# A Cross Sectional Study of Factors Influencing Stunting in Infants Under Five Years Old in Klaten,Central Java, Indonesia

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**KEYWORDS**

Factors, Influencing, Stunting, Infants,

**ABSTRACT**

**Aims** : This study aims to determine the association of nutritional status, parenting patterns, exclusive breastfeeding, history of complementary feeding, birth spacing with the incidence of stunting in Klaten, Central Java.
**Methods** : This study used quantitative methods with a cross-sectional approach. The population in this study consisted of 75 children aged 24 to 60 months in Klaten, Central Java who were selected using the total sampling method so that a sample size of 75 children was obtained. This study used instruments of demographic data questionnaire, parenting pattern questionnaire, and complementary feeding history questionnaire which were measured by Kendall Test B and C.
**Findings** : The study showed that there was a relationship between nutritional status with parenting, exclusive breastfeeding, history of complementary feeding with the incidence of stunting in Klaten, Central Java, with a p value of 0.000 ($\alpha = 0.05$). The results also showed that there was no relationship between birth distance and the incidence of stunting in Klaten, Central Java, with a p value of 0.301 ($\alpha=0.05$).
**Conclusion** : There was no relationship between birth distance and the incidence of stunting in Klaten

## Introduction:

The stunting rate in the world is still high, in 2022 the prevalence of stunting in the world reached 22.3%[1]. Data of prevalence of stunting in toddlers showed a rate of 30.8% in Indonesia, in Central Java based on (EPPGBM) Electronic Calculation of Community-Based Nutrition Recording and Reporting in 2022 the stunting rate in Central Java was at 11.9%, and the prevalence of stunting rates in toddlers in Klaten District reached 18.2% [2].

A variety of direct and indirect factors can influence stunting in children. Direct factors that contribute to stunting include the sex of the child, low birth weight, and nutritional intake due to lack of energy and protein intake. Health conditions related to infectious diseases, respiratory infections and diarrhoea also impact stunting. There are also indirect influences on stunting such as ineffective parenting, exclusive breastfeeding, incomplete vaccination status, and family characteristics including parental education, family economic status, and parental employment [3].

Stunting greatly affects children's growth and development. When children are stunted or malnourished, their growth and development, including weight and height growth, cognitive development, including gross motor and fine motor can affect their social-emotional skills and development. If this situation occurs during the golden years, the child's growth and development will be less than optimal, which will have an impact until adulthood [4].
Stunting in toddlers can inhibit overall physical and cognitive growth, so it is important to prioritize the prevention of stunting. Stunting is strongly associated with high mortality and morbidity, as well as impaired motor and intellectual development. Height gain also carries the risk of reduced mental capacity, reduced productivity, and increased susceptibility to degenerative diseases. Stunted children are more at risk of infection and can negatively impact their educational experience, impairing their ability to learn effectively and making them more likely to be absent. Ultimately, this can lead to long-term economic setbacks for Indonesia[5].
Efforts to combat stunting are largely in line with those of the government. There are two interventions that can be implemented as stated in Executive Order Number 72 of 2021 concerning Accelerating Stunting Reduction. The first effort is specific interventions in the form of stakeholder and community activities to solve the problems that directly cause stunting. Specific interventions that directly target nutritional problems include nutritional improvement, provision of special breast milk and growth formula, health improvement and maintenance, as well as treatment and prevention of low birth weight babies, and provision of protein. On the other hand, sensitive interventions that are applied indirectly can be applied to areas other than nutrition and health, such as improving knowledge and behaviour, increasing environmental capacity, and improving economic and community welfare[6].
According to a preliminary study conducted on 6 December 2023, data obtained that the highest health problem in toddlers in Klaten, Central Java is stunting. Based on data from community empowerment cadres in Klaten, Central Java in 2023, the stunting rate in Kadibolo Village was high in Wedi Subdistrict, ranked 11th in Wedi Subdistrict. Klaten, Central Java there are 153 toddlers in which there are 15 (9.8%) stunting toddlers and malnutrition status as many as 8 (5.22%) toddlers.
Interviews that have been conducted with parents of 10 toddlers resulted in 4 toddlers being cared for by their grandmothers, 2 toddlers not receiving exclusive breastfeeding, 2 toddlers who eat irregularly every day. The results of interviews conducted with village midwives and KPM (Community Empowerment Cadre) cadres in Klaten, Central Java also stated that it was difficult to implement programmes for handling stunting in toddlers in Klaten, Central Java because parents were less cooperative.

