding practices also influence stunting instances, as improper timing, texture, and nutrient content of complementary foods harm children's nutritional status and development (19). Nutrition education for mothers or caregivers, focusing on food diversity, complementary feeding, and food and beverage hygiene, has been shown to drastically reduce the rate of malnutrition in preschool children (20).

Even though early feeding practices significantly impact toddler nutritional status, there has been a lack of comprehensive studies examining the relationship between a history of early initiation breastfeeding, exclusive breastfeeding, complementary feeding, and nutritional education with toddler nutritional status. Existing research has generally focused on individual elements or specific feeding techniques rather than the combined influence of these factors on the nutritional condition of toddlers. This study aimed to determine the relationship between a history of early initiation breastfeeding, exclusive breastfeeding, and complementary feeding, as well as nutritional education about breastfeeding and complementary feeding, with the nutritional status of toddlers.

## METHODS

This quantitative study used a descriptive observational design with a cross-sectional approach. The research was conducted in the Sumbang District area, Indonesia, on April 23-28, 2018. The sample for this study was children under three years old (toddlers) in the Sumbang District area, as many as 356 people. The sample was obtained using a systematic random sampling method.

The independent variables in this study were the history of early initiation breastfeeding, exclusive breastfeeding, complementary

feeding, and nutrition education. Early initiation breastfeeding is a method of initiation of breastfeeding within 1 hour after the baby is born. Exclusive breastfeeding is breastfeeding without consuming food or other drinks, except medicine, for six months from the baby's birth. Complementary feeding is given during the transition period between exclusive breastfeeding and family food, which is given when breast milk is no longer able to meet the energy and nutritional needs of the baby. The nutrition education referred to in this study was education regarding breastfeeding and complementary feeding. The dependent variable in this study was the nutritional status of toddlers, which was assessed using the height-for-age index.

Data were collected through interviews with respondents, namely the mothers of the sample, using a questionnaire. Early initiation breastfeeding data were grouped into groups. Yes, for those who received, and No, for those who did not. The data on exclusive breastfeeding was categorized into two groups: the exclusive breastfeeding group and the non-exclusive breastfeeding group. The complementary feeding data included when the child started consuming solid foods, categorized as before six months or at six months or older. It also included whether the complementary feeding was purchased or homemade and whether it was instant (commercial) or local (using local food ingredients). Toddlers' nutritional status data was obtained by measuring their height and comparing it to their age in months. It was categorized as usual (Z-score  $> -2$  S.D.), short (Z-score between  $-2$  SD and  $-3$  S.D.), and very short (Z-score  $< -3$  S.D.).

The research data were analyzed statistically using univariate and bivariate analysis. The univariate analysis produces the percentage of each group on each variable. Bivariate analysis was carried out using the Chi-Square test, which aimed to assess whether there was a significant relationship between the independent and dependent variables, with a p-value  $< 0.05$ .

## RESULTS

The characteristics of the respondents in the study are presented in Table 1. Regarding

the father's age, it was found that the majority (80.9 %) fell within the range of 20 to 40 years, with the highest proportion (52.8 %) having completed only elementary school. On the mothers' age, it was observed that the majority (76.7 %) were between 20 and 35 years old, with the highest percentage (53.4 %) of mothers who had completed only elementary school. Of the total sample, 236 toddlers (66.4 %) had a normal height-for-age, indicating they were within the expected range for their age.

The average born length and current age of toddlers are shown in Table 2. The average born length of toddlers in the Sumbang area reached 48.32 cm. It is still within the normal range of born length which is 49 – 50 cm. The average current age of toddlers in the Sumbang Area during the measurement was 14.98 months or almost 1 year and 3 months old.

The results of the analysis of the relationship between the independent and dependent variables in this study are shown in Table 3. The analysis using the Chi-Square test shows a significant relationship between exclusive breastfeeding and the nutritional status of toddlers ( $p=0.032$ ).

Table 1. Demographic Characteristics of Study Participants

Characteristics	n	%
Father's age		
20-40 years	288	80.9
<20 or >40 years	68	19.1
Father's education level		
Elementary school	188	52.8
Junior high school	105	29.5
Senior high school	48	13.5
University	14	3.9
No education	1	0.3
Mother's age		
20-35 years	273	76.7
<20 or >35 years	83	23.3
Mother's education level		
Elementary school	190	53.4
Junior high school	107	30.1
Senior high school	44	12.4
University	12	3.4
No education	3	0.8
Nutritional status of toddlers		
Normal	236	66.4
Short	89	25.0
Very short	31	8.7

Table 2. Average Born Length and Age of Toddlers in the Sumbang Area

Length & Age	Mean ± Standard Deviation
Born length (cm)	48.32 ± 2.70
Toddler's age (months)	14.98 ± 5.96

