

History of Chronic Energy Deficiency (CED) of Pregnant Women and Stunting in Toddlers

Triani Yulianti¹, Winarsih Nur Ambarwati², Sulastri Sulastri³, Alfiah Rahmawati⁴

¹Sekolah Tinggi Ilmu Kesehatan Estu Utomo, Indonesia

²School of Healthcare University of Leeds, United Kingdom

³Universitas Muhammadiyah Surakarta, Indonesia

⁴Universitas Sultan Agung Semarang, Indonesia

Article Info

Article history:

Received: Sep 14, 2023

Revised: Nov 10, 2023

Accepted: Nov 16, 2023

DOI: [10.58418/Ijni.V2i2.45](https://doi.org/10.58418/Ijni.V2i2.45)

How to cite this article:

Yulianti, T., Ambarwati, W. N., Sulastri, S., & Rahmawati, A. (2023). History of Chronic Energy Deficiency (CED) of Pregnant Women and Stunting in Toddlers. *International Journal of Nursing Information*, 2(2), 7–12.

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ABSTRACT

Children who experience stunting in the early stages of life up to five years of age will not reach their maximum physical and mental/intelligence potential in adulthood. The problem of stunting is in the world's attention, and it is evident that one of the targets of the Sustainable Development Goals (SDGs) is to reduce cases of stunting worldwide. The purpose of this study was to determine the relationship between the history of CED in pregnant women and the incidence of stunting. This research method is analytic with a case-control retrospective approach. The sampling technique used was proportional sampling, which in this study was divided into two groups, namely 24 groups of toddlers with stunting and a control group of 24 toddlers who were not stunted in Kacangan Village, Andong District, Boyolali Regency, Indonesia. The results show a significant relationship between the history of CED during pregnancy and the incidence of stunting. It is hoped that midwives can provide counseling and monitor the nutritional status of pregnant women, bearing in mind that if the nutritional status of pregnant women is good, it can reduce the incidence of stunting in toddlers. The contribution of this research is to provide information regarding the importance of the nutritional status of pregnant women.

Keywords: Chronic Energy Deficiency, Toddlers, Stunting, Nutrition, Pregnant Women



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Corresponding Author:

Triani Yulianti

Sekolah Tinggi Ilmu Kesehatan Estu Utomo, Indonesia

Email: tranieub@gmail.com

1. INTRODUCTION

Stunting is a growth disorder in children (Febriani et al., 2020; Handryastuti et al., 2022). People with this disorder have a shorter or stunted height based on age standards (Campos et al., 2020; Scheffler & Hermanussen, 2022). This serious condition occurs because children do not get the right amount of nutritious intake, for a long time or chronically. In Indonesia, stunting contributes to 15-17 percent of total child deaths (Lukman et al., 2022). The problem of malnutrition that is currently a priority is chronic malnutrition in toddlers, which is represented by the anthropometric status of height/age below normal, namely children in the short and very short categories, which are called stunting. Stunting is problem number 3 in the 2018-2023 Strategic Plan (Miswan, 2022). It is feared that children who experience stunting in their early life up to five years will not reach their maximum physical and mental/intelligence potential in adulthood. This is due to malnutrition in the first 1,000 days of life which will result in disruption of linear growth and at the same time disruption of the development of brain cells.

The 270 days of fetal growth, which continues from 730 days after birth to 2 years, is a period of tissue preparation and maturation of the primary organs (Mulianingsih et al., 2021). Formation of a person's genetic potential in the next period until adulthood. The effects of stunting are permanent, and difficult to return to its potential growth path. Children who are already stunted will decrease their

physical potential, thus hindering other potential abilities/skills that are very important for the development of the following quality of life. Likewise, stunted children also represent a decrease in intelligence. As a result, in the next period, they will have low cognitive abilities, leading to uncompetitive work quality, thus affecting low economic productivity.

