

Relationship Between Pregnant Mothers' Nutritional Status and the Event of Malnutrition in Babys

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Abstract: The nutritional status of pregnant women, assessed using the Upper Arm Circumference (IILA), plays a crucial role in fetal growth and birth outcomes. Inadequate maternal nutrition can lead to low birth weight, which increases the risk of stunting a condition characterized by a height-for-age (TB/U) less than -2 SD. Stunting is associated with a fourfold increase in child mortality under five years old, highlighting its significant impact on public health. This quantitative case-control study aimed to examine the relationship between maternal nutritional status during pregnancy and the incidence of stunting in toddlers. The study was conducted from August 25, 2024, to January 24, 2025, at Gogogoman Health Center in Kotamobagu City. A total of 60 toddlers participated, with 30 stunted toddlers (case group) and 30 non-stunted toddlers (control group). Data were collected through self-administered questionnaires, medical records, and microtoise measurements. The study employed univariate and bivariate data analysis, using a chi-square test to explore the association between maternal nutritional status and stunting incidence. The results indicated that the majority of respondents had adequate (non-KEK) maternal nutritional status. Specifically, 40% of mothers in the stunted group were classified as non-KEK, while 83.3% of mothers in the non-stunted group were in the same category. A statistically significant association was found between maternal nutritional status and the incidence of stunting, with a p-value of 0.010. These findings underscore the importance of improving maternal nutrition to prevent stunting and its associated risks. The study recommends collaborative efforts between health centers and local governments to provide targeted nutrition education and support for pregnant women and women of reproductive age, aiming to reduce stunting incidence and improve child health outcomes.

Keywords: Maternal Nutrition; Stunting; Toddlers

1. Introduction

Toddlers are a group of children aged 0–5 years. Toddler growth and development are prominent during this period, and determine the success of the child's development in the future (Andriani & Wirjatmadi, 2012). Toddlers will be healthy and well-nourished if they receive healthy and balanced food from the beginning of their lives (Apriliyanti & Kustriyanti, 2023).

Based on their nutritional needs, toddlers are divided into 3 groups, namely infants or toddlers (under two years old) aged 0–2 years, toddlers (under three years old) aged 2–3 years, and preschool groups aged 3–5 years. Children can begin to choose what foods they like and dislike. Fulfilled nutritional intake is very important for optimal growth and development. The toddler age group has unique characteristics in the form of increased activity and fine motor growth that is more rapid than other age groups, so their nutritional needs must also be met based on their age level (Widya addiarto & Yulia Rachmawati Hasanah, 2023). Meanwhile, preschool children are characterized by rapid gross motor development and learning processes from what is seen and imitated (Sopiah, 2022).

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Nutritional problems in children in Indonesia are grouped into 3 categories: nutrition that has been resolved, unresolved, and increasing and inhibiting (Prasetyo et al., 2024). The unresolved problems are malnutrition and stunting. WHO (2014) defines stunting as an irreversible growth disorder that is largely influenced by inadequate nutritional intake and recurrent infections in the first 1,000 days of life (Aryani et al., 2024).

Stunting is a serious condition that, according to UNICEF (2013), contributes to 15–17% of child deaths worldwide. Rapid growth during childhood makes nutritional needs very important. Poor nutrition during pregnancy and early childhood can cause stunting (Soliman et al., 2021).

SSGI data (2021) shows the prevalence of stunting in Indonesia is 24.4%. Although decreasing from the previous year, this figure is still far from the national target of 14% in 2025. The nutritional status of pregnant women is very important for the health of the mother and fetus (Kurnia, 2023). Babies from mothers with malnutrition are at risk of stunting (Astuti et al., 2022).

Assessment of the nutritional status of pregnant women can be seen from weight gain, height, body mass index (BMI) before pregnancy, and upper arm circumference (LILA) (Aldisurya et al., 2023). Anthropometry is a method used to assess the risk of chronic nutritional status in women of childbearing age (Ningrum & Cahyaningrum, 2020). Chronic Energy Deficiency (CED) in pregnant women is caused by a lack of energy and protein intake during pregnancy. CED is characterized by a LILA measurement result of <23.5 cm (Widyayanti et al., 2025).

