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**RISK FACTOR PROFILE OF CHRONIC ENERGY DEFICIENCY IN FIRST TRIMESTER PREGNANT WOMEN IN PRIMARY HEALTH CARE FACILITIES**

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**ABSTRACT**

Chronic Energy Deficiency (CED) in pregnant women remains a major health concern due to its impact on the health of both the mother and her unborn baby. This condition is influenced by various factors, such as the mother's age, education level, and family economic situation. This study aims to identify factors contributing to the incidence of Chronic Energy Deficiency (CED) in pregnant women. This study used a quantitative descriptive approach and was conducted at the Kauman Community Health Center, Tulungagung Regency, from April to May 2025. The study sample included all pregnant women in their first and second trimesters who experienced CED and had received antenatal care (ANC). A total of 34 respondents were selected using a total sampling method. Data was collected through a closed questionnaire that had passed validity and reliability tests and was distributed online via Google Forms. The variables studied included maternal age, education level, and family income. Univariate analysis was performed to describe the frequency distribution and percentage of each variable. The study results show that the majority of pregnant women experiencing CED are in a relatively safe age range (74%), have a secondary education (53%), and come from families with low economic status (53%). These results indicate that CED is not only experienced by vulnerable age groups but is also influenced by educational and family economic factors. In conclusion, the incidence of CED in pregnant women is influenced by various interrelated factors, including factors of age, education and family income

Keywords: age; chronic energy deficiency; education; family income; pregnant women

**INTRODUCTION**

Pregnant women are a group vulnerable to nutritional problems. Nutritional problems frequently experienced by pregnant women include chronic energy deficiency syndrome (CED), anemia, and IDD. Chronic energy deficiency is a condition that occurs due to an imbalance between energy and protein intake, resulting in a lack of essential nutrients (Kemenkes RI, 2019). Chronic Energy Deficiency (CED) in pregnant women remains a health problem in developing countries, with a prevalence of 15–47%, with Indonesia ranking fourth highest (WHO, 2015). Nationally, the prevalence of CED in pregnant women has decreased from 17.3% in 2018 to 16.9% in 2023, but has not yet reached the Ministry of Health's Strategic Plan target of 14.5%. In East Java Province, the prevalence of chronic energy deficiency syndrome (CED) in pregnant women fluctuated and increased again to 8.7% in 2023. In Tulungagung Regency, the prevalence of CED in pregnant women showed an increasing trend until 2021, and data from the Kauman Community Health Center (Puskesmas) in 2025 recorded 34 cases of CED out of 301 pregnant women in their first and second trimesters, with the majority occurring in the first trimester.

Chronic Energy Deficiency (CED) in pregnant women is a condition in which energy and protein intake are chronically low and insufficient to meet the needs of the mother and fetus. During pregnancy, nutritional needs, including energy and micronutrients, increase to support fetal development and

maternal health. If these needs are not met, metabolic disorders can occur that pose a risk to the health of both mother and fetus (WHO, 2014). CED results in decreased energy and protein reserves, as well as reduced maternal muscle and fat mass. It also reduces albumin and hemoglobin levels, which can reduce the blood's ability to carry oxygen. Lack of oxygen and nutrients to tissues can cause serious problems such as tissue hypoxia and negative effects on the placenta. CED inhibits placental growth and reduces blood flow, which is detrimental to the fetus and can lead to growth restriction, low birth weight, and premature birth. Furthermore, CED can increase the risk of preeclampsia and infection in the mother and affect uterine contractions during labor, increasing the likelihood of postpartum hemorrhage. Overall, CED negatively impacts the health of both mother and fetus and requires special attention to prevent and detect it.

Maternal age is associated with the risk of CED, especially in pregnant women under 20 years of age. Pregnant women under 20 years of age are considered to be still in their growth period, where all reproductive organs are not yet fully functional. Inadequate nutrition during this growth period can directly impact CED, which in turn can have long-term consequences, increasing the risk of complications such as bleeding, prematurity, and low birth weight (Fitri et al., 2022). Family income is also a factor associated with the occurrence of CED. The relationship between income and chronic energy deficiencies (CED) is related to meeting food needs. Pregnant women with limited income often cannot meet the nutritional requirements required for pregnancy. An unvaried diet can lead to the risk of prolonged CED, which can then increase the risk of fetal growth retardation (Livia Hidayatul Husnia, Gumiarti, 2025).

