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Research Article

The Connection between Pregnancy Spacing and the Occurrence of Stunting in Children : An In-Depth Analysis of Contributing Factors

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Abstract: Stunting is a serious nutritional problem in Indonesia, affecting the growth and development of children under five years of age. Non-ideal pregnancy spacing is one of the factors that can contribute to stunting, as closely spaced pregnancies can lead to inadequate maternal nutrition, which affects the child's development. This study aims to analyze the relationship between pregnancy spacing and the incidence of stunting in children under five. The research design employed is observational analytic with a case-control approach. Data collection was conducted from February to October 2024, focusing on children with stunting and children with normal growth as control cases. The case-control study involved a total sample size of 60 children, with 30 stunted children as cases and 30 non-stunted children as controls. The control cases were selected using simple random sampling to ensure unbiased representation. The primary analysis technique used was the chi-square test to examine the relationship between pregnancy spacing and the incidence of stunting. The results indicated that children born with a pregnancy spacing of less than 24 months had a 1.5 times higher risk of experiencing stunting compared to those born with a pregnancy spacing of more than 24 months. Statistical analysis using the chi-square test yielded a significant p-value of 0.002 (< 0.05), which confirms a strong association between short pregnancy spacing and stunting. This study concludes that insufficient pregnancy spacing is a significant factor contributing to the incidence of stunting in children under five. Therefore, it is recommended that public health campaigns and education programs on family planning and reproductive health be strengthened to reduce the risk of stunting in Indonesia. Such initiatives will help prevent future generations from experiencing the negative effects of inadequate growth and development.

Keywords: Parity; Pregnancy spacing; Stunting

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1. Introduction

Stunting is a condition in which a child's physical growth is hampered due to chronic malnutrition, especially in the first thousand days of life, namely from in the womb to the age of two years. According to data from WHO, stunting can be identified by measuring height for age, where children whose height is below a certain standard deviation are considered stunted (WHO, 2018). In Indonesia, the prevalence of stunting reached 27.67% in 2021, indicating that one in four children experience this serious growth problem (Ministry of

Health, 2022) The ideal pregnancy spacing is usually recommended between 24 and 60 months. Too short a spacing can cause the mother to not have enough time to recover physically and nutritionally before getting pregnant again. This can result in malnutrition in the mother, which in turn has an impact on the growth and development of the child. A study in Indonesia showed that children born with a gestational interval of less than 24 months have a higher risk of stunting compared to those born after a longer gestational interval (J et al., 2018; Nur Apriningtyas et al., 2019; Titaley et al., 2019)

Based on data from the 2022 Indonesian Nutritional Status Study, the stunting rate in Indonesia in toddlers reached 21.6%. The prevalence of stunting in North Sulawesi reached 20.5% while in North Minahasa Regency the prevalence of stunting reached 20.5% (Ministry of Health, 2022). The incidence of stunting is not only an individual health problem, but also a serious public health issue. Stunting is closely related to quality of life and productivity in the future. According to UNICEF (2021), children who experience stunting have a higher risk of experiencing learning difficulties, reduced productivity, and poor health in adulthood. Therefore, justification for addressing the problem of stunting is very important (Ministry of Health of the Republic of Indonesia, 2020)

Data from WHO shows that children who experience stunting have a higher risk of death from infectious diseases and other complications (World Health Organization, 2021). Therefore, preventing stunting must be a priority in public health programs, especially in developing countries such as Indonesia (Maulina et al., 2022; Rahmawati et al., 2018)

The cause of stunting is a combination of various interacting factors. The first and most common factor is malnutrition, both during pregnancy and during the child's growth period. According to WHO, malnutrition can be caused by an unbalanced diet, lack of access to nutritious food, and low parental knowledge about nutrition (World Health Organization, 2021). In Indonesia, many families still rely on low-nutrient staple foods, such as rice, without paying attention to adequate protein, vitamin, and mineral intake (Abdillah, 2022; Gupta & Santhya, 2020; Trihono, 2015)

In addition to malnutrition, repeated infections are also a major cause of stunting. Children who frequently experience infections, such as diarrhea and respiratory infections, will experience poor nutrient absorption, so that their growth is stunted. Data from the Ministry of Health shows that around 20% of children in Indonesia experience diarrhea at least once a year, which can contribute to stunting (Udoh & Amodu, 2016)

The effects of stunting are very diverse and can affect individuals and society as a whole. Stunting directly affects children's physical growth, where children who experience stunting will have a lower height compared to their peers. According to research by Christian (2013), stunting can result in a 20% decrease in a child's height at the age of five. This can continue into adulthood, where stunted individuals tend to have less than optimal height (Christian et al., 2013).