Research by Safitri et al. (2023) shows that one of the risks of stunting is CED in women of childbearing age. If the mother experiences malnutrition during the first 1,000 days of the fetus's life, this will have an impact on growth, LBW, and even infant mortality (Safitri et al., 2023). Research by Adila et al. (2023) shows that toddlers from pregnant women with KEK have a 2.2 times greater risk of experiencing stunting (Putri Adila et al., 2023). Mulianingsih et al. (2021) also found that KEK mothers during pregnancy have a 4.8 times greater risk of having stunted children than mothers without KEK (Mulianingsih et al., 2021).

Pregnant women are a group at risk of malnutrition whose nutritional status must be considered. Adequate nutrition during pregnancy plays an important role in the success of pregnancy and breastfeeding (Tyarini et al., 2025). Poor nutrition in mothers causes fetal growth to be disrupted and increases the risk of degenerative diseases in adulthood (Roseboom, 2019).

According to Akbar (2023), the impacts of stunting are divided into short and long term. Short-term impacts include increased morbidity and mortality, as well as impaired cognitive, motor, and verbal development. Long-term impacts include short stature in adulthood, risk of degenerative diseases, low learning achievement, and low work productivity (Akbar et al., 2023).

According to the Indonesian Ministry of Health (2016), the impact of malnutrition causes metabolic disorders, brain development, and intelligence in children. Stunting also causes low immunity, susceptibility to illness, and the risk of chronic diseases such as obesity, diabetes, and low work quality as adults (Morales et al., 2024).

Toddler development is assessed from cognitive, psychosocial, and physical aspects (Fibriana et al., n.d.). The impacts of stunting include decreased intellectuality and cognitive abilities (Romey & Mangunsong, 2025). According to Ismail (2024), there is a relationship between height for age (TB/A) and cognitive development (Ismail et al., 2024). Research by Lestari et al. (2024) shows that stunted children have lower academic grades than normal children (Lestari et al., 2024).

An initial survey of 10 mothers of toddlers in the work area of the Gogaguman Health Center, Kotamobagu City showed that 60% of toddlers had short nutritional status (Z-score TB/A -2 SD). Of the 10 mothers, 4 (40%) with KEK nutritional status had stunted children. Only 2 (20%) mothers who were not KEK had stunted children, and 4 mothers who were not KEK had children with normal nutritional status.

2. Research Methods

This type of research is quantitative with a case-control design. This study was conducted from July 25, 2024, to January 24, 2025, in Kotamobagu City. Case samples were taken from all toddlers who experienced stunting, as many as 30 people, and the control group was toddlers who did not experience stunting, as many as 30 people. Data collection tools in the form of self-data questionnaires, medical records, and microtubules. Data analysis in this study used univariate and bivariate analysis with the chi-square test.

3. Results and Discussion

3.1. Respondent Characteristics

The characteristics of respondents studied in this study include the mother's age, the mother's education, the mother's occupation, the toddler's age, and the toddler's gender. The frequency distribution of mothers' education and toddlers' gender in this study can be seen in Table 1:

Table 1. Respondent Characteristics Based on Age and Gender

No	Characteristics	<u>Case Group</u>		<u>Control Group</u>	
		n	%	n	%
1	Age				
	< 3 year	14	46,7	14	46,7
	≥ 3 year	16	53,3	16	53,3
2	Gender				
	Male	14	46,7	14	46,7
	Female	16	53,3	16	53,3
3	Father Occupation				
	Unemployment	0	0	0	0
	Private	21	70	16	53,3

Entrepreneur	2	6,7	10	33,3
Breeder	5	16,7	4	13,3
Government employees	2	6,7	0	0
4 Mother Occupation				
Work	13	43,3	21	70
5 Father education				
SD-SMP	1	3,3	0	0
SMA	24	80	22	73,3
Diploma / Bachelor	5	16,7	8	26,7
6 Mother Education				
SD-SMP	7	23,3	6	20
SMA	19	63,4	20	66,7
Diploma/ Bachelor	4	13,3	4	13,3
Total	30	100	30	100
Unemployment	17	56,7	9	30

Based on the results of the study on the characteristics of respondents between the case group (stunted toddlers) and the control group (non-stunted toddlers), it was found that the distribution of age and gender of toddlers in both groups showed a balanced proportion. In both the case and control groups, 46.7% of toddlers were under 3 years old, and 53.3% were 3 years old or older. Meanwhile, based on gender, 46.7% were male and 53.3% female in both groups. This shows that age and gender do not show a striking difference in the incidence of stunting.

