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Maternal characteristics and stunting in children aged 24–60 months in West Jawa, Indonesia: A retrospective study

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Abstract

Background: Stunting is a nutritional health problem that can have both short and long-term adverse effects on children and will ultimately lead to a decrease in human resources.
Purpose: To determine the relationship between maternal characteristics and the incidence of stunting in children aged 24-60 months in Sukamulya Village.
Method: Quantitative research with a *case control* approach. The sample in this study amounted to 93 respondents. Data analysis that will be used in this study is univariate and bivariate analysis using *Chi-square*
Results: The results of the bivariate statistical test showed that there was a relationship between maternal height (*p-value*=0.000) and maternal age at pregnancy (*p-value*= 0.000) on stunting of toddlers aged 24-60 months in Sukamulya Village The results of bivariate statistical tests showed there was no relationship between birth spacing (*p-value=0.*147) to stunting of toddlers aged 24-60 months in Sukamulya Village.
Conclusion: Factors associated with the incidence of stunting are maternal height and age at pregnancy and factors that are not associated with the incidence of toddler stunting are birth spacing.

Keywords: Maternal Factors; Pregnancy; Stunting.

INTRODUCTION

Stunting is a national and global problem. Around 148 million (22.3%) children under the age of five would suffer from stunting globally in 2022. of which 52% are distributed throughout Asia and 43% are distributed in Africa. The stunting rate in Asia is high (Das, Hossain, & Nesa, 2009). The Indonesian Nutrition Status Survey (SSGI) data show that the country's stunting rate dropped from 24.4% in 2021 to 21.6% in 2022, although there has been progress in reducing stunting, Indonesia has not been able to reach the standards of the WHO, with the stunting prevalence rate must be below 20% (Ministry of Health of the Republic of Indonesia, 2023). Stunting has a negative impact on children. The growth and development of stunted children will not be optimal so it can have short-term and long-term effects on their health and life (World Health Organization, 2014).

Stunting has received attention from various national and international parties. The World Health Assembly (WHA) in 2012 set six global nutrition targets to reduce the high problem of malnutrition by 2025, one of which targets a 40% reduction in stunting *in* children under five from a total of 171 million *stunted* toddlers in 2010 to around 102.6 million children under five in 2025 (World Health Organization, 2014). Indonesia is also committed to helping reduce the incidence of stunting. The government targets the prevalence of stunting in 2024 to fall to 14% and achieve sustainable development targets in 2030 based on achievements in 2024. Nurses can contribute to stunting prevention

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efforts through education and counseling on stunting prevention, conducting comprehensive and holistic examinations of pregnant women, detecting and finding cases of stunting, and conducting interprofessional collaboration as an effort to increase understanding, skills, attitudes, and behavior of mothers in preventing stunting (Nurhaeni, Badrin, Dinarti, Riasmini, & Riyanti, 2021).

Factors causing stunting based on the World Health Organization (WHO) conceptual framework are divided into household and family factors, fulfillment of nutritional intake, breastfeeding, and history of infection. Household and family factors are divided into maternal factors and home environment. Maternal factors include poor maternal nutrition during preconception, pregnancy, and breastfeeding, maternal height, infection during pregnancy, pregnancy at a young age, mental health during pregnancy, history of IUGR (Intrauterine Growth Restriction) and preterm birth, short birth spacing, and hypertension in pregnancy (Islam, Ullah, Mainali, Imam, & Hasan, 2020).

Maternal factors are factors in the mother before and during pregnancy. Maternal factors will affect either transgenerationally or directly on the growth and development of offspring during the first 1000 days of life (*HPK*) of the child (Djauhari, 2017). The maternal factors (maternal weight, maternal height, and maternal nutritional status) are the factors that most strongly influence the incidence of stunting compared to other factors such as socioeconomic or Water, Sanitation, Hygiene (WASH) and community-level factors (agrotechnology and infrastructure) (Dorsey, Manohar, Neupane, Shrestha, Klemm, & West Jr, 2018). Based on preliminary studies conducted in Hamlet 3 Sukamulya Village, there are 18 in children age 24-60 months who are stunting out of a total of 93 (19.35%) children age 24 – 60 months. This number is high if associated with the target of West Java province in 2023 which promotes "Jabar Zero New Stunting 2023". In addition, based on an interview with the head of RW 09, Sukamulya Village has low socioeconomic factors. These factors will affect income and education which in turn lead to high rates of early marriage, non-compliance with antenatal care standards, maternal health during pregnancy, and poor maternal nutritional status.

