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A Cross-Sectional Study on Pregnant Women's Knowledge and Chronic Energy Deficiency (CED) in Bandar Lampung City

Monica Dara Delia Suja * [1] , Indah Budiarti [2] , Lely Sulistianingrum [3]

[1 2 3] Midwifery Department, Poltekkes Kemenkes Tanjungkarang

Author's Email Correspondence (*): monicadarads@poltekkes-tjk.ac.id (+6285281475550)

ABSTRACT

Pregnant women who suffer from chronic energy deficiency (CED) tend to give birth to low birth weight babies. Based on data from the 2022 Lampung Province Health Profile, there were 5,142 pregnant women with CED. This study aims to examine the relationship between maternal knowledge and the incidence Chronic Energy Deficiency (CED) in pregnant women in Bandar Lampung City. This cross sectional study conducted on August 2025 in 5 community health centers with the highest number of pregnant women with CED in Bandar Lampung, namely Panjang, Kedaton, Kemiling, Kupang Kota, and Rajabasa Community Health Centers. Population in this study consisted of all pregnant women in the five health center areas where the study was conducted. Sample size was calculated using the Slovin formula with a population of 384 people in the five areas, resulting in a sample size of 200 pregnant women, which will be divided into five areas with a minimum sample of 40 respondents in each health center area. Data collection was carried out by filling out questionnaires distributed directly to mothers when they came to the health center or Posyandu. Variables was mothers' knowledge about the causes of CED and the incidence of CED in pregnant women. Analysis was performed using the chi-square statistical test and logistic regression. The results show that there is a relationship between mother's knowledge dan CED (p-value <0,05). Educational programs on the causes of chronic energy deficiency and counseling on ANC are required to increase mothers' knowledge and prevent CED.

Keywords *: pregnant women; chronic energy deficiency; education*

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INTRODUCTION

The maternal and child health (MCH) program is one of the programs that receives high priority. Pregnant women, nursing mothers, infants, and children are groups that are highly vulnerable to illness and death. Maternal and infant mortality rates, stunting prevalence rates, and the high number of infants with low birth weight (LBW) are essentially determined by the nutritional status of mothers during pregnancy (1). According to data from the World Health Organization (WHO), maternal mortality remains high, with approximately 808 women dying every day worldwide due to complications during pregnancy or childbirth. Maternal mortality in developing countries is caused by chronic energy deficiency (CED) and anemia during pregnancy in 40% of cases (2) . CED is a condition in which a person suffers from chronic malnutrition, characterized by an upper arm circumference (UAC) of <23.5 cm, which leads to health problems. Pregnant women with poor nutritional status or CED tend to give birth to LBW babies who have a high risk of death and disability (3).

To date, many pregnant women still experience nutritional problems, particularly malnutrition such as CED and anemia. The occurrence of CED in pregnant women is generally caused by low nutritional intake during pregnancy, which not only affects the mother and her baby, but also increases the risk of maternal mortality (4). In addition, lack of energy during pregnancy can disrupt embryo and fetal development as well as the health of the pregnant woman. The nutritional intake of pregnant women greatly affects fetal growth and development, which can lead to the risk of giving birth to babies with short stature (5).

The 2018 Basic Health Research recorded that the prevalence of pregnant women with CED in Indonesia was 17.3%. The CED rate among pregnant women in Lampung Province was 13.6%, with the highest CED rate found in East Nusa Tenggara at 36.8%,

followed by Maluku at 30.7%, and the lowest CED rate in North Kalimantan at 1.7% (Ministry of Health, 2018). Based on data from the 2022 Lampung Province Health Profile, the number of pregnant women with CED was 5,142 (6). The region with the highest number of pregnant women with CED was Bandar Lampung City, with 1,004 pregnant women with CED. The 2022 Bandar Lampung City Health Profile data shows that the 5 subdistricts with the highest number of pregnant women with CED are Panjang, Kedaton, Kemiling, Teluk Betung Utara, and Rajabasa (6).