## DISCUSSION

In this study, exclusive breastfeeding up to 6 months of age was shown to have a significant relationship with the nutritional status of toddlers according to height to age index. Several studies have indicated a relationship between exclusive breastfeeding and the occurrence of stunting in toddlers (21,22). A similar result with a study in Makassar, Indonesia, showed a significant relationship between six-month exclusive breastfeeding and stunting in toddlers aged 6-24 months (23). However, the results differed in the West Java, Indonesia research that no significant relationship existed between exclusive breastfeeding for six months and cases of stunting (24). This difference could be due to differences in the exclusion criteria used in determining the sample: babies who consumed the first complementary feeding before reaching 6 months of age, babies with serious illnesses, and babies with a history of premature birth. Although several studies have shown that infant formula consumption can increase weight and height faster when compared to consumption of breast milk, this weight gain can cause excess weight in infants, which can be a driving factor for obesity and obesity-related degenerative diseases such as hypertension, diabetes mellitus, to cardiovascular disease in adulthood (25,26).

Exclusive breastfeeding for the first six months of age is the most effective way to reduce the incidence of morbidity and mortality in children and the incidence of asthma, cancer, obesity, diabetes mellitus, and cardiovascular disease (27). Consumption of exclusive breastfeeding also increases cognitive abilities and the chances of living a healthy life as an adult compared to babies who do not consume exclusive breastfeeding (28). Giving formula to infants

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Table 3. Bivariate Analysis on Independent Variables with Nutritional Status of Toddlers

Variable	N	%	p-value
Early initiation breastfeeding			
Yes	189	53.1	0.375
No	167	46.9	
Exclusive breastfeeding			
Yes	245	68.8	0.032*
No	111	31.2	
First complementary food consumption			
≥ 6 months	323	90.7	0.801
< 6 months	33	9.3	
Complementary food type			
Purchased	180	50.6	0.745
Homemade	176	49.4	
Type of complementary feeding			
Instant (commercial products)	140	39.3	0.645
Local food	216	60.7	
Nutrition education on breastfeeding			
Yes	218	61.2	0.926
No	138	38.8	
Nutrition education on complementary feeding			
Yes	192	57.6	0.399
No	164	42.4	

under six months, especially in families with lower middle income, tends to be discouraged, considering the risk of water contamination used for brewing formulas and inadequate sanitary conditions (26,29).

The results of our study showed that the early initiation breastfeeding variable did not have a significant relationship with the nutritional status of toddlers from height to age index. Similar results were shown in Fitriyani and Sunarto's study of children aged 6-23 months in Central Java Province, namely that there was no significant relationship between early initiation of breastfeeding and the incidence of stunting in under-five (30). However, different results were shown in the study results of Sunartiningsih et al., in children aged 12 - 24 months at the Gunungsari Health Center, Bojonegoro, namely, there is a significant relationship between early initiation of breastfeeding and cases of stunting in children aged 12 - 24 months (31). This difference could be due to differences in the sample collection method used by simple random sampling in Bojonegoro and systematic random sampling for research in Sumbang District. In addition, there

are different data sources, namely secondary data for research in Bojonegoro and primary data for research on toddlers in Sumbang District.

According to our study findings, no significant association exists between the origin and kind of complementary feeding eaten and toddler nutritional status. Other research has found similar results, indicating that the time of introducing complementary feeding and the origin/type of complementary feeding may not significantly impact toddlers' nutritional status (23,32-35). However, numerous research has yielded different results, and this study's small sample size and uneven data distribution may have influenced the results. The availability of caretakers, mothers' work commitments, and the hygienic preparation of supplemental foods all play critical roles in assuring toddler nutrition (36). Further research is needed to explore the relationship between the type and origin of complementary feeding and nutritional status more comprehensively.

The present study found no link between the history of nutrition education on breastfeeding and complementary feeding and the nutritional status of children in the Sumbang District.

Nutrition education, on the other hand, is critical for boosting mothers' knowledge and awareness of feeding methods (36-37). Inconsistent results could be attributed to a lack of data on nutrition education quality and delivery. Overall, treating malnutrition necessitates a multifaceted strategy, including nutrition education (39), given that the incidence of stunting among toddlers in the Sumbang District is 26.5 %, which is comparable to the prevalence in Situbondo Regency (26 %) (40). Further initiatives may be required to address the high prevalence of stunting among toddlers in the Sumbang District and adjacent places.

### CONCLUSION

This study concluded that exclusive breastfeeding significantly affects children's nutritional status. In contrast, other variables such as early initiation of breastfeeding, the type and origin of complementary foods consumed, and nutrition education about breastfeeding and complementary feeding have no significant impact on toddlers' nutritional status. However, more research is needed to investigate additional factors that may alter the nutritional health of children under five. Nutrition education programs are suggested to improve quality and effectiveness to boost mothers' knowledge and habits. Healthcare practitioners should promote healthy nursing practices and provide clear guidance for exclusive breastfeeding to improve toddlers' nutritional status.

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