RESEARCH METHOD

This study used a quantitative research design. The research design used correlation with a *case control* approach. The independent variables in this study were maternal height, birth spacing, and maternal age during pregnancy and the dependent variable in this study was stunting. Data collection uses primary data. Primary data for children taken included measurements of body height/age or body length/age and using anthropometric tables assessing children's nutritional status and maternal data were taken through directed interview using questioner by toddler's mother. The maternal factor assessment indicator were categorized into normal and at risk, maternal height was normal if >146 cm and at risk if <145 cm. birth spacing are categorized as normal if ≥ 2 years and categorized as at risk if < 2 years. Maternal age during pregnancy are categorized as normal if they are 20 to 35 years old during pregnancy and are called at risk when the mother's age is < 20 or > 35 years old (Ministry of Health of the Republic Indonesia, 2018).

The population of this study were mothers who had stunting toddlers aged 24-60 months in Hamlet 3 Sukamulya Village. The technique used in this study was total sampling. The inclusion criteria for samples suitable for research include mothers who have toddlers aged 24-60 months, mothers who have a Child Identity Card, mothers who are willing to become respondents, and live in Hamlet 3 Sukamulya Village Then for the exclusion criteria, namely, mothers who refuse to be involved in the study. Based on the data obtained, the number of samples in this study was 93respondents.

Data analysis in this study, namely, univariate and bivariate. Univariate analysis was used to see the characteristics of each variable studied through frequency distribution calculations. Bivariate analysis was used to see the relationship of maternal factor sub-variables to the incidence of stunting. In this study, the analysis will be carried out using the *Chi-Square* method. *The* ethical permit for this study used an ethical permit obtained from the Padjadjaran University research ethics committee with number 37/UN6.KEP/EC/2023.

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RESEARCH RESULTS

Table 1. Characteristic of Respondents (N=93)

Variables	Result
Maternal Age (n/%)	
(Mean±SD)(Range)(Years)	(29.41±6.412)(19-46)
<19 years	3/3.2
20-35 years	75/80.7
>36 years	15/16.1
Maternal Age at Pregnancy (n/%)	
Not Risky (20 – 35 years old)	68/73.1
Risky (<20 or > 35 years old)	25/26.9
Maternal Education (n/%)	
Elementary School	24/25.8
High School	64/68.8
Diploma - Bachelor	5/5.4
Maternal Height (n/%)	
Short (<145 cm)	13/14.0
Normal (>146 cm)	80/86.0
Gender of Toodlers (n/%)	
Male	43/46.2
Female	50/53.8
Birth Spacing (n/%)	
Not Risky (> 2 years)	85/95.6
Risky (< 2 years)	8/4.4

The results in table 1 show the age of the respondents with mean data of 29.41 and a standard deviation of 6,412 in the age range 19 - 46 years, where those aged <19 years were 3.2%, those aged 20-35 years were 80.7%, and those aged > 36 years were 16. 1%. Meanwhile, for maternal age during pregnancy, those in the no-risk category (20 – 35 years) were 73.1% and those in the risk category (<20 or > 35 years) were 26.9%, then for the educational status of respondents with elementary school education it was 25.8%, which 68.8% had a junior high school education, and 5.4% had a diploma – bachelor's degree. Furthermore, the height of respondents in the low category (<145cm) was 14.0% and the normal category (>146 cm) was 86.0%. Then, for the gender of toddlers, it was 46.2% male and 53.8% female, while birth spacing in the no-risk category (> 2 years) was 95.6% and in the at-risk category (< 2 years) it was 4.4%.