Education level and CED are linked to maternal health status. Mothers with low educational attainment have low levels of knowledge and awareness of various health information. This low level of health knowledge affects their behavior in fulfilling nutritional needs, choosing balanced and optimal nutrition for fetal development, which can also impact health complications for both mother and fetus during the prenatal period (Uswatun Hasanah, Olivia Tri Monica, Desy Susanti, 2023). The impacts of chronic energy deficiency syndrome (CED) on pregnant women include anemia, preeclampsia, stunted births, low birth weight (LBW), and complications during childbirth, which can disrupt fetal growth. Routine antenatal care (ANC) during pregnancy, adequate supplementation during pregnancy, balanced and optimal nutrition, and adequate nutrition education for pregnant women and prospective brides are essential to detect the effects of CED as early as possible, ensuring healthy babies without further complications (Putri et al., 2023). Given the numerous risk factors for CED in pregnant women, and the potential long-term impacts on both mother and fetus, researchers aim to explore and early identification of various CED risk factors in pregnant women to provide education and prevent CED.

## **METHOD**

This study is a quantitative descriptive study that aims to describe the factors that influence the incidence of Chronic Energy Deficiency (CED) in pregnant women. The study was conducted at the Kauman Tulungagung Community Health Center in the period April–May 2025. The population in this study were all pregnant women experiencing CED in the first and second trimester who came to the Kauman Tulungagung Community Health Center for antenatal care (ANC). The sampling technique used was total sampling. Data collection was carried out using a closed questionnaire compiled based on research variables and distributed online via Google Form. The variables studied included maternal age, education level, family income, pregnancy spacing, meal frequency, and food variety. The research instrument was tested for validity and reliability by distributing questionnaires to 20 pregnant women. Validity was tested using the Pearson Product Moment correlation method, and the results showed that all statement items had a calculated  $r$  value higher than the table  $r$  (0.4438), thus being declared valid. To test reliability, Cronbach's Alpha was used, which produced a value of 0.864, indicating that this instrument has a high

level of reliability. The data obtained were then processed including editing, coding, and tabulation. Data analysis was carried out univariately to describe the frequency distribution and percentage of each research variable.

## RESULT AND DISCUSSION

### Respondent Characteristics

Table 1.

Age Characteristics of Pregnant Women with chronic energy deficiency syndrome (CED)		
Age Category	f	%
Not at Risk	25	74
At Risk	9	26

Table 1 shows that Most pregnant women who experience KEK are of a non-risk age, namely 25 women, or 74%. Table 1 shows that the majority of pregnant women with Chronic Energy Deficiency (CED) are actually in the "Not at Risk" category, reaching 74%. This suggests that age alone is not the primary determinant of high CED rates, as most cases occur in groups considered safe. This requires further study, as other factors such as education level, economic status, and quality of antenatal care also influence the spread of CED. Epidemiologically, the distribution of CED can be influenced by various population characteristics, such as the number of pregnant adolescents and socioeconomic status. Although the "not at risk" age group accounts for many CED cases, age still has the potential to be a triggering factor in certain situations. Several studies have demonstrated a link between maternal age and nutritional status, which is often influenced by other factors such as nutritional knowledge and family financial situation (Erna K. Wati, Retno Murwani, 2024).

From the perspective of nutritional improvement, the data in the table indicates that CED prevention efforts should not only target "at-risk" groups but also encompass all productive age groups. Efforts such as increasing the frequency of antenatal visits, providing micronutrient supplements, and nutrition education should be directed at all pregnant women, and community-based approaches are often more effective than strategies focused solely on age. Ideal age range of 20–34 years can also trigger CED if socioeconomic conditions are poor or pregnancies are spaced too closely. Several studies have shown that interventions that focus on socioeconomic factors are more effective in reducing CED rates than those solely focused on age (Wayan Ike Ulandarai, 2025). Public health policies should consider age alongside other structural factors to allocate resources efficiently. Research reveals that the majority of pregnant women with Chronic Energy Deficiency (CED) have a high school education (53%). This is consistent with other research suggesting that a mother's education level is closely related to her nutritional status during pregnancy, with mothers with lower levels of education being at greater risk of CED (Tri et al., 2023). The analysis confirms that maternal education plays a crucial role in the incidence of CED, both in simple and more in-depth analyses.

Studies have revealed that many pregnant women with chronic energy deficiency (CED) are in the age range previously considered safe. This indicates that age is not the sole determining factor for CED. Although pregnancy at too young or too old an age is often associated with nutritional problems, pregnant women of ideal reproductive age are also at risk for CED if nutritional intake is inadequate, pregnancies are spaced too closely together, and prenatal care is inadequate. Age should be considered alongside other factors (Fitri et al., 2022). High incidence of CED in pregnant women who are not considered at risk may be triggered by socioeconomic conditions and unhealthy lifestyles. These factors include limited knowledge about nutrition, difficulty accessing nutritious food, and excessive physical activity. The heavy burden of responsibilities often increases pregnant women's energy needs, but this is not balanced by a balanced nutritional intake. Therefore, CED prevention efforts must target all pregnant women through nutrition counseling programs and regular nutritional status checks.

