Original Article

Determinants of Stunting among Children Aged 0–24 Months: A Cross-Sectional Study

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ABSTRACT

Background: This study was conducted in response to the issue of stunting in Bekasi Regency, which had remained at a stagnant rate of 21.5%. Therefore, the local government aimed to continue reducing this figure to 4%. The purpose of this study was to determine the determinants of stunting in children aged 0-24 months.

Methods: This study used analytical observation with a cross-sectional approach. The population of mothers who had children aged 0-24 months was 156 respondents, accidental sampling technique, with a sample size of 61 respondents, independent variables were history of Chronic Energy Deficiency (CED) pregnancy using medical record of MUAC (Mid-Upper Arm Circumference), using a questionnaire to exclusive breastfeeding, maternal education, age of pregnant women, and using Maternal and Child Health books (MCH books) to immunization historys and dependent variable are stunting using Maternal and Child Health books (MCH books).

Results: It is known that the Chronic Energy Deficiency (CED) significance value is 0.009, exclusive breastfeeding is 0.006, maternal age is 0.0141, and immunization history is 0.005. Thus, the four factors have a p-value <0.05. At the same time, the significance value of maternal education is 0.358 > 0.05. Based on the results of the Odds Ratio (OR) CED obtained, 20.889, exclusive breastfeeding 19.500, and maternal age 15.300, which indicates that CED has a higher chance of affecting the incidence of stunting in children aged 0-24 months compared to other variables.

Conclusion: The community should be able to take preventive steps to provide nutrition, ensuring that the fetus or baby born does not experience stunting.

Keywords: Chronic energy deficiency; education; exclusive breastfeeding; immunization; maternal age; stunting.

Implications for Practice:

- Comprehensive midwifery care is needed to prevent stunting in children.
- Family involvement is very important, which requires a special approach to discussions related to midwifery care, from pregnancy and newborns to the golden age.
- Increase training for midwives and cadres on promotive and preventive efforts for stunting.

Introduction

The decline of the low-quality population is indicated by the rampant problems of nutrition and stunting, which will have an impact on the quality of human resources. This affects the degradation of the younger generation and future economic conditions (Rahayuwati et al., 2020).

Stunting (short) or chronic malnutrition is another form of growth failure. Children who experience stunting appear to have a normal, proportional body, but in fact, their height is shorter than the normal height for children of their age (Muliasari et al., 2022).

WHO estimates the prevalence of stunting toddlers worldwide at 22.3% or as many as 148.1 million in 2022. According to the Indonesian Nutrition Status Study Report at the Ministry of Health, the prevalence of stunting in Indonesia fell from 27.7% in 2019 to 24.4% in 2021, and then to 21.6% in 2022, with the majority of cases occurring in children aged 3-4 years and 6-59 months. However, this figure still does not align with WHO standards, which aim for less than 20%. For this reason, the government is aiming to reduce stunting to 17% by 2023 and 14% by 2025. According to Indonesia's 2022 profile, teenagers who received FE tablets in DKI Jakarta were only around 63.5% (Hucek, 2022; Ramadhan & Febriyani, 2024).

In Indonesia, based on the results of the Riskesdas carried out in 2007, 2013, and 2018, the stunting rate in children is still above 30%. This means that there are 3 stunted children out of 10 children born in Indonesia. This indicates that stunting remains a public health issue in Indonesia to date. The province with the highest proportion of very short and short nutritional status is East Nusa Tenggara, which reaches 42.6%, and the lowest is DKI Jakarta at 17.7%. At the same time, South Sumatra Province is ranked twentieth out of thirty-four provinces, with a proportion of stunted children at 31.7%, which is still above the national average of 30.8% (Jayanti et al., 2021).

The incidence of stunting in Bekasi Regency has reached 21.5%, so the local government is continuing to reduce this figure with a target of 4%. Therefore, the incidence of stunting in Bekasi Regency still exists, and the local government continues to strive to minimize it.

Low frequency of exclusive breastfeeding is one of the triggers for malnutrition in toddlers, caused by past experiences, and has an impact on their future. Good breastfeeding practices from mothers will maintain the child's nutritional balance, ensuring their growth and development remain normal (Umwali et al., 2022).

