**FICCO PUBLIC HEALTH JOURNAL**
Publisher: Ficco Scientific Corner
Website: http://journal.theficco.com/index.php/publichealth

e-ISSN: **3047-9126**
Vol. **02** | No. **02** | **August 2025**

Open Access

**ORIGINAL ARTICLE**

# Analysis of Factors Associated with The Incidence of Stunting among Toddlers in The Working Area of Baron Health Center, Nganjuk District, Indonesia

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**DOI:** 10.5281/zenodo.16996160 **Received:** Juny 09, 2025 **Accepted:** Juny 14, 2025 **Published:** August 29, 2025

## ABSTRACT

**Background**: Cases of stunting in children under five are still high. The prevalence of stunting in toddlers in Nganjuk Regency reached 17.1% (13,821 children aged 0-59 months). This study aims to analyze the factors associated with the incidence of stunting in toddlers aged 0-59 months in the working area of the Baron Health Center, Nganjuk Regency. **Methods**: This research is a quantitative study using a Cross Sectional study design. Total population 3,028 toddlers, with a sample of 379 children. Analysis using the Chi Square test. **Results**: The results of statistical tests of pregnant women who experience Chronic Energy Deficiency (CED), it can be concluded that there is a relationship between the status of pregnant women Chronic Energy Deficiency (CED) and the incidence of stunting in toddlers with a significance value is < 0.01. Women with anemia who are pregnant A significant correlation has been found between toddler stunting incidence and anemic status. is <0.01 and pregnant women who suffer from comorbidities there is a relationship between the history of comorbidities in pregnant women with the incidence of stunting in toddlers with a significance value is < 0.01. **Conclusions**: The incidence of stunting in toddlers can be caused by various factors. This study proves that pregnant women experiencing Chronic Energy Deficiency (CED) anemic pregnant women, and a history of comorbidities are significantly associated with the incidence of stunting in toddlers (sig < 0.01 < 0.05).

**Keywords:** Pregnant Women, CED, Anemia, Disease, Stunting.

## INTRODUCTION

Stunting in children under five is a health problem that has a serious impact on children's growth and development. Children who are stunted tend to have lagging physical growth and cognitive development, which can reduce future productivity. This condition also has the potential to exacerbate social and economic inequality, and increase the burden of health costs. As a result, the quality of human resources declines, hampering the nation's global competitiveness and long-term development. Although various health programs have been implemented to reduce the prevalence of stunting, field data shows that the incidence of stunting in children under five still remains high in various regions. This is strongly suspected to be related to the high rates of Chronic Energy Deficiency (CED) and anemia in pregnant women (Laily & Indarjo, 2023). In addition to normal physiological changes during pregnancy, pregnant women can also experience various comorbidities that require special treatment to prevent complications for the mother and fetus. Comorbidities can affect the health of the pregnancy, fetus and delivery process, so it is important to understand the types, causes and management (Nasriyah & Ediyono, 2023).

Stunting is a global health problem that has been recognized by the World Health Organization

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(WHO) as an important indicator in measuring child health worldwide. According to the UNICEF report in 2023, about 22% of children under the age of five are stunted worldwide (Hikmah et al., 2024) . Based on the Indonesian Health Survey (IHS) in 2023, the prevalence of stunting in children under five reached 21.5%, which means that almost one-third of children under five years old experience growth problems. The Ministry of Health targets that by 2024 the prevalence of stunting in Indonesia will be 14% (Ministry of Health of the Republic of Indonesia, 2018) . In East Java Province, the stunting prevalence rate reached 17.7%, higher than the health ministry's target (Indonesian Health Survey 2023).

In Nganjuk District, based on data from the local Health Office, the prevalence of stunting is 17.1% (13,821 children). Meanwhile, the results of nutritional status monitoring by the Baron Community Health Center in 2023 stated that under-fives with stunted nutrition cases reached 6.81% and in early 2024 increased to 7.14%. Although this figure shows below the national target, the problem of stunting in this region is still a serious concern that requires more effective and comprehensive handling because Nganjuk Regency has become one of 100 districts / cities throughout Indonesia that has been selected as a special location for the acceleration of stunting reduction and prevention programs since 2017.

The process of stunting in toddlers can be traced from various interrelated factors. One of the main causes is the nutritional status of mothers during pregnancy, especially mothers who experience Chronic Energy Deficiency (CED) and anemia. Chronic energy deficiency (CED) in pregnant women contributes to low birth weight (LBW), which is a major risk factor for stunting. Anemia in pregnant women also plays a role in increasing the risk of stunting due to the lack of oxygen supply to the fetus, which can inhibit optimal growth. Concomitant diseases in pregnant women, such as diabetes or hypertension, can interfere with the supply of nutrients to the fetus and thus risk inhibiting growth. This condition increases the chance of stunting in infants because fetal growth is not optimal during pregnancy. In addition, environmental factors such as lack of access to clean water and proper sanitation, as well as inadequate feeding practices, also exacerbate this condition (Elmighrabi et al., 2024).