Child stunting is one of the most significant barriers to human development and globally affects an estimated 162 million children under 5 years of age (Laksono et al., 2022; Rueda-Guevara et al., 2021). Stunting according to the WHO Child Growth Standard is based on an index of body length compared to age or height compared to age with a z-score less than -2 SD. Stunting is currently a problem because it is associated with an increased risk of morbidity and mortality (Leroy & Frongillo, 2019; Thurstans et al., 2022), as well as suboptimal brain development so that children's motor and mental development is hampered. Growth stunting that occurs in early childhood can continue and there is a risk of growing short in adolescence. Children who grow short at an early age (0-2 years) and remain short at ages 4-6 years have a 27 times the risk of remaining short before entering puberty.

Stunting that has been going on since childhood will have an impact in the future, namely it can cause disturbances in Intelligence Quotient (IQ), psychomotor development (Delima et al., 2023), motor abilities (Setianingsih et al., 2020), and neurosensory integration (Putri et al., 2023), having a lower average IQ compared to children who are not stunted. WHO sets a maximum tolerance limit for stunting (short stature) of 20% or one fifth of the total number of toddlers (Rohmawati et al., 2022). Meanwhile, in Indonesia, 7.8 million out of 23 million toddlers were stunted or around 35.6%. In Indonesia, around 37% (almost 9 million) of children under five are stunted. Basic Health Research conducted by the Ministry of Health stated that the percentage of very short toddlers aged 0-59 months in Central Java Province in 2019 was 31.15%, while the percentage of toddlers who were short was 20.06%. This is still far from the target set by WHO and in Boyolali District itself there are as many as 5.3% of toddlers who experience stunting. Seeing the high prevalence of stunting in Central Java in particular which is spread across all regencies/cities, it is feared that a "lost generation" will occur in the future. Based on these data it can be said that all Regencies/Cities in Central Java are still facing the problem of chronic stunting malnutrition. Thus in all Regencies/Cities in Central Java it is necessary to implement comprehensive efforts to reduce the prevalence of stunting.

The causes of stunting are divided into 4 major groups, namely family and household factors, inadequate complementary feeding, breastfeeding and infection (Arlinda et al., 2022; Djogo et al., 2022; Yuliastini et al., 2020). Family factors, especially maternal, can be due to poor nutrition during preconception, pregnancy and lactation (Ali, 2021). Nutrition in the mother that affects including CED. Chronic energy deficiency causes inadequate reserves of nutrients needed by the fetus in the womb resulting in a decrease in blood volume (Farias et al., 2020). This will cause inadequate cardiac output which will cause blood flow to the placenta to decrease so that the placenta becomes small and transfers nutrients from mother. Decreased fetal passage through the placenta results in fetal growth retardation resulting in the risk of giving birth to a baby with low birth weight (LBW) or IntraUterine Growth Restriction (IUGR). History of LBW has an important role in the incidence of stunting (Ivone et al., 2021).

Data in Andong District as of January 2, 2022 shows that the highest stunting rate is in the village of Kacangan with a total of 13%, namely 288 toddlers and 38 toddlers who are stunted. And of the 28 pregnant women there were 9 people (32%) who experienced CED. Seeing the high number of toddlers who experience stunting and pregnant women who experience CED, the researchers want to know whether there is a relationship between a history of CED during pregnancy and the incidence of stunting in toddlers in Kacangan Village, Andong Boyolali District. Based on the background above, the purpose of the study to know how big the impact of a pregnancy that lacks caloric energy is with the occurrence of stunting in toddlers.

2. METHOD

The type of research used is analytic observational with a case-control approach. Analytical observational research looks for relationships between one variable and another. The case-control approach is an analytical study that concerns how risk factors are studied using a retrospective approach. Case-control studies can be used to assess the role of risk factors in disease occurrence (cause-effect relationships). The retrospective approach is a research method with the primary objective of making an objective picture or description of a situation by looking back. This study's independent variable was the mother's history of chronic energy deficiency (CED) during pregnancy. Meanwhile, the dependent variable is stunting status in toddlers in order to find out the relationship between the history of CED in pregnant women and stunting.