Children who have been given exclusive breastfeeding and solid foods according to their needs can reduce the risk of malnutrition. This is because, at the age of 0-6 months, babies can develop an immune system, thereby protecting them from infectious diseases. After six months of age, babies are introduced to solid foods in specific amounts and frequencies to meet their nutritional needs. The less often breastfeeding is given, the higher the risk of malnutrition and stunted growth (Rahayuwati et al., 2020; Restu & Yoonush, 2025).

Essentially, it is crucial to understand that the weight of a baby at birth is influenced by several factors, including the mother's nutritional intake during pregnancy, which is determined by her food consumption. Then there is the baby's eating behavior; exclusive breastfeeding is a potential way to improve the baby's nutrition in the early stages of growth, especially during the first 6 months of life. Eating behavior is also related to the accuracy of eating, the types of food, and the quantity and quality of food. In this aspect, parents often face challenges in raising their children, as several factors can hinder the quality of the baby's eating behavior (Fikrie et al., 2024).

Like a mother who prioritizes her career, thereby neglecting her child's eating behavior, this is a strong indicator that damage to the baby's eating behavior is also related to the level of health (Ani et al., 2023).

Environmental factors are one aspect that also needs to be considered. This is because it will greatly determine the acquisition of optimal genetic potential. If the environmental conditions are less supportive, such as being dirty or in a slum, it will result in a higher potential for disease to emerge. This inhibits the optimal genetic potential in babies. The characteristics of this environment can be classified as bio, psycho, and psychosocial, where the three basic points of the type of environment will affect each individual, from conception until the end of their life (Yunitasari et al., 2021).

Based on research conducted, stunting can increase the risk of morbidity, mortality, impaired motor brain development, and decreased productivity of children in the future. Children who experience stunting cases indicate to society that there is an ongoing problem. Stunting is marked by a Z score for height/age of less than -2 SD, categorized as low nutritional status.

According to the WHO, social determinants of health that affect stunting include various factors, such as socioeconomic conditions, maternal and child nutrition, access to health services, sanitation, and cultural factors. Handling stunting requires joint efforts from multiple parties, including the government, health workers, families, and communities. By understanding and addressing the social determinants of health that affect stunting, it is hoped that the prevalence of stunting in Indonesia will continue to decline, allowing Indonesian children to grow and develop optimally (Azzahla et al., 2022).

The first thousand days of a child's life (1000 HPK) are a critical period that will determine their future, and during this period, Indonesian children face serious growth disorders. After 1000 HPK, the adverse effects of stunting are very difficult to treat. To overcome stunting, the community needs to be educated to understand the importance of nutrition for pregnant women, infants, and toddlers. Fulfilling nutritional needs during this period is a focus of attention both nationally and internationally. Efforts to overcome the "1000 HPK" problem include nutritional interventions from early pregnancy and continuing until the child is 2 years old; however, proper guidance is needed for this intervention (Aramico et al., 2020).

The Bekasi Regency Government is undertaking efforts to monitor the situation by forming a special task force aimed at reducing stunting rates. Based on the background above, the author is interested in conducting further research related to "Analysis of Determinant Factors of Stunting Incidents in Children Aged 0-24 months in the Cibarusah Health Center Work Area, Bekasi Regency."

Methods

Study Design

This study employs an analytical cross-sectional design, where the researcher measures a variable at a specific time; each subject is observed only once, while taking into account subject parameters to obtain a relevant comparative description.

Participants

The population in this study consisted of mothers and children aged 0-24 months in one of the health center's working areas in Bekasi, totaling 156 children. A sample size of 61 respondents was obtained using a purposive sampling technique. The inclusion criteria were mothers who could read and write, and mothers who were willing to participate as respondents. The exclusion criteria in this study were children who already had stunted offspring and children who were sick.