Stunting is a condition of impaired growth in children caused by chronic malnutrition, especially in the first 1,000 days of life, which results in children having a height that is far below their age standard. The main symptom of stunting is stunted growth, where children appear shorter than their peers, and is often accompanied by delays in cognitive and motor development. In addition, children with stunting also have a higher risk of infection and disease due to a weak immune system. Stunting can have an impact on children's cognitive abilities and immune system. This impact also continues into adulthood, which can increase the risk of certain diseases. In addition, stunting has the potential to reduce individual productivity in the future. As a result, the quality of human resources and the nation's competitiveness can be affected (Ardianto & Elisanti, 2024).

Overcoming stunting requires a comprehensive approach that involves various sectors. Efforts to prevent and overcome stunting must focus on improving the nutritional status of pregnant women through nutritional supplementation programs, monitoring maternal and fetal health, and providing education related to healthy eating patterns. In addition, detection and intervention of comorbidities in pregnant women, as well as education related to good feeding practices in children, are needed.

According to research conducted by Wahyuni et al, (2024), Nutrition literacy and nutritional knowledge are significantly correlated with stunting incidence. Infant and young child feeding, the choice and preparation of wholesome foods, child development, stunting prevention, health service accessibility, food security, and traditional food nutrition knowledge are all related to nutrition literacy and knowledge. Puskesmas also need to strengthen the monitoring and evaluation system for the programs that have been running, in order to ensure that the interventions are effective in reducing the incidence of stunting. Handling this stunting problem requires strong collaboration

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between local governments, health workers, and local communities so that the long-term goal of reducing stunting prevalence can be achieved (Padlilah & Ariyanti, 2024).

Systematic review by Sentika et al, (2024), study from 2024 emphasizes the critical significance that interprofessional teamwork plays as a major factor in reducing the prevalence of stunting in Indonesia. Effective stunting prevention necessitates coordinated work across healthcare specialties, community organizations, and governmental levels, as supported by the evidence. The results of interviews with 10 mothers of stunted toddlers in the Baron Puskesmas Working Area of Nganjuk Regency found that 7 mothers (70%) said that they experienced anemia during pregnancy. This finding strengthens the assumption that the high rate of stunting in the Baron Health Center area is closely related to the prevalence of anemia in pregnant women. Based on this background, the researcher wishes to conduct a study with the title " Analysis of Factors Associated with the Incidence of Stunting in Toddlers in the Baron Health Center Working Area, Nganjuk Regency." This study aimed to analyse the influence of CED, anemia, and comorbid diseases in pregnant women on the incidence of stunting in children under five in the working area of the Baron Public Health Center, Nganjuk Regency.

## METHODS

This type of research is quantitative. The population is all toddlers who are in the working area of the Baron Health Center, Nganjuk Regency in 2024 totaling 3028 children. The sample size studied was 379 respondents. Of the toddler respondents obtained, it was seen whether the mother during pregnancy experienced Chronic Energy Deficiency (CED), there was a history of anemia, and there were comorbidities, and whether the toddler was stunted or not stunted. Chronic energy deficiency (CED) is a condition in which pregnant women experience a significant lack of calorie and protein intake, characterized by an upper arm circumference (UAC) of less than 23.5 cm. Anemia is a condition in which the hemoglobin level in the blood of pregnant women is below the normal standard (< 11 g/dL), which can affect the health of the mother and fetus. Anemia is a condition in which a pregnant woman's blood hemoglobin level is below the normal standard (< 11 g/dL), which can affect the health of the mother and the fetus. Toddler Stunting is a condition in which a child has a height that is lower than the normal standard for their age, according to WHO or Indonesian Ministry of Health standards (Stunting: z-score < -2 SD).The test used was the Chi Square test.

## RESULTS AND DISCUSSION

Among a total of 379 children, 330 (87.1%) were not stunted and 49 (12.9%) were stunted. In the group of mothers without chronic energy deficiency (No CED), 321 children (92.2%) were not stunted and 27 (7.8%) were stunted. Meanwhile, in the group of mothers with chronic energy deficiency (CED), 9 children (29.0%) were not stunted and 22 (71.0%) were stunted.

**Table 1.** Cross-tabulation of Chronic Energy Deficiency (CED) pregnant women and the incidence of stunting

| Status | Not Stunting | Stunting | Total |
|---|---|---|---|
| No CED | 321 | 27 | 348 |
| CED | 9 | 22 | 31 |
| Total | 330 | 49 | 379 |

Table 2 shows the cross-tabulation between anemia status and the incidence of stunting. Among 379 children, 330 (87.1%) were not stunted and 49 (12.9%) were stunted. In the non-anemia group, 322 children (91.0%) were not stunted and 32 (9.0%) were stunted. Meanwhile, in the anemia group, 8 children (32.0%) were not stunted and 17 (68.0%) were stunted.

**Table 2.** Cross Tabulation of Anemia and Incidence of Stunting

| Status | Not Stunting | Stunting | Total |
|---|---|---|---|
| No Anemia | 322 | 32 | 354 |
| Anemia | 8 | 17 | 25 |
| Total | 330 | 49 | 379 |

e-ISSN: 3047-9126
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Table 3 presents the cross-tabulation between history of comorbidities and the incidence of stunting. Of the 379 children, 330 (87.1%) were not stunted and 49 (12.9%) were stunted. In the group without comorbidities, 323 children (89.5%) were not stunted and 38 (10.5%) were stunted. Meanwhile, in the group with comorbidities, 7 children (38.9%) were not stunted and 11 (61.1%) were stunted.