The population for this study was toddlers in Kacangan Village, Andong District, Boyolali Regency, Indonesia, in April 2022. The sample in this study was divided into two groups, namely the toddler group with stunting and the control group. These toddlers were not stunted in Kacangan Village, Andong District, Boyolali Regency. The sample size calculation used software size from WHO, and the results obtained were 24 samples. In this study, the case group was selected, namely toddlers with stunting, and

the control group, namely toddlers who were not stunted, with a ratio of 1:1, so that the sample size for each group was 24 toddlers, so the total sample was 48 toddlers. Table 1 below is the operational definition of conducting this research.

Table 1
Variable Operational Definitions

Variables	Operational Definitions	Measuring instrument	Category Measure	Scale
History of CED in pregnant women (Independent Variable)	The examination is carried out by measuring LILA when the woman is pregnant. Data on the incidence of CED in the mother's cohort or KMS/KIA book showing the results of CED examinations or book diagnoses at KIA	Secondary Data of the KIA Book	1. Not CED LILA \geq 23 cm 2. CED LILA < 23 cm	Ordinal
Stunting events (Dependent variable)	Toddlers who are classified as short based on body length indicators using the WHO 2005 standard Z-score, with values < -2SD to -3SD.	Secondary data from Z-Score Height/Age measurement results from the Posyandu of Kacangan Village	1. No Stunting -2 SD to 2 SD 2. Stunting If the measurement results are outside the normal limits	Ordinal

3. RESULTS AND DISCUSSION

3.1. Results

Table 2 below shows the respondents' identities based on age, parity, and mother's occupation for univariate analysis in this study.

Table 2
Characteristics of Respondents Blood Pressure

Characteristics	Categories	Frequencies	Percentage
Age	<20	7	14.6
	20 – 35	38	79.2
	>35	3	6.2
Parity	1	20	42
	2 – 4	28	58
	>4	0	0
Occupation	Housewife	25	52
	Factory employee	18	37.5
	Student	2	4.2
	Teacher/civil servant	3	6.3

Based on Table 2 above, it is known that the age of the mothers in this study was mostly 20-35 years old, namely 38 respondents (79.2%). Most of the parity of respondents were multipara (2-4), namely 28 respondents (58%). Most of the occupation have housewife, namely 25 respondents (52%).

Table 3
History of CED in Mothers having Toddlers

Categories	Frequencies	Percentage
CED	19	40
Not CED	29	60
Total	48	100

From the Table 3 above it can be seen that most or 60% of mothers who have toddlers in the village of kacangqn did not experience CED during pregnancy, namely 29 respondents (60%). Relationship between history of CED during pregnancy and the incidence of stunting in infants. Bivariate analysis was carried out using the chi-square test because the data scale is ordinal with the results in the following Table 4.

Table 4
Chi-square Test

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.056 ^a	1	0.008
Continuity Correction	5.575	1	0.018
Likelihood Ratio Fisher exact Test	7.279	1	0.007
N of Valid Cases	48		0.009

Based on Table 4, the results of statistical calculations of the Chi Square test regarding the relationship between history of CED during pregnancy and stunting in toddlers, a p value of 0.018 was obtained. Because the p value <a is 0.018 <0.05, it can be concluded that there is a relationship between the history of CED during pregnancy and the incidence of stunting in toddlers.

3.2. Discussion

3.2.1. History of CED during Pregnancy

The results of analyzing the history of CED during pregnancy in mothers under five in this study found that 29 mothers (60%) did not experience CED during pregnancy, and there were 19 mothers (40%) experienced CED during pregnancy. In this study, it was found that two mothers who were CED during pregnancy were still students. In the case of this study, pregnant women, while still in school, were then married off by their families. This is due to the lack of knowledge of mothers about the dangers of pregnancy at a young age.

