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*Research Article*

# Relationship between CED Status, Pregnant Women and LBW with Stunting Incidence in Toddlers at Dolodou Health Center, West Dumoga District

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**Abstract:** Stunting is a medical condition that significantly affects children's growth and development, resulting in long-term impacts on physical health, cognitive abilities, and productivity in adulthood. The problem often begins during pregnancy and early life, when nutrition and health care play a critical role in determining a child's developmental trajectory. This study aimed to analyze the relationship between the prevalence of stunting among toddlers in the operational area of the Dolodou Health Center UPTD and two key maternal and perinatal factors: chronic energy deficiency (CED) in pregnant mothers and low birth weight (LBW). A cross-sectional design was applied using a quantitative research approach. The study population consisted of all mothers with toddlers in the Dolodou Health Center area, and 31 respondents were recruited using a total sampling technique. Data were collected using structured questionnaires to gather information on maternal nutrition history, pregnancy conditions, and child anthropometric measurements. Chi-square statistical analysis was used to examine the relationships between variables. The results revealed a significant association between stunting and maternal CED status ($p = 0.024$), indicating that children born to mothers with chronic energy deficiency were at a higher risk of experiencing stunting. Additionally, children with a history of LBW were found to be more likely to suffer from stunting compared to those with normal birth weight. These findings underscore the importance of preventive measures during pregnancy, including nutritional monitoring, dietary supplementation, and health education to prevent both CED and LBW. In conclusion, addressing maternal nutritional health before and during pregnancy, along with continuous monitoring of child growth, is crucial to reducing stunting prevalence. Collaborative efforts between health workers, families, and the community are essential to ensure adequate nutrition and promote healthy development in children.

**Keywords:** Birthweight, Children, Nutrition, Pregnancy, Stunting

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## 1. Introduction

The quality of human resources begins to form since in the womb, where the fetus's status is significantly impacted by the mother's health throughout pregnancy. Pregnant women who experience People with chronic energy deficiency (CED) are susceptible to babies with low birth weight. Stunting is more common in babies with low birth weights (LBW). Stunting is one of the impacts of malnutrition that can inhibit the

development and maturation of kids, so that they cannot reach their genetic potential optimally. This condition is measured using the Height Based on Age (TB/U) or Indicators of Length by Age (PB/U). The TB/U indicator reflects long-term nutritional status something takes place because various factors that occur over a considerable amount of time, such as poverty, inappropriate parenting patterns, and inadequate sanitation and hygiene, which ultimately increase the risk of recurrent diseases.(Rismayana & Sunarti, 2024).

One of the health problems experienced by toddlers is stunting. One condition is stunting. in which toddlers experience a lack of nutritional intake for a long time, so that their growth is disrupted and their height is lower than the standard for their age. This condition is caused by a dietary intake imbalance and various further health issues, especially during the first 1,000 days of life.(Ma'rupah et al., 2024)

Based on The Ministry of Health in Indonesia (2022) Health services for infants, toddlers, and preschoolers aim to reduce mortality rates in this age group and enhance their standard of living. This effort includes reducing the prevalence of stunting and wasting by ensuring the fulfillment of essential services. In addition, this service plays a role in disease prevention and early detection of health risks in infants and toddlers, so that they can be followed up quickly and accurately.(Rahayu et al., 2024)

According to According to data from the Asia Development Bank, Timor Leste has the highest rate of stunting in toddlers in Southeast Asia (48.8%). With a predominance of 31.8%, Indonesia comes in second, followed by Laos in third with 30.2%. Conversely, with a prevalence of just 2.8%, Singapore has the lowest rate of stunting in Southeast Asia (Noviana et al., 2023). With a prevalence of 31.8%, Indonesia has the second-highest stunting rates in Southeast Asia. below Timor Leste which reached 48.8%. Based on the Indonesian Nutritional Status Survey (SSGI) report conducted by the Ministry of Health, the prevalence of stunting in Indonesia has fluctuated from year to year. In 2022, 21.6% of toddlers were recorded as experiencing stunting, a decrease of 2.8% compared to 2021. However, further efforts are still needed to reduce the stunting rate by 3.8% per year so that the target of 14% in 2024 can be achieved. (Wahyuni & Kusumodestoni, 2024) According to the 2022 Indonesian Nutritional Status Survey (SSGI), 21.6% of Indonesian toddlers suffer from stunting. a decrease compared to 2021 which was recorded at 24.4%.(Prihatiningrum et al., 2024). Based on data reported through the e-PPBGM application how common stunting is in North Sulawesi shows a downward trend from 2020 to 2022. In 2020, the stunting rate was recorded at 4.7%, then decreased to 3% in 2021, and decreased again to 2.4% in 2022(Mandu et al., 2024).