The long-term impact of stunting is also seen in children's cognitive development. Children who experience stunting are at higher risk of experiencing developmental delays and learning difficulties in school. Several studies have shown that stunted children have lower academic performance compared to children who grow well. This can result in lower levels of education and skills in adulthood, which in turn affects employment opportunities and income (Bharti et al., 2019; O et al., 2019)

Stunting is also associated with poor health in adulthood. Individuals who experience stunting are at higher risk of experiencing various health problems, such as diabetes, hypertension, and heart disease. This shows that stunting is not only a child's health problem, but can also have an impact on overall public health (Maulina et al., 2024; Nita retnasari, 2011)

Many studies have shown that short pregnancy intervals are closely related to the risk of stunting. For example, a study conducted by in the Philippines found that children born to mothers with a gestational interval of less than 24 months had a higher prevalence of stunting compared to those born to mothers with a longer gestational interval. This data suggests that short gestational intervals can result in prolonged malnutrition in children. (Charla et al., 2019) In addition, several studies by showed that mothers with short gestational intervals are more likely to experience anemia and other nutritional deficiencies, which have a direct impact on child growth. This study confirms that maternal health greatly affects child health, and short gestational intervals can worsen maternal health conditions, increasing the risk of stunting in children (Beal et al., 2018; Zhang et al., 2013). By ensuring adequate iron intake, pregnant women can provide the nutrients needed for fetal growth, thereby reducing the risk of stunting in children.

2. Proposed Method

This type of research is observational analytic with a case-control design. This study was conducted from February to October 2024. This study design used a case-control to study the causes of anemia during pregnancy. The number of samples used was 30 cases, while 30 control cases were selected by simple random sampling to control confounding variables, with inclusion and exclusion criteria. The inclusion criteria in this study were pregnant women with a TB> 145cm, pregnant women age 20-35 years, normal BMI. The sampling technique in this study was simple random sampling for both case and control groups. The dependent variable is the incidence of stunting. The independent variable is the pregnancy spacing. The research instrument in this study used secondary data by looking at medical records, namely the mother's KIA book and cohort records at the health center. The analysis method used was univariate, bivariate with Chi-square.

3. Results

Table 1. Frequency Distribution of Respondents of Stunting Incidents

Dependent variable	Frequency (f)	Percentage (%)
Stunting	30	50
Normal	30	50
Amount	**60**	**100%**

Table 1. Shows that half of the respondents had stunted babies and had normal babies (50%).

Table 2. Frequency Distribution of Respondents Based on Pregnancy Spacing

Independent variable	Frequency (f)	Percentage (%)
Pregnancy interval ≤24 months	20	33.4
Pregnancy interval >24 months	40	66.6
Amount	**60**	**100%**

Table 2. Shows that almost all respondents are compliant in consuming Fe tablets (78.3%), while a small proportion (21.7%) are not compliant in consuming Fe tablets.

Table 3. Relationship between pregnancy spacing and stunting incidence

Stunting Incident							
Pregnancy interval	**Normal**		**Stunting**		**Total**		***ρ (Sig)***
	f	**%**	**f**	**%**	**f**	**%**	
≤24 months	7	11.6	13	21.7	20	33.4	0.002
>24 months	23	38.4	17	28.3	40	66.6	
Total	30	50	30	50	60	100%	

Table 3 shows that 21.7% of respondents with a pregnancy interval of ≤24 months experienced stunting. After the chi-square test was conducted in the Halsil test, the significant relationship between pregnancy interval and stunting was p (Sig) 0.002 (<0.05).