In this study, it was found that seven mothers (14.6%) were below the standard age for pregnancy, and three pregnant women were over 35 years old. Suppose the younger and older the mother during pregnancy, it will affect the nutritional needs needed. Young mothers (<20 years) need much additional nutrition because apart from being used for growth and development for themselves, these nutrients must also be shared with the fetus that is being conceived.

This is in accordance with the opinion of Hani & Rosida (2018) that several other important things related to the nutritional status of a mother are pregnancy at a young age (<20 years), pregnancies with a short distance from previous pregnancies (<2 years), pregnancies too often and pregnancy at too old age (> 35 years). The same thing was stated by Reski et al., (2020) that cases of Chronic Energy Deficiency (CED) in Indonesia are caused by several factors namely age, education, occupation, history of disease, history of anemia, and parity.

In this study, it was found that 5 mothers had CED status as Housewife and 12 mothers worked in factories. This is because mothers do not pay attention to the food consumed, such as often consuming snacks that are less nutritious. Researchers see that there are low socioeconomic factors so that the nutritional coverage of the mother is not considered. This is in line that families with low economic levels will usually spend part of their income on food (Daniel, 2020; Penne & Goedemé, 2021). Meanwhile, the more money, the better the food obtained because most of the income is used to buy the food as desired. Even though the mother is not working, the husband or family of the preconception woman has a job with sufficient income to meet the nutritional needs of the family but in this case the family economy is also low so that it will also increase the risk of CED in pregnant women.

3.2.2. Relationship between History of CED during Pregnancy and Stunting in Toddlers

The results of bivariate analysis on 2 variables using the Chi Square test showed that there was a relationship between the history of CED and the incidence of stunting in toddlers in the village of Kacangan, Kec. Andong Regency Boyolali with a p value of 0.018 which is 0.018 <0.005 so that Ho is rejected and Ha is accepted. So that there is a relationship between a history of CED during pregnancy and the incidence of stunting in the village of Kacangan, Kec. Andong Regency Boyolali. Thus it can be concluded that the incidence of CED in mothers during pregnancy can result in stunting in toddlers.

Stunting in toddlers is influenced by the mother's nutritional history such as chronic energy deficiency (CED) (Adila & Yanti, 2023). Maternal nutritional status in pregnant women can affect the growth of the fetus in the womb (Moreno-Fernandez et al., 2020; Odhiambo et al., 2020). If the mother's nutritional status is normal before and during pregnancy, it is likely that she will give birth to a healthy, full-term baby with normal weight and good growth and development of the baby. In infants can be

measured by Height/Age. If the height/age of a child under five years (toddlers) has a lower length/height compared to children of his age, it can be called stunting.

The results of this study are in line with a similar study from Ruaida & Soumokil (2018) that there is a significant relationship between CED in women during pregnancy and the incidence of LBW which can be seen from the p value = 0.00 and OR = 5.93 (95% CI; 2.57 – 13.70). So it can be interpreted that mothers with CED during pregnancy have a 5.93 times greater chance of causing a child with stunting compared to mothers who are not CED.

In this study, it was found that respondents who experienced CED but their toddlers were not stunted when they were toddlers, this is because even though the mother experienced CED, the mother fulfilled the baby's nutrition optimally and cared for her baby herself. From the calculation of the Odds ratio, the number 5,320 is obtained, which means that mothers who experience CED during pregnancy are at risk of giving birth to babies who are stunted 5.3 times compared to mothers who are not CED during pregnancy.

4. CONCLUSION

There is a significant relationship between the history of CED during pregnancy and the incidence of stunting. With this research, it is hoped that midwives will provide counseling and monitor the nutritional status of pregnant women. Given that if the nutritional status of pregnant women is good, it can reduce the incidence of stunting in children under five. The contribution of this research is to provide information regarding the importance of the nutritional status of pregnant women.

ACKNOWLEDGEMENTS

The authors would like to thank all colleague from STIKes Estu Utomo, School of Health care University of Leeds United Kingdom, Universitas Muhammadiyah Surakarta, and Universitas Sultan Agung Semarang.

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