Stunting is not only a physical problem, but also has a broad influence on the development of Indonesian Personnel. If the stunting rate is too high, it could be a threat to the creation of a superior generation. One of the impacts of stunting is the suboptimal cognitive development of children, which can affect their lives in the future. Cognitive abilities

include complex thinking, reasoning, and problem solving. Good cognitive development will help children understand general knowledge more broadly, so that they can function well in social life.(Daracantika et al., 2021). The nutritional condition of expectant mothers, which is crucial for the fetus's growth and development, is one risk factor that leads to stunting. Nutritional problems need to be considered from the time of pregnancy, because lack of nutrition in early life can have long-term impacts. These impacts include Low birth weight (LBW), tiny, short, thin bodies, weakened immune systems, stunted fetal development (PJT), and an elevated risk of mortality(Alfarisi et al., 2019)

To achieve the target of reducing stunting, an active role is needed from various sectors, both government, private sector, and all levels of society. Preventing stunting is a shared responsibility, one of which is through the role of the PKK driving team and health cadres who are part of the community. Therefore, it is important to involve the PKK and health cadres in efforts to prevent and screen for stunting by increasing understanding of stunting in toddlers and preventive measures.(Yuwanti et al., 2022).

## 2. Preliminaries or Related Work or Literature Review

Stunting remains a pressing public health concern in many developing countries, particularly in Indonesia. It is a condition characterized by impaired linear growth in children, often resulting from chronic malnutrition during the first 1,000 days of existence, starting from conception and ending on the second birthday. Stunting has long-term consequences on physical health, cognitive development, and economic productivity. Extensive research has highlighted the multifactorial etiology of stunting, including maternal nutrition, fetal development, birth weight, infection, and socio-environmental factors(Anjani et al., 2024)

**Maternal Nutritional Status and Chronic Energy Deficiency (CED)**

Pregnant women's nutritional health is crucial for both fetal growth and the development of the unborn kid. A disease known as chronic energy deficiency (CED) occurs when a woman's caloric intake is insufficient for her physiological needs over a prolonged period. CED during pregnancy has been linked to intrauterine growth restriction, low birth weight (LBW), and increased susceptibility to stunting in children (Jannah & Nadimin, 2021)

According to(Purwitaningtyas & Paramitha, 2024) There is a noteworthy association between CED and the prevalence of stunting in toddlers, particularly during the crucial developmental phase of early childhood. Pregnant women who are chronically undernourished are more likely to deliver babies who are stunted or experience growth delays.

To combat CED, interventions such as iron and folic acid supplementation, nutritional counseling, and community-based maternal nutrition programs have been implemented across various regions. Community health initiatives, such as those led by the PKK (Family Welfare Movement) and village health cadres, have been instrumental in identifying at-risk pregnancies and promoting early nutrition education(Hapsari et al., 2022). These grassroots programs help bridge gaps in healthcare access and support improved maternal and child health outcomes.

**Low Birth Weight (LBW) and the Risk of Stunting in Early Childhood**

A birth weight of less than 2,500 grams is known as low birth weight (LBW), and it is a crucial predictor of neonatal morbidity and mortality, and is strongly associated with stunting in later childhood. Infants born with LBW often face challenges in maintaining normal growth trajectories due to compromised nutrient stores, immature immune systems, and increased susceptibility to infections(Marlina et al., 2024.)