**Table 3.** Cross Tabulation of History of Comorbidities and Incidence of Stunting

| Status | Not Stunting | Stunting | Total |
|---|---|---|---|
| No Comorbidities | 323 | 38 | 361 |
| Comorbidities | 7 | 11 | 18 |
| Total | 330 | 49 | 379 |

Data analysis was performed using the Chi-square test calculated. The results of the Chi-square test are presented as follows:

**Table 4.** Chi Square Test

| No | Independent Variable | Devendent Variable | *Chi Square* | *p-value* |
|---|---|---|---|---|
| 1 | CED | Stunting | 101.025 | 0,001 |
| 2 | Anaemia | | 72.110 | 0,001 |
| 3 | Comorbidities | | 38.972 | 0,001 |

Based on the data in Table 4, the chi-square test for the independent variable CED yielded a p-value of 0.001 (< α = 0.05), indicating a significant association between maternal chronic energy deficiency (CED) and the incidence of stunting among toddlers in the working area of the Baron Community Health Centre, Nganjuk Regency.

The chi-square test for the independent variable anemia yielded a p-value of 0.001 (< α = 0.05), indicating a significant association between maternal anemia and the incidence of stunting among toddlers in the working area of the Baron Community Health Centre, Nganjuk Regency.

Based on the data in Table 4, the chi-square test for the independent variable comorbidities yielded a p-value of 0.001 (< α = 0.05), indicating a significant association between maternal comorbidities (HIV/AIDS, hypertension, pulmonary tuberculosis, hepatitis) and the incidence of stunting among toddlers in the working area of the Baron Community Health Centre, Nganjuk Regency.

The results of research that has been done show that pregnant women who experience Chronic Energy Deficiency (CED) is associated with the incidence of stunting in toddlers. This is in accordance with research conducted in North Buton Regency which shows that pregnant women Chronic Energy Deficiency (CED) has a correlation with the incidence of stunting in toddlers (Adibin. et al., 2022). Research conducted by Kurnia and Ismawarti (2023) on toddlers aged 2459 months in the working area of Puskesmas Godean 1 also showed similar results that the nutritional status of pregnant women had a significant relationship with the incidence of stunting (Kurnia, 2023). Meanwhile, research conducted on toddlers aged 6-23 months in Karawang Regency shows that there is a significant relationship between CED experienced by pregnant women and the incidence of stunting (Asna et al., 2023).

Evidence from research by Dewi et al. (2020) indicates a correlation between the occurrence of stunting in children and the history of maternal anemia during pregnancy. In contrast to research on 2,688 people in East Jakarta. The results showed that there was no significant relationship between the history of Chronic Energy Deficiency (CED) in pregnant women and the incidence of stunting in toddlers after being controlled by confounding variables, namely healthy latrines (Ramadhani & Ronoatmodjo, 2023)

In addition to the nutritional status of pregnant women, especially pregnant women who experience Chronic Energy Deficiency (CED), research that has been done shows that anemia is also one of the factors that can cause stunting in toddlers. The condition of anemia in mothers during pregnancy triggers the incidence of stunting in toddlers (Zulaikha et al., 2022). Research in 9 African countries involving 31,873 pairs of mothers and children shows that there is a relationship between anemia experienced by mothers and the incidence of stunting in children (Tamirat et al., 2021). Another study conducted on toddlers aged 1224 months showed that maternal anemia status

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had a significant relationship with the incidence of stunting (Meikawati et al., 2021). Hastuty (2020) conducted research on toddlers in the Puskesmas Kampar working area with the results that anemia status was significantly related to the incidence of stunting (Hastuty et al., 2020; Dewi et al., 2020)

Comorbidities experienced by pregnant women affect the incidence of stunting in toddlers. In line with the research that has been done, research in Somalia shows that there is a relationship between comorbid diseases and cases of stunting in children (Kinyoki et al., 2017). In contrast to this study, research conducted by Patel et al. (2018) concluded that there was no association between comorbid pregnancy diseases and stunting (Patel et al., 2018). Additionally, studies on toddlers in Grobogan Regency reveal no connection between the prevalence of stunting in toddlers and the history of comorbidities in pregnant mothers (Yuwanti et al., 2021). This suggests that in some areas there are other factors that influence the incidence of stunting besides congenital pregnancy diseases.

## CONCLUSIONS

The incidence of stunting in toddlers is influenced by multiple maternal health factors. This study demonstrates that maternal chronic energy deficiency (CED), anemia, and a history of comorbidities are significantly associated with a higher risk of stunting among toddler. These findings highlight the importance of early detection and management of maternal health problems during pregnancy to prevent stunting in children

## ACKNOWLEDGMENTS

The authors gratefully acknowledge the University of Strada Indonesia for its support, research facilities, and the opportunity to conduct this study.

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