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Table 2. Maternal factors and the stunting (N=93)

Variables	Stunting		p-value	OR (CI 95%)
	Normal (n=75)	Stunted (n=18)		
Maternal height (n/%)				
Short (≤145 cm)	5/6.7	8/44.4	0.000	11.200
Normal (>146 cm)	70/93.3	10/55.6		(3.055 - 41.2551)
Maternal age at pregnancy (n/%)				
Not Risky (20 – 35 years old)	63/84.0	5/27.8	0.000	13.650
Risky (<20 or > 35 years old)	12/16.0	13/72.2		(4.103 – 45.412)
Birth spacing (n/%)				
Not Risky (> 2 years)	67/89.3	18/100	0.147	0.893
Risky (≤ 2 years)	8/10.7	0/0.0		(0.826 – 0.966)

Based on table 2, the results of the bivariate analysis show that the incidence of stunting in the maternal height factor has a pValue of 0.000, where in the low category (≤145cm) 6.7% of stunting does not occur and 44.4% of stunting occurs, while the incidence of stunting in the normal category of maternal height (>146 cm), 93.3% did not experience stunting and 55.6% did stunting.

Meanwhile, the maternal age factor during pregnancy received a pValue of 0.000, where in the no-risk category (20 – 35 years), 84.0% of those who did not experience stunting occurred and 27.8% of those who experienced stunting occurred, while the incidence of stunting in the maternal age factor during pregnancy was in the category those at risk (< 20 or > 35 years) who did not experience stunting were 16.0% and those who experienced stunting were 72.2%.

Furthermore, the birth distance factor obtained a pValue of 0.147, where in the non-risk category (> 2 years), 89.3% of those who did not experience stunting occurred and 100.0% of those who experienced stunting occurred, while the incidence of stunting in the birth distance factor was in the risk category (≤ 2 years). those who did not experience stunting were 10.7% and those who experienced stunting were 0.00%.

DISCUSSION

Maternal Height

The results of the statistical test, there is a correlation between maternal height and the prevalence of stunting, this is evidenced in the *Chi-Square test with a* p value <0.05 (*p* = 0.000; OR = 11.200; 95%CI = 3.055 - 41.2551). The statistical results also show that mothers with short height (<145 cm) have a 11.200 times greater risk of giving birth to stunting toddlers compared to mothers who have a height > 146 cm.

This research is in line with research in Bangladesh. The study showed that maternal height was significantly associated with the incidence of stunting (*p* = <0.001) (Khatun, Rasheed, Alam, Huda, & Dibley, 2019). Height is an anthropometry that represents chronic nutritional problems and will result in long-term nutritional deficiencies (Nuraeni & Diana, 2019). Other research in Yogyakarta, Indonesia also showed that there was a relationship between height and the incidence of stunting with a *p* = 0.035 (OR = 2.720; 95%CI: 1.050-7.049). This study also explained that mothers who have a height of <150 cm have a 2.7 times greater risk of having stunted children under five compared to mothers who have normal height (> 150 cm) (Andari, Siswati, & Paramashanti, 2020).

The intergenerational cycle of malnutrition in mothers with short stature can cause inhibition of fetal growth in utero due to biomechanical factors or maternal organ size and biological mechanisms or maternal nutritional supply during pregnancy. Mothers of short stature have a narrower pelvis than mothers of average height, which affects the uterine environment used for fetal growth (Wells, 2017; Khatun, Rasheed, Alam, Huda, & Dibley, 2019).

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Prevention of stunting can be done early, starting with health monitoring during adolescence by ensuring nutritional needs are met for optimal height growth as an adult. In addition, in pregnant women with short height, it can be done by providing nutritional interventions and monitoring maternal health from preconception to postnatal (Sinha, Taneja, Chowdhury, Mazumder, Rongsen-Chandola, Upadhyay, & Bhan, 2018; Khatun et al., 2019).

Maternal Age During Pregnancy

The results of statistical tests that have been carried out show that there is an association between the *sub-variable* of gestational age on the incidence of stunting with a *p*-value < 0.05 (p-value 0.000; OR = 13.650; 95% CI = 4.103 – 45.412). In this study, it was also found that mothers with risky gestational age had 13.650 times greater stunting than mothers who had an ideal age (20-35 years) during pregnancy.This study is in line with several other studies. The results of research conducted at Pakem Health Center, Sleman Regency, that there is a significant relationship between the age of pregnancy at risk with the incidence of stunting with a p-value=0.000 (OR: 3.562; 95%CI: 2.118 -5.991) (Kurniawati, Sujiyatini, & Saputro, 2022). Another study on risk factors for stunting in children under five years of age 24-59 months in Gianyar Regency, Bali showed that gestational age at risk had a significant relationship with the incidence of stunting with a value of (p = 0.005; AOR 4.24; 95%CI 1.56-11.49) (Manggala, Kenwa, Kenwa, Jaya, & Sawitri, 2018).