LBW is not only an outcome of maternal nutritional deficiencies, but also a consequence of other maternal health issues such as anemia, infections, and insufficient antenatal care. Babies with LBW may enter a cycle of undernutrition that begins at birth and persists through early childhood, ultimately manifesting as stunting.(Anggraini et al., 2024)

Effective stunting prevention must be grounded in integrated community health systems, where early detection of risk factors, nutrition-sensitive policies, and family education converge to support optimal child growth. The findings of the present study align with this literature, particularly by demonstrating the statistically significant relationships between maternal CED, LBW, and stunting, suggesting that early maternal and neonatal health interventions are key to breaking the intergenerational cycle of malnutrition.(Hadina et al., 2022).

## 3. Proposed Method

This study employed a cross-sectional research design and a quantitative methodology. that seeks to analyze the connection between low birth weight (LBW) and chronic energy deficiency (CED) status with the incidence of stunting in toddlers. The participants in this research were mothers and young children in the working section of the Dolodou Medical Facility UPTD. The sampling technique used the total sampling method, with a total of 31 mothers and children. Surveys were used to gather data, which was then examined utilizing SPSS software. Data analysis included descriptive statistical tests to see the frequency and percentage distribution, as well as the chi-square test to determine CED Status, Pregnant Women, and LBW in Relation to Toddler Stunting Incidence at Dolodou Health Center, West Dumoga District

## 4. Results and Discussion

Distribution of Respondents Chalralcharacteristics

**Table 1. Age Frequency Distribution**

| Age | Frequency | Percentage (%) |
|---|---|---|
| <20 years | 5 | 16.1% |
| 20-35 years | 22 | 67.1% |
| >35 years | 5 | 16.1% |
| Totalll | 31 | 100% |

Based on table 1, It might be seen that most Respondents are located in the ale 20–35 years old, as many as 22 people (67.1%). This alge is a productive age for mothers in breastfeeding and caring for their babies. Meanwhile, mothers under the age of 20 years only number 5 people (16.1%), and mothers over theage of 35 years are 5 people (16.1%)

**Table 2.** Frequency Distribution of Jobs

| Work | Frequency | Percentage (%) |
|---|---|---|
| housewife | 27 | 87.1% |
| Self-employed | 2 | 6.5% |
| civil servant | 2 | 6.5% |
| Total | 31 | 100% |

Based on Table 2, it can be seen because housewives make up the bulk of responders, totaling 27 individuals (87.1%). Meanwhile, only 2 respondents (6.5%) are self-employed and another 2 (6.5%) are civil servants. This shows that most of the participants are full-time homemakers, which may influence their time availability and access to reproductive health services.

**Table 3:** Education Level Frequency Distribution

| Education level | Frequency | Percentage (%) |
|---|---|---|
| Sd | 2 | 6.5% |
| Junior High School | 7 | 22.6% |
| Senior High School | 20 | 64.5% |
| PT | 2 | 6.5% |
| Total | 37 | 100% |

Based on Table 3, the largest proportion of respondents had completed senior high school, totaling 20 individuals (64.5%). This is followed by 7 respondents (22.6%) with a junior high school education. Meanwhile, both elementary school (SD) and college/university level (PT) are represented by only 2 respondents each (6.5%). This indicates that most of the respondents have a secondary education background, which may affect their health literacy, particularly regarding contraceptive choices.

Table 4. Frequency Distribution of CED Status

| CED Status | Frequency | Percentage (%) |
|---|---|---|
| Yes | 11 | 35.5% |
| No | 20 | 64.5% |
| Total | 31 | 100% |

Based on Table 4, the majorty of respondents were not classified as experiencing Chronic Energy Deficiency (CED), totaling 20 individuals (64.5%). Meanwhile, only 11 individuals (35.5%) were identified as having CED. This indicates that most respondents had a relatively adequate nutritional status, which may positively influence reproductive health and pregnancy outcomes.