In terms of father's occupation, most fathers in the case group worked in the private sector (70%), while in the control group, only 53.3%. Interestingly, there were more fathers who worked as entrepreneurs in the control group (33.3%) compared to the case group (6.7%). This shows that the type of father's occupation, which can affect the family's economic stability, has the potential to affect the child's nutritional status.

Mother's occupation also showed a striking difference, where 70% of mothers in the control group worked, while only 43.3% in the case group. Working mothers are likely to have better economic access and, therefore, are able to meet their children's nutritional needs more optimally.

The majority of fathers' and mothers' education levels are at the high school level for both groups. Although the level of education shows an almost even distribution, the skills and knowledge related to nutrition applied in daily life can differ, depending on access to information and the family environment (Sutami, n.d.).

Overall, the work factor of parents, especially mothers, appears to have an influence on children's nutritional status. This reinforces the importance of family economic empowerment and increasing nutritional knowledge to prevent stunting.

3.2. Nutritional Status of Mothers During Pregnancy

The indicator for measuring maternal nutritional status during pregnancy is by using the Upper Arm Circumference (MUAC) measurement indicator. The Upper Arm Circumference (MUAC) is one of the options for determining nutritional status because it is easy to do and

does not require tools that are difficult to obtain. The results of maternal nutritional status during pregnancy obtained can be seen in Table 2, namely:

Table 2. Nutritional Status of Mothers During Pregnancy

No	Maternal Nutritional Status During Pregnancy (LILA)	Case Group		Control Group	
		n	%	n	%
1	KEK (Chronic Energy Deficiency)	18	40	5	16,7
2	No KEK (Chronic Energy Deficiency)	12	60	25	83,3
Total		30	100	30	100

The results of the study showed that out of a total of 30 mothers in the case group (stunted toddlers), 18 (60%) experienced Chronic Energy Deficiency (CED) during pregnancy, while in the control group (non-stunted toddlers), only 5 (16.7%) mothers experienced CED. On the other hand, the proportion of mothers who did not experience CED was higher in the control group, namely 25 people (83.3%), compared to the case group, which was only 12 people (40%).

These results illustrate a strong relationship between maternal nutritional status during pregnancy and the incidence of stunting in toddlers, where mothers who experience CED have a higher risk of giving birth to children with short stature (stunting). CED reflects the condition of pregnant women who experience inadequate energy and protein intake for a long period, which can affect fetal growth since in the womb (Tyarini et al., 2025).

This finding is supported by research by Maskur et al. (2021), which states that pregnant women with KEK have a 2 to 4.8 times greater risk of giving birth to stunted children compared to mothers with good nutritional status (Maskur et al., 2021). This is also in line with the guidelines from the Roswita (2022), which states that mothers with LILA <23.5 cm are categorized as having KEK and must receive special attention in fulfilling their nutrition (Roswita & Nurbaniwati, 2022).

Thus, preventing KEK in pregnant women is an important step in reducing stunting rates, through nutritional interventions since pregnancy, routine LILA monitoring, and education for pregnant women about the importance of adequate nutritional intake.

3.3. Relationship Between Maternal Nutritional Status During Pregnancy And Stunting Incidence

Table 3. Relationship between maternal nutritional status during pregnancy and stunting incidence

Kejadian Stunting								
Maternal Nutritional Status During Pregnancy (LILA)	Case Group		Control Group		Total		OR 95% CI	p-value
	n	%	n	%	n	%		
KEK (Chronic	18	60	5	16,7	23	38,3	7,500	0,01

Energy Deficiency)							
No KEK (Chronic Energy Deficiency)	12	40	25	83.3	37	61.7	(2,244-25,062)
Total	30	100	30	100	60	100	

The results of the study showed that of the 30 mothers in the case group (stunted toddlers), 60% experienced Chronic Energy Deficiency (CED) during pregnancy, while in the control group (non-stunted toddlers), only 16.7% of mothers experienced CED. Statistical analysis using the Chi-square test showed that there was a significant relationship between maternal nutritional status during pregnancy and the incidence of stunting, with a p value = 0.01 and odds ratio (OR) = 7.510, meaning that pregnant women who experience CED have a 7.5 times greater risk of giving birth to stunted children compared to mothers who do not have CED.

