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Original Article

Determinan Factors of Chronic Energy Deficiency in Pregnant Women

Niluh Nita Silfia[1], Hastuti Usman[1], Sulviana[1], Hadina[1], Sri Yanti Kusika[1], Widya Pani[1], Taqwin[2]

[1]Department of Midwifery, Poltekkes Kemenkes Palu, Central Sulawesi, Indonesia
[2]Department of Nursing, Poltekkes Kemenkes Palu, Central Sulawesi, Indonesia

Corresponding author: niluhnita81@gmail.com

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ABSTRACT

Background: Chronic Energy Deficiency (CED) in pregnant women is a nutritional problem that impacts the health of both the mother and the fetus. In the working area of Lere Health Center, Palu City, 38 cases of CED were recorded in 2021–2022. This study aims to identify the determining factors of CED occurrence in pregnant women in that area.

Method: The research method used was a case-control study with a retrospective approach. The study population consisted of 214 pregnant women, with a sample of 76 respondents selected through purposive sampling. Secondary data were analyzed univariately and bivariately using the Chi-square test through SPSS software.

Result: The research results indicate that pregnant women with primary and secondary education levels (65.8%), parity >3, and a history of hyperemesis gravidarum (55.2%) are more likely to experience chronic energy deficiency (CED). Bivariate analysis showed a significant relationship between education (p = 0.000; OR = 9.436), parity (p = 0.000; OR = 6.321), and hyperemesis gravidarum (p = 0.001; OR = 11.998) with the incidence of CED.

Conclusion: The conclusion of this study is that there is a relationship between education, parity, and a history of hyperemesis gravidarum with the occurrence of CED in pregnant women. The researchers recommend improving the quality of health services and nutritional counseling to reduce the incidence of CED in the working area of Lere Community Health Center.

INTRODUCTION

Chronic Energy Deficiency (CED) during pregnancy is a serious nutritional problem that directly impacts the health of both the mother and the fetus. CED is characterized by a mid-upper arm circumference (MUAC) of less than 23.5 cm, reflecting low energy and protein reserves in the pregnant woman's body. This condition is generally caused by inadequate nutritional intake in terms of both quality and quantity, increasing the risk of complications during pregnancy and childbirth. (Simbolon et al., 2018) The scale of the malnutrition problem (KEK) is quite extensive and has become a national concern, especially in areas with low levels of education and access to health information. Research by (Muryani et al., 2022) at the Danu Mulya Health Center, Pulau Rimau

District, Banyuasin Regency, shows that factors such as education, maternal knowledge, dietary patterns, and a history of Hyperemesis Gravidarum significantly relate to the occurrence of KEK. Similar findings were also obtained in the working area of Lere Health Center, Palu City, where education, parity, and a history of Hyperemesis Gravidarum also contributed to the high rates of KEK in pregnant women.

The chronology of the occurrence of PEM (Protein-Energy Malnutrition) generally begins with a lack of understanding among pregnant women about the importance of balanced nutrition, compounded by socioeconomic conditions that limit access to nutritious food. This ignorance is exacerbated by pregnancy symptoms such as excessive nausea and vomiting (Hyperemesis Gravidarum), which lead to a drastic reduction in food intake. Over time, the deficiency in energy and protein becomes chronic and impacts fetal growth as well as maternal health. As a solution, a multidimensional approach is needed, which includes nutrition education for pregnant women, improved access to nutritious food, and routine monitoring of nutritional status through MUAC measurements. Community-based interventions and capacity building for healthcare workers at the health center level are also important strategies to reduce the prevalence of chronic energy deficiency and improve the overall health quality of pregnant women.

METHODS

This type of research is an observational study with a case-control design aimed at determining the role of education, parity, and hyperemesis gravidarum in the occurrence of Chronic Energy Deficiency (CED) in pregnant women. The study uses a retrospective approach, by tracing past data available in the Lere Community Health Center working area, Palu City. The research was conducted on July 10, 2023**.** The population in this study consisted of all pregnant women recorded in the working area of Lere Health Center, Palu City, during the period from 2021 to 2022, with a total number of 214 individuals. This population was chosen because it has characteristics relevant to the research objective, namely pregnant women at risk of experiencing chronic energy deficiency (CED). The sampling technique was carried out using purposive sampling, which is the selection of samples based on certain criteria set by the researchers. The sample was divided into two groups: the case group, consisting of 38 pregnant women experiencing CED, and the control group, consisting of 38 pregnant women not experiencing CED. The total sample in this study consisted of 76 respondents. The sample selection was based on medical records and health reports of pregnant women available at Lere Health Center. The data used in this study were secondary data obtained from various official and reliable sources, including National Data and WHO Data related to the nutritional status of pregnant women, the Profile of the Ministry of Health of the Republic of Indonesia, the Health Profile of Central Sulawesi Province, the Health Office Report of Palu City, medical records, and health reports from Lere Health Center, Palu City. The time range of the data used was from 2020 to 2022. The data were used to identify the characteristics of pregnant women, nutritional status, as well as the risk factors studied.