Instruments

This study has two variables, namely independent variables and dependent variables. The independent variables in this study are history of Chronic Energy

Deficiency (CED) pregnancy using medical record of MUAC (Mid-Upper Arm Circumference), a structured questionnaire used to measure exclusive breastfeeding, maternal education, age of pregnant women, and using Maternal and Child Health books (MCH books) to immunization historys and dependent variable are stunting using Maternal and Child Health books (MCH books), with stunting category Z-Score≥-3.0SD to Z-Score<-3.0SD. Validity and reliability tests were not conducted because the data only included general respondent information.

Data Collection

This study was conducted in one of the health center's working areas in Bekasi, from November 2023 to May 2024, with assistance from cadres. Respondents were invited to the integrated health post, given informed consent, and then administered a questionnaire. They were also reviewed in the MCH books regarding the child's height. Respondents who did not attend the integrated health post were visited at home.

Data Analysis

In this study, the data analysis technique employed is bivariate analysis, with a Fisher's Exact Test used for statistical significance.

Ethical Considerations

This study obtained informed consent from all participants, ensured confidentiality, and guaranteed voluntary participation, with the right to withdraw at any time without consequences. This study has been ethically cleared with the number: 0823424/EC/KEPK/I/10/2023

Results

Table 1. Distribution Frequency of Characteristics of Respondents

Characteristics of Respondents	n	%
Occupation		
Self-employed	12	19.7
Housewife	49	80.3
Children's Age		
0-6 months	14	23.0
7-12 months	14	23.0
13-18 months	15	24.6
19-24 months	18	29.5
Number of Children		
1	14	23.0
2-3	45	73.8
>3	2	3.3
Chronic Energy Deficiency		
MUAC ≥ 23.5: Normal	48	78.7
MUAC < 23.5: Abnormal	13	21.3
Exclusive Breastfeeding		
Yes	54	88.5
No	7	11.5
Mother's Education		
Elementary School-High School	56	91.8
DIII/S1	5	8.2
Age of Pregnant Mother		
20-35	53	86.9
<20 or >35	8	13.1
Immunization History		
Complete	59	96.7
Incomplete	2	3.3
Stunting		
Normal	56	91.8
Abnormal	5	8.2

Table 1 indicates that almost all respondents work as housewives as many as 49 (80.3%) respondents, respondents have children aged 19-24 months as many as 18 (29.5%) respondents, respondents have 2-3 children as many as 45 (73.8%) respondents, respondents have MUAC ≥ 23.5 cm (normal/not chronic energy deficiency) as many as 48 (78.7%) respondents, respondents provide exclusive breastfeeding as many as 54 (88.5%) respondents, respondents have elementary-high school education as many as 56 (91.8%) respondents, respondents are 20-35 years old as many as 53 (86.9%) respondents, respondents have a history of complete basic immunization as many as 59 (96.7%) respondents, respondents do not experience stunting (normal) as many as 56 (91.8%) respondents.

Table 2. The Relationship between Chronic Energy Deficiency, Exclusive Breastfeeding, Mother's Education, Mother's Age, Immunization History, and Stunting Incidence

Variables	Stunting Incidence				Total		P Value *(Fisher's Exact Test)*	OR (Estimate)
	Normal		Abnormal					
	f(n)	%	f(n)	%	f(n)	%		
CED								
MUAC ≥ 23,5 cm: Normal	47	77.0	1	1.6	48	78.7	0.006	20.889
MUAC <23,5 cm: Abnormal	9	14.8	4	6.6	13	21.3		
Exclusive breastfeeding								
Yes	52	85.2	2	3.3	54	88.5	0.009	19.500
No	4	6.6	3	4.9	7	11.5		
Mother's education								
Elementary-High school	52	85.2	4	6.6	56	91.8	0.358	
DIII/S1	4	6.6	1	1.6	5	8.2		
Mother's Age								
20 – 35	51	83.6	2	3.3	53	86.9	0.014	15.300
<20 or > 35	5	8.2	3	4.9	8	13.1		
Immunization history								
Complete	56	91.8	3	4.9	59	96.7	0.005	
Incomplete	0	0.0	2	3.3	2	3.3		