The 95% confidence interval (Confidence Interval/CI) of 2.244–25.062 indicates that these results are statistically significant and not coincidental.

This finding is in line with the research of Alfari et al. (2019) which found that toddlers from pregnant mothers with CED have a 2.2 times greater risk of experiencing stunting than toddlers from mothers who do not have CED (Putri Adila et al., 2023). Another study by Rualida and Soumokil (2018) also showed a 4.8 times higher risk of stunting in mothers with KEK nutritional status.

According to UNICEF (2013), nutritional deficiencies during the first 1,000 days of life, including pregnancy, will have a significant impact on fetal and toddler growth. KEK can interfere with fetal development, causing Low Birth Weight (LBW), linear growth disorders, and ultimately stunting.

Thus, the nutritional status of pregnant women plays an important role in preventing stunting. Nutritional interventions during pregnancy are crucial to ensure optimal toddler growth and development.

4. Conclusions

The results of this study indicate a significant relationship between maternal nutritional status during pregnancy, as measured using the Upper Arm Circumference (LILA) indicator, and the incidence of stunting in toddlers. Pregnant women who experience Chronic Energy Deficiency (CED) have a 7.5 times greater risk of giving birth to children with stunting compared to mothers who do not experience CED ($p = 0.01$; 95% CI = 2.244–25.062). Thus, it can be concluded that maternal nutritional status during pregnancy is a determinant factor that influences the incidence of stunting in children. Efforts to improve the nutrition of pregnant women, especially during the first 1,000 days of life, are very important to reduce the incidence of stunting.