RESULTS

The results of the study are presented in the following table:

Table 1. Characteristics of Respondents

Characteristics	n	%
Age		
≤20 Years	7	9.2
≥35 Years	8	10.5
21-34 Years	61	80.2

Job		
House Wife	42	55.2
Entrepreneur	21	27.6
Honorary employee	9	11.8
Private employee	4	5.2
Total	76	100

(Source: secondary data 2021 – 2022)

Based on Table 4.1, it is known that the majority of respondents are in the age range of 21–34 years, totaling 61 respondents (80.2%). Meanwhile, the age group with the fewest respondents is under 20 years, with 7 respondents (9.2%). In terms of occupation, most respondents are Housewives, totaling 42 respondents (55.2%). The occupation with the lowest number of respondents is private employees, with 4 respondents (5.2%).

Table 2. Distribution of pregnant women with chronic energy deficiency (CED)

Characteristics	n	%
Chronic Energy Deficiency		
Not KEK	38	50
KEK	38	50
Education		
Higher	26	34.2
Primary & Secondary	50	65.8
Parity		
Not at risk if ≤ 3	33	43.4
At risk if >3	43	56.6
HEG History		
No HEG ≤ 10 times (within 24 hours)	34	44.7
HEG > 10 times (within 24 hours)	42	55.2

(Source: secondary data 2021 – 2022)

Table 4.2 shows that as many as 38 respondents (50%) experienced chronic energy deficiency. The educational level of respondents is dominated by primary education, with 50 respondents (65.8%). Based on parity, the majority of respondents have high-risk parity, totaling 43 respondents (56.6%). Meanwhile, 42 respondents (55.2%) have a history of hyperemesis gravidarum.

DISCUSSION

Researchers generally start with the assumption that Chronic Energy Deficiency (CED) in pregnant women is a complex and multifactorial nutritional problem, influenced by socioeconomic conditions, nutritional knowledge, dietary patterns, health status, and access to healthcare services. CED is characterized by a mid-upper arm circumference (MUAC) < 23.5 cm and poses a risk of pregnancy complications such as difficult labor, low birth weight, and even fetal death. This study aims to identify the characteristics of pregnant women, nutritional status, and risk factors related to pregnancy conditions. The collected data were analyzed to describe the respondents' profiles and reveal the relationships between the studied variables.

The data show that the majority of pregnant women are within the healthy reproductive age range (20–35 years). Most respondents have a secondary education level and work as homemakers. The gestational age at the time of examination ranged from the first to the third trimester, with a relatively even distribution. Based on the findings of various studies, energy and protein intake are the most dominant factors, and high parity, HEG, and nutritional knowledge also have a significant impact. Recommended interventions include nutrition education, regular monitoring of MUAC, and

the provision of supplementary foods at health facilities. This study reinforces the importance of a multidimensional approach in preventing maternal undernutrition, including improving nutritional literacy, socioeconomic support, and more responsive maternity care services.

The nutritional status of pregnant women is assessed based on body mass index (BMI) and upper arm circumference (MUAC). The results show that some respondents fall into the undernutrition category, which could increase the risk of pregnancy complications. Factors such as dietary patterns, frequency of consuming nutritious foods, and access to healthcare services also affect nutritional status. Some identified risk factors include previous pregnancy history (Mothers with a history of complications are at higher risk of experiencing similar issues), poor nutritional status (Linked to the risk of anemia and low birth weight), lack of antenatal care (Can lead to delayed detection of pregnancy problems), and extreme age (under 20 or over 35 years): At risk for preeclampsia and preterm delivery.

Recent research, identified that most pregnant women are of reproductive age (21–26 years), have education ranging from primary to secondary level, and are housewives (Helmizar et al., 2025). Another study showed that the majority of pregnant women come from middle-income households and have attended antenatal care (ANC) visits regularly (BMC Pregnancy and Childbirth). Demographic factors such as age, education, and employment status do not always have a direct relationship with nutritional status, but they remain important in determining access to healthcare services and nutritional information (Karenia Putri et al., 2025). Nutritional status is measured through indicators such as pre-pregnancy Body Mass Index (BMI) and Mid-Upper Arm Circumference (MUAC). A study in Padang found that pre-pregnancy BMI was significantly associated with nutritional status in the first trimester ($p < 0.001$), while age, education, and parity showed no significant relationship. Meanwhile, research in Pekanbaru (2024) indicated that 17.2% of pregnant women experienced Chronic Energy Deficiency (CED) based on MUAC < 23.5 cm. Interestingly, 41.8% of pregnant women had low nutritional knowledge, and even 15.9% of those with good knowledge still experienced CED, suggesting that knowledge alone is not sufficient without support for food access and healthcare services

CONCLUSION

Based on the results of this study, the findings indicate a relationship between educational factors and the occurrence of chronic energy deficiency (CED) in pregnant women at Lere Health Center; a relationship between parity factors and the occurrence of CED in pregnant women at Lere Health Center; and a relationship between a history of hyperemesis gravidarum and the occurrence of CED in pregnant women at Lere Health Center. Suggestions are expected to contribute scientifically to midwifery by providing knowledge to reduce the incidence of CED, and also serve as a source and reference for future research related to the determining factors of CED in pregnant women and as material for further study. For the working area of Lere Health Center, Palu City, the results of this study are expected to provide input for improving service quality, providing information, and reducing the incidence of pregnant women experiencing chronic energy deficiency

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