**Material and Methods:**
The method used in this study was a quantitative method with a cross-sectional approach. The population of this study were children aged 24 to 60 months from Klaten, Central Java, totalling 75 respondents. Sampling in this study using total sampling method. The sampling criteria set for this study were infants aged 24 to 60 months and parents of toddlers who were willing to become respondents. The exclusion criteria were children aged <24 months, when the respondent's research was not in place and the respondent did not want to be a respondent.
The measuring instruments of this study include microtois, scales, measurement SOP, respondent characteristic sheet, parenting questionnaire and complementary feeding history. Respondent characteristics included birth spacing, gender of toddlers, age of toddlers, number of children, mother's age, mother's occupation, and parents' income.
This parenting questionnaire was adopted from research with the validity test on this parenting questionnaire conducted by ITEKES Bali using face validity. The survey consisted of 23 questions. Questions regarding democratic parenting consisted of 9 statements, authoritarian

parenting 8 questions, and permissive (mixed) parenting consisted of 6 questions[7]. The survey used a Likert scale with 1 to 4 points. The total score uses a nominal scale that refers to poor parenting if the score is <55, moderate parenting 56-75, good parenting 76-100.
The questionnaire on this variable was adopted from research before and obtained valid results with a table r value of 0.2353 and a calculated r value in the range of 0.287-0.726[8]. The reliability test of this questionnaire was declared reliable with a Cronbach's alpha value of 0.720. The types of complementary feeding behaviour history questionnaire are: age group of first complementary feeding, type of main component of complementary feeding, frequency of complementary feeding per day, and ratio and structure of complementary feeding. This questionnaire will then be used to determine the behaviour of mothers when feeding complementary foods to their infants. It is categorized as appropriate behaviour if the actions, activities, or patterns of behaviour are in accordance with the values and rules in the provision of complementary foods to infants. Inappropriate behaviour if the actions, activities, or patterns of behaviour are not in accordance with the values and rules in the provision of complementary foods to infants, such as the first time an infant is given complementary foods before 6 months of age. It is categorized as inappropriate behaviour if the toddler has been given age-appropriate complementary foods but the frequency, portion or texture of complementary foods are not in accordance with the rules for infant age. This survey used a Likert scale, with scores of 1-3. The scale used to determine the total score value is a nominal scale, which is said to be appropriate behaviour if the total score is 28-36, inappropriate behaviour 20-27, and appropriate behaviour with a total score of 12-19.
Data collection was conducted after parents of toddlers agreed to become respondents. Researchers then took anthropometric measurements of toddlers and gave questionnaires on respondent characteristics, parenting patterns, and history of complementary feeding. The data analysis technique used the Kendals tau B and C test.

**Results:**

The results of this study describe the characteristics of respondents and the results of statistical tests of the relationship between stunting risk and the incidence of stunting in Kadibolo Village, Wedi District, Klaten Regency. The characteristics of respondents include birth spacing, gender of toddlers, age of toddlers, mother's age, mother's occupation, number of children, and parents' income.
Table 1 Frequency Distribution of Respondent Characteristics Based on Stunting, Nutritional Status, Gender, Birth Spacing, Exclusive Breastfeeding of Toddlers, Parenting Patterns, History of MP-ASI, Maternal Occupation, Parental Income (n=67).