Table 2 indicates that the results of Fisher's Exact Test have a significance value of 0.006 <0.05, meaning that there is a relationship between Chronic Energy Deficiency and stunting. The Odds Ratio (OR) results obtained were 20.889, which means that respondents without Chronic Energy Deficiency will have a 20.889 times greater chance of not experiencing stunting in their children aged 0-24 months. The results of Fisher's Exact Test, with a significance value of 0.009 (<0.05), indicate a relationship between exclusive breastfeeding and the incidence of stunting in children aged 0-24 months. The Odds Ratio (OR) result is 19.500, indicating that respondents who provide exclusive breastfeeding will have a 19.5 times greater chance of not experiencing stunting in their children aged 0-24 months. The results of Fisher's Exact Test, with a significance value of 0.358 > 0.05, indicate that there is no relationship between the mother's level of education and the incidence of stunting in children aged 0-24 months. Since the results of the statistical test indicate no relationship, the odds ratio is disregarded. The results of Fisher's Exact Test, with a significance value of 0.014 < 0.05, indicate a relationship between maternal age and the incidence of stunting in children aged 0-24 months. The Odds Ratio (OR) results obtained were 15.300, indicating that respondents who gave birth at the age of 20-35 (non-risk age) have a 15.300 times greater chance of not experiencing stunting in their children aged 0-24 months. The results of Fisher's Exact Test, with a significance value of 0.005 < 0.05, indicate a relationship between immunization history

and stunting in children aged 0-24 months. The Odds Ratio (OR) results obtained suggest that each stratum is such that the response results of the first two groups are 0, or the first response results of the second group are 0. This is because the Mantel-Haenszel general odds ratio estimate is asymptotically normally distributed under the assumption of a general odds ratio of 1,000.

Discussion

Based on the results of the Odds Ratio (OR) for Chronic Energy Deficiency (CED), it was obtained as much as 20.889, exclusive breastfeeding 19.500, maternal age 15.300, which means that Chronic Energy Deficiency (CED) has a higher chance than other variables related to the incidence of stunting in children aged 0-24 months.

The incidence of stunting in children aged 24-59 months and a history of Chronic Energy Deficiency (CED) correlates 4.64 times. Pregnant women who have a history of CED have each as many as 31.3% of children with a history of stunting and 9.0% without stunting (Widayati & Dewi, 2021).

According to studies, to prevent CED in pregnancy, health promotion and prevention activities must be stepped up immediately. In addition, it is essential to carry out regular antenatal care (ANC) checks to detect pregnancy complications for both the mother and the fetus, especially those related to fetal growth and development, so that they can be prevented, and low birth weight and stunting in children can be avoided.

Pregnant women with CED tend to have babies with low birth weight (LBW), which is one of the main risk factors for stunting. In addition, CED can also affect overall fetal growth and increase the risk of other pregnancy complications, such as preeclampsia and hemorrhage, which can also contribute to stunting (Jannah et al., 2023).

Pregnant women with Chronic Energy Deficiency (CED) are at risk of stunting in children. The nutritional status of pregnant women is a significant factor that greatly affects the growth and development of the fetus in the womb and can also impact the baby's birth outcomes. In addition, lack of nutrition, preterm pregnancy, and babies with low birth weight greatly affect growth problems (Muliani et al., 2023).

During pregnancy until the first few weeks after giving birth, there is a risk of malnutrition, both for the mother and the baby. Low birth weight and mothers with a history of Chronic Energy Deficiency during pregnancy can cause stunting (Togatorop et al., 2024).

Pregnant women with CED are an important risk factor that can cause stunting in children. Therefore, it is important to ensure that pregnant women receive adequate nutritional intake and are well managed to prevent the occurrence of CED and reduce the risk of stunting.

Toddlers who do not receive exclusive breastfeeding have more stunted growth than toddlers who receive exclusive breastfeeding. Breast milk is the best source of nutrition for babies, and in addition to its benefits for babies, it is also beneficial for mothers, families, and the country. Babies who receive exclusive breastfeeding have immunity to E. coli bacteria, thereby minimizing the risk of various diseases. Exclusive breastfeeding plays an important role in protecting children under five years of age from breast milk infections. Especially for low-income communities, exclusive breastfeeding will help people reduce expenses (Putri et al., 2022).

By providing exclusive breastfeeding, mothers provide a strong foundation for optimal child health and development, helping to prevent stunting and ensuring that children grow into healthy and intelligent individuals.