References

- Akbar, R. R., Kartika, W., & Khairunnisa, M. (2023). The effect of stunting on child growth and development. *Scientific Journal*, 2(4), 153-160. <https://doi.org/10.56260/sciena.v2i4.118>
- Aldisurya, A. A., Akhriani, M., Wati, D. A., & Dewi, A. P. (2023). Relationship between pre-pregnancy body mass index (BMI), number of pregnancies, and number of nutrition education participation with circumference upper arm (IILA) of pregnant women. *Indonesian Journal of Health Research and Development*, 1(2), 32-38. <https://doi.org/10.58723/ijhrd.v1i2.99>
- Apriliyanti, R., & Kustriyanti, D. (2023). Children growth and development of 18 months-aged babies: Nutritional status overview for early stunting screening. *Jurnal Smart Keperawatan*, 10(1), 37. <https://doi.org/10.34310/jskp.v10i1.709>
- Aryani, A., Herawati, V. D., Mufidah, N., & Eriyanti, E. (2024). The effect of health education on nutrition on increasing mothers' knowledge in preventing stunting in children. 2(1). <https://doi.org/10.36728/iceete.v2i1.167>
- Astuti, F. D., Azka, A., & Rokhmayanti, R. (2022). Maternal age correlates with stunting in children: Systematic review. *Journal of Maternal and Child Health*, 7(4), 479-448. <https://doi.org/10.26911/thejmch.2022.07.04.11>
- Fibriana, A. I., Budiono, I., Pribadi, F. S., & Kasmini, O. W. (n.d.). Factors influencing cognitive development in early childhood: A systematic literature review. 9-22.
- Ismail, F., Fasrini, U. U., & Harmen, A. P. (2024). Nutritional status and cognitive development in children aged 2-5: A narrative review.
- Kurnia, Y. (2023). Correlation between nutritional status of mothers during pregnancy and stunting incidence at the age of 24-59 months at Godean Health Center 1. *Jurnal Kebidanan*, 12(1), 61-68. <https://doi.org/10.26714/jk.12.1.2023.61-68>
- Lestari, E., Siregar, A., Hidayat, A. K., & Yusuf, A. A. (2024). Stunting and its association with education and cognitive outcomes in adulthood: A longitudinal study in Indonesia. *PLoS ONE*, 19(5), 1-18. <https://doi.org/10.1371/journal.pone.0295380>
- Maskur, S. U., Budiman, B., & Lestari, A. (2021). The relationship between knowledge and dietary habit with incidence chronic energy deficiency in the pregnant women in the working area Talise City of Palu. *International Journal of Health, Economics, and Social Sciences (IJHESS)*, 3(1), 19-27. <https://doi.org/10.56338/ijhess.v3i1.1423>
- Morales, F., Montserrat-de la Paz, S., Leon, M. J., & Rivero-Pino, F. (2024). Effects of malnutrition on the immune system and infection and the role of nutritional strategies regarding improvements in children's health status: A literature review. *Nutrients*, 16(1), 1-16. <https://doi.org/10.3390/nu16010001>
- Mulianingsih, M., Nurmayani, W., Pratiwi, A., Rifky, N., & Safitri, H. (2021). Nutritional status and weight of pregnant women to birth weight (BBL) to early detection of stunting. *STRADA Jurnal Ilmiah Kesehatan*, 10(1), 138-150. <https://doi.org/10.30994/sjik.v10i1.523>
- Ningrum, E. W., & Cahyaningrum, E. D. (2020). Estimation model on newborn anthropometry based on mid-upper arm circumference (MUAC). *Jurnal Kebidanan Dan Keperawatan Aisyiyah*, 16(1), 120-125. <https://doi.org/10.31101/jkk.1486>
- Prasetyo, Y. B., Wardoyo, S. S. I., & Laksono, A. D. (2024). Factors influencing children's dietary variety in Eastern Indonesia: A comprehensive national analysis. *Jurnal Keperawatan Padjadjaran*, 12(3), 308-315. <https://doi.org/10.24198/jkp.v12i3.2488>
- Putri Adila, W., Sri Yanti, R., & Sriyanti, R. (2023). The relationship of chronic energy deficiency (CED), exclusive breastfeeding, and economic with stunting in Nagari Aua Kuning West Pasaman. *Science Midwifery*, 10(6), 2721-9453.
- Romey, R., & Mangunsong, D. (2025). Stunting and its implications on cognitive ability and language development. 10, 134-147. <https://doi.org/10.26911/jepublichealth.2025.10.02.01>
- Roseboom, T. J. (2019). Epidemiological evidence for the developmental origins of health and disease: Effects of prenatal undernutrition in humans. *Journal of Endocrinology*, 242(1), T135-T144. <https://doi.org/10.1530/JOE-18-0683>
- Roswita, K. W., & Nurbaniwati, N. (2022). The correlation between anemia and chronic energy deficiency in pregnant women with the incidence of low birth weight at the Ciwaringin Cirebon Health Center in 2020-2022. 382-390. <https://doi.org/10.24198/obgynia.v7i3.751>
- Safitri, N. I., Noor, N. N., Wahiduddin, Amiruddin, R., Jafar, N., Balqis, & Mallongi, A. (2023). Risk factors of stunting in children aged 0-23 months in Katumbangan Health Center, Indonesia. *Pharmacognosy Journal*, 15(5), 851-855. <https://doi.org/10.5530/pj.2023.15.163>
- Soliman, A., De Sanctis, V., Alaraj, N., Ahmed, S., Alyafei, F., Hamed, N., & Soliman, N. (2021). Early and long-term consequences of nutritional stunting: From childhood to adulthood. *Acta Biomedica*, 92(1), 1-12. <https://doi.org/10.23750/abm.v92i1.11346>
- Sopiah, M. (2022). Early childhood development (physical, intellectual, emotional, social, moral, and religious tasks) implications for education. *Indonesian Journal of Early Childhood: Jurnal Dunia Anak Usia Dini*, 4(2), 361. <https://doi.org/10.35473/ijec.v4i2.1674>
- Sutami, I. (n.d.). Nutrition education on family-based food and knowledge on feeding practices of mothers of children Agricultural Extension and Communication Study Program, Faculty of Agriculture, Sebelas Maret. 36, 1548-1556.
- Tyarini, I. A., Menga, M. K., Setiawati, A., & Daiyah, I. (2025). The effect of nutritional status of pregnant women on the incidence of stunting in early childhood: Determinants of growth and development. 24-31. <https://doi.org/10.61099/junedik.v3i1.71>
- Widya Addiarto, & Yulia Rachmawati Hasanah. (2023). Study investigation the risk factors of toddlers with low nutritional status in the North Coast of Java, Indonesia. *Jurnal Kesehatan Dr. Soebandi*, 11(2), 107-112. <https://doi.org/10.36858/jkds.v11i2.508>
- Widayanti, A., Dewie, A., & Silfia, N. N. (2025). Determinants of chronic energy deficiency (CED) in pregnant women in the Lere Health Center working area, Palu City in 2021-2023. 17(1), 1-10. <https://doi.org/10.36456/1dzp9q54>