| Variable | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Stunting | Very Short | 0 | 0 |
| | Short | 22 | 32,8 |
| | Normal | 45 | 67,2 |
| | Tall | 0 | 0 |
| | Total | 67 | 100 |
| Nutritional Status | Very Poor | 0 | 0 |
| | Poor | 19 | 28,4 |
| | Normal | 47 | 70,1 |
| | Over Weight | 1 | 1,5 |
| | Total | 67 | 100 |
| Sex | Male | 38 | 56,7 |
| | Female | 29 | 43,3 |
| | Total | 67 | 100 |

| | | | |
|---|---|---|---|
| Exclusive breastfeeding | No | 20 | 29,9 |
| | Yes | 47 | 70,1 |
| | Total | 67 | 100 |
| Parenting | Poor | 5 | 7,5 |
| | Fair | 22 | 32,8 |
| | Good | 40 | 59,7 |
| | Total | 67 | 100 |
| Complementary feeding history | Inappropriate | 3 | 4,5 |
| | Less Appropriate | 18 | 26,9 |
| | Appropriate | 46 | 68,7 |
| | Total | 67 | 100 |
| Mother's occupation | House Wife | 44 | 65,7 |
| | Private employee | 4 | 6 |
| | Self-employed | 6 | 9 |
| | CIVIL SERVANTS/ARMY/POLICE | 1 | 1,5 |
| | Others | 12 | 17,9 |
| | Total | 67 | 100 |
| Parents' Income | Poor | 44 | 65,7 |
| | More | 23 | 34,3 |
| | Total | 67 | 100 |
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| | Others | 12 | 17,9 |
| | Total | 67 | 100 |
| Parents' Income | Poor | 44 | 65,7 |
| | More | 23 | 34,3 |
| | Total | 67 | 100 |

Source : Author, 2024

Table 2 below, shows that the characteristics of respondents based on the age of the child obtained data from 67 respondents, the average age of the child in this study was 41.731 ± 9.9690 months. The characteristics of respondents based on the age of the mother obtained data from 67 respondents, the average age of the mother in this study was 31.373 ± 5.3196 years.

Table 2 . Respondent Characteristics

| Variable | Mean | Max | Min | SD |
|---|---|---|---|---|
| Child's Age (Month) | 41,731 | 60 | 26 | 9,9690 |
| Mother's Age (Years) | 31,373 | 4,5 | 22 | 5,3196 |
| Number of Children | 2,10 | 6 | 1 | 0,890 |

Source : Author,2024

Table 3: Relationship between nutritional status, parenting patterns, exclusive breastfeeding, history of complementary feeding, and birth spacing with the incidence of stunting in Klaten, Central Java.