The number of children is one indicator of the relationship between socioeconomic

status and stunting. In this study, it was found that the number of children did not affect the incidence of stunting . Mothers with higher levels of education tend to have a better understanding of child nutrition and health, which can ultimately help prevent stunting. The mother's level of education affects the mother's knowledge about preparing a balanced nutritional menu for children to improve their health. Mothers with higher levels of education are more likely to be selective, creative, and innovative in choosing, preparing, and varying the food menu for their children, thereby reducing the risk of difficulty eating and stunting. Mothers with better education are more likely to apply this knowledge in daily practice, such as providing a balanced diet, maintaining hygiene, and seeking appropriate health services.

Maternal age is one of the factors that influence stunting because pregnancy at a young age (<20 years) means that the mother does not yet have mature reproductive organs for pregnancy. In addition, this age causes problems such as premature births and low birth weight. Meanwhile, maternal age >35 years or pregnancy at an older age will result in anxiety in pregnancy and childbirth, and reproductive organs that are too old for pregnancy (Ghita, 2019).

Mothers who become pregnant at age <20 years or >35 years have a higher risk of giving birth to stunted children than mothers who become pregnant at a more ideal age (20-34 years). Mothers who become pregnant in their teens or older often have less than optimal health conditions, such as malnutrition or chronic diseases, which can negatively impact fetal growth.

The results of this study indicate that the proportion of stunted toddlers is higher in those with a history of partial basic immunization compared to those with a history of complete basic immunization (Kassaw et al., 2023). The results of the study in Kupang showed that children without a history of immunization had a greater chance of suffering from stunting compared to those with a history of immunization, which was 1.983 times greater. Other studies also state that complete immunization has a significant effect on stunting. Complete immunization is necessary at an early age because this is the period when one is most susceptible to disease. Children who are not immunized or only partially immunized are more vulnerable to disease, which has an impact on stunting (Lubis et al., 2023).

An incomplete immunization history can increase the risk of stunting because it increases the child's susceptibility to infectious diseases that can interfere with nutrient absorption and hinder growth. Therefore, it is important to ensure that children receive complete basic immunization according to the recommended schedule to prevent stunting and support their optimal development.

Relevance to Clinical Practice

This research highlights the importance of integrating comprehensive midwifery care from pregnancy to the child's golden age to reduce the incidence of stunting. This approach supports more effective clinical practice in child health, emphasizing the need for cross-sector collaboration among health workers, cadres, nutritionists, and the community to ensure adequate nutrition in children. For example, training in making balanced nutritional menus for pregnant women and mothers with toddlers, daily balanced nutritional menu modules, routine check-ups from early pregnancy, and mentoring pregnant women and toddlers.

Conclusion

Chronic Energy Deficiency in pregnant women can interfere with fetal growth and

increase the risk of pregnancy complications, which in turn can affect the child's nutritional status. Exclusive breastfeeding also plays a crucial role in providing optimal nutrition and protection against various diseases that can lead to stunting. Mothers with higher education tend to have a better understanding of nutrition, health, and parenting, all of which contribute to preventing stunting. An incomplete immunization history can increase the risk of stunting because it increases the child's vulnerability to infectious diseases that can interfere with nutrient absorption and growth.

Based on these findings, collaboration with nutritionists, health services, cadres, and related parties is needed to prevent and treat stunting. There are no control variables in this study, allowing further researchers to examine preventive and curative efforts for stunting. The community can also take preventive measures, such as maintaining a balanced diet and taking supplements for pregnant women to avoid KEK, thereby ensuring optimal fetal or infant growth.

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CrediT Authorship Contributions Statement

Hainun Nisa: Conceptualization, Methodology, Supervision, Writing - Original Draft, Funding Acquisition

Puri Kresna Wati: Software, Investigation, Resources, Validation, Formal Analysis, Writing - Review & Editing

Dewi Rostianingsih: Investigation, Resources, Data Curation, Project Administration

Friska Junita: Review & Editing, Visualization, Project Administration

Conflicts Of Interest

There is no conflict of interest in this research.

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