Table 2.  
chronic energy deficiency syndrome (CED factors based on education

Education Level	f	%
Low	12	35
Medium	18	53
High	4	12

Table 2 shows that Most pregnant women experiencing CED had a secondary education, 18 of whom, or 53%. out of 53 respondents, the majority were in the third trimester (58.50%). Tabel 2. The correlation between low education and CED is linked to knowledge and ease of access to information. Lack of education often results in limited insight into nutrition and a balanced diet during pregnancy. Research shows that nutrition education programs can improve maternal Knowledge, but its effects on health are also influenced by other social and economic factors (AMINURROHMAN, 2024).

Education is influenced by socioeconomic factors such as employment type, income, and accessibility to healthcare. Research from various locations shows that while education plays a role, economic conditions and healthcare services are equally important (Silvia Mariana, Alya Farah Dipa, Nisa Kartika Ningsih, 2024). Formal education alone is not sufficient to ensure adequate nutrition, and many pregnant women with secondary education still lack nutritional understanding. Therefore, CED prevention needs to focus on context-appropriate nutrition education and intensive support from healthcare professionals. Attention should also be paid to how knowledge is applied in everyday life and the mother's ability to make decisions regarding food.

Table 3.  
Factors of Chronic Energy Deficiency (CED) Based on Family Income

Family Income Level	f	%
Low	18	53
High	16	47

Table 3 shows that Those who experienced KEK mostly had secondary education, namely 18 people. Table 3 shows that most pregnant women with Chronic Energy Deficiency (CED) come from low-income families (18 out of 34; 53%). This finding aligns with numerous studies demonstrating a strong relationship between family income and maternal nutritional status: low-income families often struggle to access nutritious food, healthcare, and supplements during pregnancy, making them more vulnerable to CED. Recent survey and analytical studies in Indonesia and middle-income countries have found a significant correlation between household income and the incidence of CED after taking into account a number of other variables (Nurul Utami R, Mustamin, Agustian Ipa, 2018).

The mechanisms linking income to CED can be explained by several factors: (a) limited purchasing power, which reduces the quantity and quality of energy and protein consumption; (b) limited access to quality antenatal care (ANC) services that provide nutrition education and supplements; and (c) work conditions and workloads that increase energy needs without increasing dietary intake. Quantitative research in various regions in Indonesia shows that low-income families often report inadequate dietary intake and low numbers of ANC visits, both of which are strongly associated with the prevalence of CED (Kamila, 2024).

According to researchers, the fact that most pregnant women with Chronic Energy Deficiency (CED) come from low-income families indicates a link between family economic circumstances and maternal nutritional status during pregnancy. Low income potentially limits a family's ability to meet energy and essential nutrient needs. Therefore, even if the mother is of optimal reproductive age or has a certain level of education, the risk of CED remains possible. These results reinforce the hypothesis that economic factors are important determinants that directly contribute to chronic energy deficiency in pregnant women.

Researchers argue that the small difference in proportions between low- and high-income groups (53% vs. 47%) indicates that CED is not unique to low-income families but can also occur in families with higher incomes. This suggests that income is not the sole factor influencing the incidence of CED, but interacts with other factors such as dietary patterns, nutritional knowledge, and the mother's activity load during pregnancy. Therefore, these research findings confirm that the incidence of CED is multifactorial and cannot be explained by a single variable.

## CONCLUSION

Existing studies show that most pregnant women with Chronic Energy Deficiency (CED) are in an age range that should not pose a reproductive risk. This indicates that age is not the primary determinant of CED, as even pregnant women at a relatively safe age can experience this energy deficiency. Therefore, age needs to be viewed as a factor related to various other aspects that influence maternal nutritional status during pregnancy. Regarding education, the majority of pregnant women with CED have secondary education. This indicates that a higher level of education does not necessarily guarantee that nutritional needs are met during pregnancy. Lack of knowledge and application of information about health and nutrition can still occur, even for mothers with secondary education, and this can increase the risk of CED. Regarding family income, most pregnant women with CED come from families with poor economic conditions. This finding underscores the importance of family economic conditions in meeting maternal nutritional needs during pregnancy. However, the presence of CED cases among high-income families indicates that economic factors are not the sole determinant, but are also related to other factors such as diet, nutritional knowledge, and maternal physical activity during pregnancy.

Overall, the results of this study confirm that the incidence of Chronic Energy Deficiency (CED) in pregnant women is influenced by various interrelated factors, namely age, education, and family income. No single factor is the primary cause of CED; rather, a combination of social, economic, and behavioral factors contribute to the condition. Therefore, a comprehensive understanding of CED must be conducted, taking into account all the characteristics of the pregnant women studied.

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