

The Relationship Between Parity and Maternal Age with the Incidence of Chronic Energy Deficiency (CED) among Pregnant Women

Hasnah Naura^{1*}

¹ Nutrition Study Program, Faculty of Health Sciences, Universitas Esa Unggul, Indonesia

Corresponding Author Email: hsnaurah@gmail.com

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ABSTRACT

Background: Chronic Energy Deficiency (CED) remains a significant nutritional challenge among pregnant women in Indonesia, contributing to risks such as low birth weight and stunting. This study aimed to analyse the relationship between maternal age and parity with the incidence of CED at the Parung Panjang Community Health Centre (Puskesmas). **Methods:** This research was a quantitative study with an observational analytic approach and a cross-sectional design. The study was conducted from June to August 2023, utilising secondary data from the medical records of 48 pregnant women selected through purposive sampling. Nutritional status was determined by Mid-Upper Arm Circumference (MUAC) measurements, with a cutoff of <23.5 cm for CED. Data were analysed using univariate and bivariate analysis (Chi-Square test) through SPSS 19.0. **Results:** The univariate analysis reveals a high prevalence of CED at 79.2%. The majority of respondents (70.8%) are in the non-risk age group (20–35 years), and parity is distributed equally between primipara and multipara (50% each). Bivariate analysis shows no significant relationship between maternal age and CED incidence ($p = 0.948$) and no significant relationship between parity and CED incidence ($p = 0.477$). **Conclusion:** The prevalence of CED in the study area is remarkably high, regardless of demographic factors. Maternal age and parity not significantly influence CED status in this population, suggesting that other factors, such as nutritional knowledge, socio-economic status, and healthcare access, may play a more dominant role. These findings highlight the need for universal nutritional interventions for all pregnant women in the region.

Highlights:

- Maternal age shows no significant correlation with the incidence of CED, suggesting that both at-risk and non-risk age groups are equally vulnerable.
- There is no statistically significant relationship between parity and CED status, indicating that primiparous and multiparous mothers face similar risks.
- The findings suggest that nutritional status in the study area is likely driven by broader factors, such as socioeconomics and nutritional knowledge, rather than maternal demographics alone.
- The results emphasize the urgent need for universal nutritional monitoring and integrated health interventions for all pregnant women in the region.

INTRODUCTION

The foundation of a child's health and Chronic Energy Deficiency (CED) is one of the primary nutritional problems still widely encountered among pregnant women in developing countries, including Indonesia. According to the 2023 Indonesia Health Survey (SKI), the prevalence of CED among pregnant women aged 10–54 years was 16.9%. This high figure reflects a major challenge in meeting nutritional needs during pregnancy. Some regions even show a significantly higher prevalence, such as Highland Papua (44.7%), compared to regions with the lowest prevalence, such as North Kalimantan (5.2%). CED not only impacts maternal health but also contributes to the risk of Low Birth Weight (LBW), stunting, and an increase in neonatal mortality rates (1).

Factors contributing to CED in pregnant women include poverty, lack of education, non-diverse consumption patterns, and low access to health services. In addition, demographic factors such as the mother's age during pregnancy and parity (the number of previous pregnancies) are suspected to correlate significantly with the mother's nutritional status (2–5). Maternal age is an important indicator in determining the risk of CED. Mothers who become pregnant during their adolescent years (<20 years) are usually still in a growth phase, so they have high nutritional requirements and are not yet fully physiologically ready to undergo pregnancy. Meanwhile, pregnancy at an age of >35 years is also risky, as metabolic functions and nutrient absorption begin to decline (2,6–8). Research by Susilowati et al. (2025) shows that pregnant women over 35 years of age have a 1.8 times higher risk of experiencing CED compared to pregnant women aged 20–30 years (9).

High parity (number of births ≥ 3) can also increase the risk of CED, especially if it is not balanced with adequate nutritional intake. A mothers with high parity have a two

times greater risk of experiencing CED compared to mothers with low parity. This can be explained by the accumulation of physical fatigue from repeated pregnancies and childbirth, as well as by increasing energy demands for childcare (10–13). The impact of CED is multidimensional. In addition to increasing the risk of obstetric complications, CED also correlates with poor fetal development, an increased risk of cognitive impairment in children, and a decline in the quality of human resources in the future (14,15). Therefore, the management of CED should involve early identification of its risk factors, including age and parity.