4. Discussion

Based on the results of the study, it was found that 21.7% of respondents with a pregnancy interval of ≤24 months experienced stunting. After the chi-square test was carried out in the Halsil test, the significant relationship between pregnancy interval and stunting was p (Sig) 0.002 (<0.05). The relationship between pregnancy interval and stunting incidence is increasingly receiving attention in public health research. Short pregnancy intervals can lead to a lack of attention and resources allocated to newborns, which has the potential to disrupt their growth and development. Research shows that children born to mothers with a pregnancy interval of less than two years have a higher risk of stunting, especially if the mother does not receive adequate prenatal care (Suchdev et al., 2020). A study in Bali showed that children born with close pregnancy intervals had a lower average height compared to children born with longer pregnancy intervals. In the study, approximately 35% of children born to mothers with a pregnancy interval of less than 24 months experienced stunting, compared to

only 15% of children born to mothers with a pregnancy interval of more than 36 months (McDonald et al., 2015). This shows that short pregnancy intervals are directly related to the risk of stunting.

In addition, psychological factors also play a role in this relationship. Mothers who have close pregnancy intervals often experience higher stress and fatigue, which can affect the quality of care provided to the child. Research shows that maternal stress can negatively impact the child's mental and physical health, contributing to the risk of stunting (Puspitaningrum et al., 2016).

The importance of family planning in this context cannot be overstated. Programs that promote family planning and healthy pregnancy intervals can help reduce the incidence of stunting. For example, health campaigns in several regions in Indonesia have shown positive results in raising awareness about the importance of safe pregnancy spacing, and as a result, stunting rates have begun to decline (Maulina et al., 2024)

The cause of stunting is a combination of various interacting factors. The first and most common factor is malnutrition, both during pregnancy and during the child's growth period. According to WHO, malnutrition can be caused by an unbalanced diet, lack of access to nutritious food, and low parental knowledge about nutrition (Gupta & Santhya, 2020). In Indonesia, many families still rely on low-nutrient staple foods, such as rice, without paying attention to adequate protein, vitamin, and mineral intake (Trihono, 2015).

Pregnancy spacing is the period between the birth of a child and the next pregnancy. Research shows that the ideal pregnancy spacing is between 24 and 36 months to minimize the risk of complications for the mother and child (World Health Organization, 2018). Too close a spacing can result in various health problems, including an increased risk of stunting in children. According to data from the Indonesian Central Statistics Agency (BPS), around 30% of mothers in Indonesia have a pregnancy interval of less than two years, which has the potential to increase health risks for their children.

In the context of public health, it is important to understand how pregnancy spacing affects maternal and child health. Short pregnancy spacing is often accompanied by a lack of physical recovery for the mother, which can impact the quality of breast milk and the nutrition received by the baby. Data from the Indonesian Ministry of Health shows that mothers who have close pregnancy spacing are more likely to experience anemia, which can contribute to suboptimal growth in children (Charla et al., 2019; Dewi et al., 2020; Mireku et al., 2020)

A longitudinal study in Central Java found that children born with a pregnancy spacing of less than 24 months had a 1.5 times higher risk of stunting compared to those born with a pregnancy spacing of more than 36 months (Yunitasari et al., 2020). This suggests a significant relationship between pregnancy spacing and child health, especially in the context of stunting.

The importance of education regarding pregnancy spacing cannot be overstated. Health campaigns that emphasize the importance of family planning and healthy pregnancy spacing need to be strengthened, especially in areas with high birth rates. By increasing awareness of

safe pregnancy spacing, it is hoped that it can reduce the incidence of stunting among children. Finally, identifying the right pregnancy spacing is the first step in efforts to prevent stunting. By understanding and managing pregnancy spacing, it is hoped that a healthier and more productive generation can be created in the future.

6. Conclusions

Recommendations resulting from this study will include steps that governments and health organizations can take to raise awareness about the importance of healthy pregnancy spacing. Educational programs for expectant mothers and couples on family planning and nutrition during pregnancy can be an effective solution. In addition, increasing access to health services, especially in remote areas, is also very important to support maternal and child health.

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