| **Variable** | **Category** | **Stunting** | | | | | | | | | | **r** | **p** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Very Short** | | **Short** | | **Normal** | | **Tall** | | **Total** | | | |
| | | **f** | **%** | **f** | **%** | **f** | **%** | **f** | **%** | **f** | **%** | | |
| Nutritional Status | Very Poor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,610 | 0,000 |
| | Poor | 0 | 0 | 15 | 22,4 | 4 | 6 | 0 | 0 | 19 | 28,4 | | |
| | Normal | 0 | 0 | 7 | 10,4 | 40 | 59,7 | 0 | 0 | 47 | 70,1 | | |
| | Over Weight | 0 | 0 | 0 | 0 | 1 | 1,5 | 0 | 0 | 1 | 1,5 | | |
| | Total | 0 | 0 | 22 | 32,8 | 45 | 67,2 | 0 | 0 | 67 | 100 | | |
| Parenting | Less | 0 | 0 | 5 | 7,5 | 0 | 0 | 0 | 0 | 5 | 7,5 | 0,806 | 0,000 |
| | Fair | 0 | 0 | 17 | 25,4 | 5 | 7,5 | 0 | 0 | 22 | 32,8 | | |
| | Good | 0 | 0 | 0 | 0 | 40 | 59,7 | 0 | 0 | 40 | 59,7 | | |
| | Total | 0 | 0 | 22 | 32,8 | 45 | 67,2 | 0 | 0 | 67 | 100 | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exclusive breastfeeding | No | 0 | 0 | 13 | 19,4 | 7 | 10,4 | 0 | 0 | 20 | 29,9 | 0,384 | 0,000 |
| | Yes | 0 | 0 | 9 | 13,4 | 38 | 56,7 | 0 | 0 | 47 | 70,1 | | |
| | Total | 0 | 0 | 22 | 32,8 | 45 | 67,2 | 0 | 0 | 67 | 100 | | |
| Complementary feeding history | Inappropriate | 0 | 0 | 2 | 3 | 1 | 1,5 | 0 | 0 | 3 | 4,5 | 0,424 | 0,000 |
| | Less Appropriate | 0 | 0 | 12 | 17,9 | 6 | 9 | 0 | 0 | 18 | 26,9 | | |
| | Appropriate | 0 | 0 | 8 | 11,9 | 38 | 56,7 | 0 | 0 | 46 | 68,7 | | |
| | Total | 0 | 0 | 22 | 32,8 | 45 | 67,2 | 0 | 0 | 67 | 100 | | |
| Birth Spacing | Close | 0 | 0 | 2 | 3 | 8 | 11,9 | 0 | 0 | 10 | 14,9 | 0,077 | 0,301 |
| | Normal | 0 | 0 | 20 | 29,9 | 37 | 55,2 | 0 | 0 | 57 | 85,1 | | |
| | Total | 0 | 0 | 22 | 32,8 | 45 | 67,2 | 0 | 0 | 67 | 100 | | |

Source : Author, 2024

Based on Table 3 above, the results of further analysis using the Kendall tau b and c test showed a significance value of p value 0.000 (α=0.05). From these results it can be concluded that there is an association between nutritional status, parenting patterns, exclusive breastfeeding, and history of complementary feeding with the incidence of stunting in Klaten, Central Java. The other results showed a significance value of p value 0.301 (α=0.05). From these results it can be concluded that there is no relationship between birth spacing and stunting in Klaten, Central Java.

**Discussion :**

***1.Univariate Analysis***

a. Gender

Research before explains that gender determines a person's nutritional needs. More energy and protein are needed by a man than a woman. Men can do more difficult things that women cannot. Boys are more likely to experience stunted growth and underweight than girls[9].

b. Age of child

As age increases the incidence of stunting decreases. During this period, infants are more active and have more contact with the outside environment than in childhood, making them more susceptible to infections. Inadequate nutrition can cause babies to lose weight. If left untreated, this can affect the child's height and may not be appropriate for their age[10].

c. Maternal age

Maternal age <20 years is still in adolescence has a risk of getting stunted offspring compared to maternal age 20-40 years who are already classified as early adulthood. Maternal age affects a mother's ability and experience in caring for her child. As mothers get older, they not only rely on their own experience, but also expand their knowledge from various available sources of knowledge[11].

d. Mother's occupation

Stay-at-home mothers have more time to seek information about height growth and take care of their children, monitoring their development and growth. A mother's work as a housewife can strengthen the relationship between children and parents and create a close and loving relationship between children and mothers. In terms of quality, working women generally spend less time with their children each day than housewives. A working mother has more challenges and less time than a stay-at-home mother, but if done right, working mothers and stay-at-home parents will not be much different[12].

e. Parents' income

Adequate family income facilitates family access to health services. This includes medical services used during infancy. This is because if a person suffers from malnutrition, it directly impacts on decreased productivity due to physical disability and decreased cognitive function, which in turn impacts the family's education and economic level[13].

f. Nutritional status

Stunted children have slow and short bone growth. This condition is caused by unmet nutritional needs and illnesses that increase over time. Achieving good growth and development requires adequate nutrition. Malnutrition is caused by insufficient food quality and quantity. Malnutrition can cause growth and development disorders, especially changes in brain structure and function during development[14].