Given the importance of the role of age and parity factors in the occurrence of CED, this study aims to analyse the relationship between these two factors and the incidence of CED in pregnant women. By identifying relevant risk factors, it is hoped that more targeted nutritional interventions can be developed, whether through education, periodic monitoring of pregnant women's nutritional status, or integrated promotive and preventive policies with maternal and child health programs. The research aimed to understand the extent to which age and parity influenced the incidence of Chronic Energy Deficiency in pregnant women as a basis for more targeted nutritional interventions.

METHODS

Research Design and Setting

This research was a quantitative study with an observational-analytic approach and a cross-sectional design. The research was conducted at the Parung Panjang Community Health Centre (Puskesmas) in Bogor Regency from June to August 2023. The data used in this study were secondary data obtained from medical records of pregnant women, which included information on age, parity, and Chronic Energy Deficiency (CED) status based on Mid-Upper Arm Circumference (MUAC/LiLA) measurements.

Participants and Sampling

The population in this study consisted of all pregnant women who underwent pregnancy examinations at the facility during the study's implementation period. The sampling technique was purposive, with inclusion criteria for pregnant women who had complete data on age, parity, and CED status. The minimum sample size was calculated using the LEMESHOW formula with an estimated proportion of 50%, a confidence level of 95%, and a margin of error of 15%, yielding a minimum sample size of 43 respondents. However, the researcher successfully collected data from 48 pregnant women who met the criteria; therefore, this number was considered sufficient and representative.

Data Collection and Analysis

Data collection was carried out using a structured questionnaire and available medical records. Maternal age was categorised into three groups: <20 years (at risk), 20–35 years (not at risk), and >35 years (at risk). Parity was categorised as primipara (never having given birth) and multipara (having given birth previously). CED status was determined based on the results of MUAC measurements, with a cutoff of <23.5 cm for the CED category and ≥ 23.5 cm for the non-CED category.

The data obtained were then edited, coded, entered, cleaned, and processed. All data were analysed using SPSS software version 19.0. Univariate analysis was performed to describe the frequency distribution and percentage of each research variable, such as age, parity, and CED status. Meanwhile, bivariate analysis was used to determine the relationship between the independent variables (age and parity) and the dependent variable (CED status) using the Chi-Square test. A p-value < 0.05 was considered the threshold for statistical significance.

RESULTS

Characteristics of respondents

Univariate analysis was performed to describe the frequency distributions of the variables in this study: maternal age, parity, and Chronic Energy Deficiency (CED) status. The results were presented in Table 1 below:

Table 1. Univariate analysis of respondent characteristics

Variables	n	%
Age		
< 20 years	2	4.2%
20–35 years	27	56.3%
>35 years	19	39.5%
Parity		
Primipara	24	50.0%
Multipara	24	50.0%
CED Risk		
CED	38	79.2%
Normal	10	20.8%

The majority of respondents were in the 20–35-year age group (56.3%), which is the WHO's ideal reproductive age group. The at-risk age groups (<20 or >35 years) consisted of a total of 14 respondents (29.2%), who were medically associated with higher potential pregnancy risks, including CED. The number of respondents who were primiparous (had never given birth or had given birth only once) and multiparous (had given birth more than once) was divided equally at 50% each. Parity was considered an important factor because it was related to nutritional needs during pregnancy. Based on Mid-Upper Arm Circumference (MUAC) measurements, it was found that 79.2% of respondents experienced CED, while 20.8% did not. This figure indicated a high prevalence of CED among pregnant women in the study area, which became a significant concern for maternal health interventions.

Bivariate analysis

Bivariate analysis was used to examine the relationship between the independent variables (age and parity) and the dependent variable (CED incidence) using the Chi-Square test. The results are presented in Table 2 below:

Table 2. Bivariate Analysis of the Relationship Between Age, Parity, and the Incidence of CED

Variables	CED	Norma	p
	n (%)	n (%)	
Age			
Not at Risk	27 (71.1%)	7 (70.0%)	0.948
At Risk	11 (28.9%)	3 (30.0%)	
Parity			
Primipara	18 (47.4%)	6 (60.0%)	0.477
Multipara	20 (52.6%)	4 (40.0%)	

A p-value of 0.948 indicated that there was no significant relationship between maternal age category and CED incidence ($p > 0.05$). This meant that both at-risk and not-at-risk age groups had similar chances of experiencing CED. Although theoretically extreme ages (too young or too old) are thought to increase the risk of CED, this was not statistically supported in this study, likely due to an unbalanced sample distribution and a small sample size.