**Table 5.** Frequency Distribution of LBW

| CED Status | Frequency | Percentage (%) |
|---|---|---|
| Yes | 11 | 35,5% |
| No | 20 | 64,5% |
| Total | 31 | 100% |

Based on Table 5, most of the of Respondents had no prior records of birth weight (LBW). deliveries. babies, accounting for 20 individuals (64.5%). On the other hand, 11 respondents (35.5%) reported having a history of LBW. These findings suggest that while most respondents had favorable pregnancy outcomes, the proportion of LBW cases remains notable and warrants attention.

**Table 6.** Frequency Distribution of Stunting Incidents

| CED Status | Frequency | Percentage (%) |
|---|---|---|
| Yes | 7 | 22.6% |
| No | 24 | 77.4% |
| Total | 31 | 100% |

Based on Table 6, most respondents did not have children with stunting, with a total of 24 individuals (77.4%). However, 7 respondents (22.6%) reported having children who experienced stunting. This highlights that although stunting is not prevalent among the majority, it remains a concern that requires further attention, particularly in relation to parenting practices, nutritional intake, and family health education.

**Table 7.** The connection between stunting incidence and CED status

| CED Status | Stunting Incident | | | | Total | P value |
|---|---|---|---|---|---|---|
| | Yes | | No | | | |
| | n | % | n | % | | |
| Yes | 5 | 45.5% | 6 | 54.5% | 100% | 0.024 |
| No | 2 | 10% | 18 | 90% | 100% | |
| Total | 7 | 22.6% | 24 | 77.4% | 100% | |

Based on Table 7, there is an statistically substantial connection between CED (chronic energy deficiency) and status and stunting occurrence (p = 0.024). Among respondents with CED, 5 individuals (45.5%) had children with stunting, while 6 individuals (54.5%) did not. Conversely, among those without CED, only 2 individuals (10%) had children with stunting, and the majority, 18 individuals (90%), did not. These findings suggest that maternal CED is significantly linked to an increased risk of childhood stunting.

**Table 8.** Relationship between LBW and Stunting Incidence

| LBW | Stunting Incident | | | | Total | P value |
|---|---|---|---|---|---|---|
| | Yes | | No | | | |
| | n | % | n | % | | |
| Yes | 5 | 45.5% | 6 | 54.5% | 100% | 0.024 |
| No | 2 | 10% | 18 | 90% | 100% | |
| Total | 7 | 22.6% | 24 | 77.4% | 100% | |

Based on Table 8, a similar significant relationship is observed LBW (low birth weight) and history and the prevalence of stunting (p = 0.024). Of the respondents with a history of LBW, 5 individuals (45.5%) had children who experienced stunting, whereas 6 individuals (54.5%) did not. In contrast, among those without a history of LBW, only 2 individuals (10%)

had stunted children, while 18 individuals (90%) did not. This suggests that LBW is a substantial risk factor for children's stunting as well.

## 5. Comparison

The results of this investigation are consistent with a number of previous research works that have investigated the relationship between maternal nutritional status, Low birth weight (LBW) and the prevalence of childhood stunting. Specifically, this study found a strong correlation between toddler stunting risk and Chronic Energy Deficiency (CED) among pregnant mothers ($p = 0.024$),

Similarly, the significant association found between LBW and stunting ($p = 0.024$) corroborates the findings of(Kamilia, 2019)Infants Having a low birth weight (LBW) are indeed more vulnerable to development disturbances during the early years of life, particularly stunting. Several studies have demonstrated a significant association between LBW and the incidence of stunting in toddlers. For example, a study conducted in Pekanbaru found that toddlers with a history of LBW had a 1.7 times more likely to have stunting than people with normal birth weight, with a statistically significant correlation between stunting and LBW (p-value = 0.000).

Overall, the study confirms and extends the existing body of literature by reinforcing the critical role of maternal health—particularly CED and birth outcomes like LBW—in the prevention of stunting. These findings suggest the need for integrated maternal-child nutrition programs at the community level, with emphasis on monitoring nutritional status during pregnancy and providing early interventions for at-risk infants.