g. Parenting

Parenting has a significant effect on the development of height both physically and mentally. The application of parenting patterns also has a very important role in child growth and development because the baby's food intake is fully controlled by the mother. Children who get good parenting are better than children who are raised badly[15].

h. Exclusive breastfeeding

Breast milk is a complete source of nutrition for infants, the composition of breast milk has been adjusted to the needs of infants and as a single food to meet all the needs of infants from birth to 6 months. Exclusive breastfeeding is a form of effort to prevent infection, malnutrition, and death in infants and children. Breast milk contains complete nutrients for babies to strengthen the immune system in babies. In addition, breast milk also contains antibodies that protect babies from infections and allergic attacks [16].

i. History of complementary feeding

Complementary feeding is needed to bridge the gap between the baby's total needs and what breast milk can fulfil. The aim is to increase the energy and nutrient requirements of the infant as breast milk cannot continuously meet the infant's needs. In this way, additional nutrients are provided to fill the gap between the amount obtained from breast milk and the total nutritional needs of the child. If complementary foods are given before or after 6 months, infants may not receive adequate nutrition, experience iron deficiency, and hinder growth and development [17].

j. Birth spacing

Adequate spacing between births allows the mother to fully recover from postnatal illnesses. When the mother feels secure in her situation, she can develop good parenting patterns in how to care for and provide nutritional needs for the child. Children born two or more years apart from the previous birth are more likely to be healthy enough to survive through growth and development[18].

k. Stunting

Stunting is short or very short growth depending on age-related length and size, and according to the WHO growth curve is less than -2 standard deviations (SD). This is due to irreversible circumstances such as insufficient nutritional intake and recurrent or chronic infections that occur within a thousand HPK [19].

Malnutrition occurs over a long period of time, starting when the foetus is in the womb until the beginning of the child's life at 1000 HPK. Low intake of vitamins and minerals, access to nutritious food, and low variety of food and animal protein sources are the causes of malnutrition in children. Inappropriate parenting factors, especially in children's eating habits and behaviours, cause children to become stunted if the mother does not ensure adequate and good nutritional intake. If a mother does not get adequate nutrition in her teenage years, including during pregnancy and breastfeeding, the physical and brain development of her child will be severely affected. Other factors that lead to stunted growth include teenage pregnancy,

maternal mental illness, teenage pregnancy, short birth spacing, and high blood pressure in the mother. Lack of access to health services, including access to sanitation and clean water, is another factor that has a significant impact on child development.

***2.Bivariate Analysis***

a. Relationship between Nutritional Status and the Incidence of Stunting

The results showed that there was a relationship between nutritional status and stunting in Klaten, Central Java. This shows that good nutritional status tends to experience good or normal growth as well.

Based on the results of this study, researchers found that nutritional intake in young children is very important as a support for the growth of nutritional status (BB/U) so that children grow according to the growth curve and to avoid growth failure that can lead to stunting. The nutritional status of infants is very important for human health. For young children, nutritional status is important to prevent stunting. A normal diet will result in a healthy body and good growth and development in young children, and prevent stunting. This has been reaffirmed by the Ministry of Health of the Republic of Indonesia, which states that the impact of short birth length continues from generation to generation, with children experiencing growth delays due to physical measurements, resulting in underweight babies.

b. The Relationship between Parenting Patterns and the Incidence of Stunting

The results of this study found a relationship between parenting patterns and stunting in Klaten, Central Java. Since malnutrition in infancy is irreversible, the mother's parenting style affects the growth and development of the baby. Therefore, young children should consume quality food during this period [20].

Based on this study, the researcher assumes that in feeding her children mothers have a very important role. Mothers must be able to provide, support, attention and special nutritional care, including organising good nutrition, providing food with good nutrition and healthy nutrition, maintaining personal hygiene, and child hygiene, as well as preparing for the next pregnancy, improving child nutrition or using health services aimed at improving child nutrition in improving food in children.

c. The Relationship between Exclusive Breastfeeding and the Incidence of Stunting

The results of this study found a relationship between exclusive breastfeeding and stunting in Klaten, Central Java.