A p-value of 0.477 also showed that there was no significant relationship between parity and CED. This meant that both primiparous and multiparous mothers had risks that did not differ significantly in experiencing CED. This might have been influenced by other factors that were not directly examined in this study, such as education, nutritional knowledge, or access to health services.

DISCUSSION

Respondent Characteristics

Respondents in this study are 48 pregnant women selected based on inclusion and exclusion criteria. Based on age categories, the majority of respondents are in the non-risk age group (20–35 years), while the remainder are in the at-risk group (<20 years or >35 years). Theoretically, the at-risk age group has a higher potential for pregnancy complications, including Chronic Energy Deficiency (CED).

In terms of parity, the respondents are split evenly: 50% primipara and 50% multipara. Primiparous women have unique nutritional needs because their bodies have not experienced pregnancy before, while multiparous women have a risk of depleted energy reserves due to previous pregnancies and deliveries. Nutritional status, measured by Mid-Upper Arm Circumference (MUAC), indicates that 79.2% of respondents have CED. This figure reflects the high prevalence of CED in the study area, which is a significant concern as CED can adversely affect pregnancy, delivery, and the health of the newborn.

Relationship between Parity and Age with CED

The Chi-Square test results show no significant relationship between parity and CED. This means that status as a primipara or multipara does not significantly affect the risk of CED in this study. Theoretically, multipara have a higher risk of experiencing CED due to increased nutritional needs and the possibility of reduced energy reserves. However, these findings do not support that theory. Other factors, such as nutritional knowledge, economic status, and access to health services, likely play a more dominant role than parity itself (13,16–20).

Additionally, the relatively small sample size and the balanced distribution between primiparas and multiparas lead to no significant difference in the statistical results. This may also be influenced by the high nutritional awareness of pregnant women, fairly uniform antenatal education, and the support of health workers in pregnancy programs in the study area.

The Chi-Square test shows a p-value of 0.948, indicating no significant relationship between maternal age category and CED incidence. This finding indicates that both at-risk ages (<20 years or >35 years) and non-risk ages (20–35 years) have nearly equal chances of experiencing CED.

Theoretically, older individuals are at risk of nutritional complications because both the metabolic system and nutrient absorption can be impaired (20,21). However, the results of this study show a nearly identical proportion of CED between the at-risk and non-at-risk age groups, resulting in no statistical significance. Several factors that can explain these results include: (1) The distribution of respondents shows a striking imbalance, with the non-risk group (20–35 years) dominating at 70.8%. This disparity can affect the results of the statistical analysis because the number of respondents in the at-risk age groups becomes too small to be meaningfully compared; (2) The sample size of only 48 respondents results in low statistical power, making it difficult to detect actual relationships among variables; (3) The uniformity in other characteristics, such as education level, socio-economic conditions, and access to healthcare, can confound the direct relationship between age or parity and CED; (4) The possibility of evenly distributed nutritional interventions in the Parung Panjang Health Centre area, such as "Pregnant Women Classes," Posyandu, and nutritional counselling—also serves as a balancing factor.

These findings are consistent with several previous studies, which have shown that age is not always the primary factor affecting nutritional status, provided access to health services and nutritional education is available. However, these results contradict physiological theories and other research stating that extreme age increases the risk of CED (6,22). This study indicates that maternal age is not a single factor determining nutritional status; rather, factors such as education, socio-economic status, and healthcare access play a more significant role.

CONCLUSION

This study concludes that there is no significant relationship between maternal age and CED incidence ($p = 0.948$) and between

parity and CED status ($p = 0.477$), indicating that both at-risk and non-at-risk groups face nearly identical nutritional challenges. These results suggest that, in this specific context, demographic factors such as age and the number of previous births are not the primary determinants of maternal nutrition. Instead, the high prevalence across all groups points to the influence of broader factors, such as socioeconomic status, nutritional knowledge, and dietary habits, as well as the limitations of a small, unbalanced sample. Ultimately, these findings highlight the urgent need for universal nutritional interventions and comprehensive monitoring for all pregnant women in the region, regardless of their demographic profile.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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