Considering the research outcome, the analysis of The correlation between low birth weight (LBW) and chronic energy deficit (CED) status with the incidence of stunting in toddlers showed a significant relationship. Bivariate Using the chi-squared test for analysis produced a p value of 0.024. Regarding the relationship between stunting prevalence and CED status, which indicated a significant relationship. CED-affected pregnant women are more likely to give birth to infants that suffer stunting conditions than moms who don't experience CED. In addition, the relationship between LBW and stunting incidence showed a similar pattern. Of the 11 babies with low birth weight, 5 babies (45.5%) experienced stunting, while of the 20 babies with normal birth weight, only 2 babies (10%) experienced stunting. According to the analysis's findings, infants with low birth weights are more likely than those with normal birth weights to experience stunting.

## 6. Conclusions

This study revealed an important association between low birth weight (LBW) and the prevalence of stunting in toddlers in the workplace and the presence of chronic energy deficiency (CED) in pregnant women of the Dolodou Health Center UPTD. Women with CED who are pregnant are at higher danger of becoming pregnant with children with stunting conditions, as well as babies with low birth weight are more likely to chance low birth weight are more likely to. Stunting prevention needs to be carried out from pregnancy by ensuring adequate nutritional intake for pregnant women and optimal monitoring of infant growth after birth. Steps such as nutrition education, monitoring maternal and infant

health, and providing nutritional interventions such as iron supplementation and additional Food plays a critical role in lowering the prevalence of stunting. Cooperation is needed between health workers, the government, and the community to raise understanding how crucial it is to maintain a healthy diet from pregnancy to toddlerhood. With the right strategy, stunting rates can be reduced so that the quality of children's health in Indonesia can improve sustainably.

Based on the findings of this study, there are several implications that can be used as recommendations for health workers and policy makers in efforts to prevent stunting in the work area ofthe Dolodou Health Center.

a. Nutrition Education for Pregnant Women Nutrition Pregnancy education initiatives women need to be improved to prevent CED. Counseling can be carried out regularly by health workers at integrated health posts or health centers to increase awareness of pregnant women about the importance of adequate nutritional intake during pregnancy. that nutritional education programs for pregnant women are very important to prevent chronic energy deficiency (CED). Routine counseling by health workers at integrated health posts can increase awareness of adequate nutritional intake during pregnancy(Risnawati & Munafiah, 2022)
b. Improving Nutritional Status Monitoring Nutritional examinations of pregnant women need to be carried out periodically through a maternal health monitoring program, including measuring body mass index (BMI) and upper arm circumference (MUAC) as indicators of CED. This is important for early detection of mothers at risk of CED so that appropriate interventions can be given. Research by(Anggreni et al., 2022)highlighting the importance of regular nutritional checks for pregnant women, including measuring body mass index (BMI) and mid-upper arm circumference (MUAC), as indicators for early detection of the risk of CED.
c. Supplementation and PMT (Additional Food Provision) To prevent CED in pregnant women, intervention is needed in the form of providing iron supplements, folic acid, and nutritious additional food for pregnant women who are at risk of experiencing CED. This is in line with the government's program in overcoming malnutrition and stunting. According to the analysis of the stunting prevention program at the Health Center, providing iron and folic acid supplements and nutritious additional food for pregnant women who are at risk of CED is an intervention step that is in line with the government's program in overcoming malnutrition(Latifah et al., 2024)
d. Monitoring of Infant and Toddler Growth Babies born with LBW must receive stricter growth monitoring to prevent stunting. Monitoring can be done through the integrated health post program by measuring weight, height, and providing education to mothers about parenting patterns and providing appropriate complementary feeding.(Setiyawati et al., 2024)

e. Collaboration with Various Parties Stunting prevention requires cooperation between health workers, integrated health post cadres, local governments, and the community. Cross-sector programs such as family empowerment in child care patterns and increasing access to nutritious food need to be strengthened.(Haryani et al., 2021)

By implementing these strategies, it is hoped that the incidence of stunting can be minimized, so that the quality of children's health in the Dolodou Health Center area can improve significantly

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