Based on this research, researchers assume that exclusive breastfeeding greatly contributes to the growth, development, and endurance of children. Breast milk can fulfil the nutritional needs of babies from birth to 24 months of age, so that babies who are exclusively breastfed can achieve optimal growth and development. Breast milk contains calcium which is absorbed more efficiently than formula milk or infant formula, thus helping infants' growth, especially their height [21]. Therefore, exclusively breastfed infants tend to be larger and follow their growth curve more closely than formula-fed infants. Breast milk is rich in calcium, which is easily absorbed by the body, to maximise growth, especially height, and prevent stunting.

d. The Relationship between History of MP-ASI Feeding with the Incidence of Stunting

The results of this study found that there was a relationship between the history of complementary feeding with the incidence of stunting in Klaten, Central Java. In the practice of providing complementary food even though the amount is in accordance with the standard, if the quality of complementary food is not good, it will cause toddlers to experience malnutrition of certain nutrients, so that it will affect the growth process of toddlers [22].

Based on this study, according to the researcher, the timely provision of adequate and quality breast milk supplementation will affect the development of infant height. This is related to the provision of proper nutrition to children.

e. Relationship between Birth Spacing and the Incidence of Stunting
The results of this study found that there was no relationship between birth spacing and stunting in Klaten, Central Java.
Based on this study, according to the researcher's assumption, the right birth spacing allows mothers to recover optimally from postpartum illnesses. Mothers will be able to develop good parenting patterns in the care and upbringing of their children if they are confident in their health conditions. Proper birth spacing allows mothers to optimally recover from postpartum conditions. Mothers can form good parenting patterns in the care and upbringing of their children and ensure that their children receive good nutrition if a mother is satisfied with her situation. Short birth spacing can make parents overwhelmed and unable to provide the best care for their children.
Based on the results of the study, it was found that the nutritional status, parenting patterns, exclusive breastfeeding, history of complementary feeding and birth spacing of toddlers in Klaten, Central Java were categorised as normal.
The cause of stunting in this study can also be caused by the gender of toddlers. In this study, it was found that the average stunted toddler was male. Boys are more likely to suffer from malnutrition than girls[23]. This condition is caused by differences in eating habits passed down by their parents. The men need a lot of protein and energy compared to women. Men can do more difficult things than women[24].
The cause of stunting in this study can also be caused by maternal knowledge. In this study, the average stunted toddler was the first child, so mothers did not have sufficient knowledge in managing and fulfilling nutrition in children. To improve children's nutritional status and achieve developmental maturity, a high level of knowledge is needed by parents. Lack of knowledge, understanding of stunting, and lack of understanding of proper feeding habits affect the behaviour and attitudes of mothers in feeding children including inappropriate amounts and types resulting in less than optimal child growth and development[25].
Another cause of toddler stunting in this study is due to parental income. Parents' income affects child growth and development. Parents who have sufficient household income can meet all of their children's primary and secondary needs[26]. The higher household income will influence the decision-making process to obtain adequate health services to optimise health status[27]. Families who have a high economic degree will face health problems and will use better health services such as going directly to the hospital without regard to cost constraints, while families with a low economy will think twice about going to the hospital looking for health facilities when facing adequate health problems due to cost constraints. Therefore, the exposure period of this disease is longer and can lead to nutritional problems.

**Conclusion:**
The results of this research analysis can be concluded that Ha is accepted, meaning that there is a relationship between nutritional status, parenting patterns, exclusive breastfeeding, history of giving MP-ASI and the incidence of stunting in Klaten, Central Java with a p value <0.000 ($\alpha$=0.05). The results of this study also concluded that Ho was accepted, meaning that there was no relationship between birth spacing and the incidence of stunting in Klaten, Central Java with a p value <0.301 ($\alpha$=0.05).

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**Conflict of interest:**
There is no conflict of interest in this research.all members of the research team have the same interest in disseminating the results of this study to the public so that it can be utilized.

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