Different results were obtained in research in Kota Agung Timur Subdistrict, Tanggamus Regency, the results showed there was no association between maternal age during pregnancy and the incidence of stunting with the results of the Fisher Exact Test p = 0.419 (Trisyani, Fara, & Mayasari, 2020). Similar results were also shown in a study on the relationship between maternal factors and the incidence of stunting in Arongan Village, Kuala Pesisir District, Nagan Raya Regency with the results of the Chi-Square test with a p-value = 0.656, which means that there is no significant relationship between the sub-variable of maternal age during pregnancy and the incidence of stunting (Najah, & Darmawi, 2022).

Conceptually, mothers who become pregnant when they are <20 years old have a reproductive system that is not physiologically ready. In addition, the lack of emotional maturity and unpreparedness for the role of a mother is often experienced by mothers who become pregnant at a young age so that it will be difficult to undergo the responsibilities of motherhood which will affect parenting to children (Fujiana, 2020). Meanwhile, mothers who become pregnant at the age of >35 years will have a high risk of experiencing various complications during pregnancy, childbirth, and postpartum (Susanti, 2021). At the age of >35 years, mothers begin to enter the early degenartive period which causes the reproductive organs to age and the quality of eggs decreases. Mothers with age> 35 endometrial conditions will experience a decrease in function and quality (Ariana & Wathan, 2020)

Prevention of stunting in this case can be done through counseling on the impact of early marriage on health and education about the dangers of getting pregnant at an old age so that mothers can prevent pregnancy at risky ages and conduct pregnancy programs according to the ideal age of pregnancy.

Birth Spacing

The statistical test results between the subvariable of birth spacing and the incidence of stunting there is no relationship between the two. with *p*-value> 0.05 (*p*-value = 0.147; OR= 0.893; 95 % CI= 0.826 – 0.966). These results are in line with research conducted in a study of factors associated with the incidence of stunting toddlers aged 24-36 months in 2018 at the Banjar Agung Health Center, South Lampung Regency, which showed that there was no relationship between birth spacing and the incidence of stunting with a *p*-value = 0.055 (Wanimbo & Wartiningsih, 2020). The results of other studies also show that there is no relationship between the two. Based on the results of statistical tests, the value of p>0.05 was obtained (p-value = 0.243; OR: 1.74; 95% CI: 0.681-4.453) (Febrina, Santoso, & Kurniati, 2017).

Different results were shown in research at the Sumbang II Health Center, Banyumas Regency regarding the history of hypertension and birth spacing with the incidence of stunting, the results showed that there was an association between the sub-variable of birth spacing with the incidence of

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stunting with a value of p = 0.029 (Anasari & Suryandari, 2022). Another study also showed similar results that there was a relationship between birth spacing and the incidence of stunting at the Pargarutan South Tapanuli Health Center in 2023 with a p-value = 0.010. Mothers who have a birth spacing that is too short tend to pay less attention to child growth and development, such as poor child nutrition, too rapid weaning of breast milk, and lack of affection (Gentina & Siregar, 2023).

In this study, researchers assumed that there was no relationship between the birth spacing sub variable and the incidence of stunting due to the small number of samples and lack of variation. Mothers who had stunting toddlers were primiparous with 36 (38.7%).Conceptually, birth spacing can be one of the factors predisposing to stunting, this is because birth spacing that is too close can affect parental parenting which results in parents not maximizing their care for their children. Short birth spacing can adversely affect child nutrition by causing intrauterine growth retardation (Ikeda, Irie, & Shibuya, 2013). In addition, close birth spacing can affect reproductive function and maternal health has not fully recovered which will affect fetal health (Meihartati, 2016). Thus, prevention is needed by setting a minimum birth spacing of two years through family planning programs (*KB Program*).

CONCLUSION

The incidence of stunting in toddlers aged 24-60 months in Sukamulya Village is greatly influenced by the mother's height during pregnancy and the mother's age during pregnancy.

SUGGESTION

It is hoped that future researchers can expand the research area and examine other sub-variables such as nutritional status, hypertension during pregnancy, history of infection during pregnancy, depression during pregnancy, history of premature birth, and IUGR (Intrauterine Growth Restriction).

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