The utilization of health services is the result of a process of seeking health services by an individual or group. One type of health system model is the health belief model. This model has three main categories in the utilization of health services, namely predisposing factors, enabling factors, and reinforcing factors (7). Studies show that factors associated with the incidence of CED in pregnant women include knowledge, infectious diseases, pregnancy spacing, education level, parity, and antenatal care visits (8).

The high incidence of CED in pregnant women can lead to high maternal mortality rates. To formulate targeted policies that can accelerate the reduction of CHE in pregnant women in Bandar Lampung City, basic research is needed to analyze the factors that influence CED. The purpose of this study is to examine the relationship between knowledge about risk factor CED and the incidence CED in pregnant women in Bandar Lampung City.

METHODS

This study is a quantitative study using a cross-sectional approach. This study was conducted by collecting data on independent and dependent variables at the same time. This study will be conducted in five community health centers with the highest number of pregnant women with KEK in Bandar Lampung, namely Panjang, Kedaton, Kemiling, Kupang Kota, and Rajabasa Community Health Centers. The population in this study is all pregnant women in the five community health center areas where the study will be

conducted. The sample used in this study consists of pregnant women in the Panjang, Kedaton, Kemiling, Kupang Kota, and Rajabasa Puskesmas areas. The sample size was calculated using the Slovin formula with a population of 384 people in the 5 areas, resulting in a sample size of 200 pregnant women, which will be divided into 5 areas with a minimum sample of 40 respondents per Puskesmas area. The research sample was selected using purposive sampling. The inclusion criteria for this study were pregnant women who lived in the working areas of the five health centers that were the sites of the study and who were willing to be respondents in this study, as evidenced by their informed consent. The exclusion criteria for this study were women who had congenital diseases during pregnancy, were unwilling to be respondents, and did not live in the health center areas to be studied.

Data collection was carried out by distributing questionnaires directly to mothers when they came to the health center or Posyandu and through home visits. The independent variables studied in this research was mothers' knowledge about the causes of CED and the dependent variable in this study is the incidence of CED in pregnant women. Questionnaires for CED on pregnant women generally show high validity and reliability, measured by Cronbach's alpha values >0.7 . The collected data will then be analyzed using univariate and bivariate analysis. Univariate analysis is presented in frequency tables, and bivariate analysis uses the chi-square statistical test and logistic regression. This study obtained ethical clearance from Ethical Commision Poltekkes Kemenkes Tanjungkarang No.182/KEPK-TJK/IV/2025.

RESULTS

Based on the table 1 below, it is known that of the total 200 pregnant women who were respondents, 83 (41.5%) experienced Chronic Energy Deficiency (CED), while 117 (58.5%) did not experience CED. This shows that the proportion of pregnant women with

poor nutritional status (CED) is still quite high in the study area. In terms of employment, the majority of respondents were employed, namely 113 (56.5%), while 87 (43.5%) were unemployed. Based on age, most pregnant women were in the non-risk group, namely 160 people (80%), while those in the risk age group (<20 years or >35 years) numbered 40 people (20%). In terms of education level, the majority of respondents had formal education, namely 157 people (78.5%), while 43 people (21.5%) did not have formal education.

Table 1
Respondent Characteristics

Characteristics Respondent	n	%
Chronic Energy Deficiency		
CED	83	41.5
Normal	117	58.5
Age		
<20 and >35 years	40	20
20-35 year	160	80
Occupation		
Working	113	43.5
Not Working	87	56.5
Knowledge		
Good	94	47
Fair	106	53
Level of Education		
Primary	43	21.5
Secondary	157	78.5

Source : Primary Data, 2025

Poor maternal knowledge significantly elevates the risk of chronic energy deficiency (CED) in pregnant women, with affected mothers showing a 66% prevalence compared to 51.9% among those with good knowledge (p=0.024). This association is quantified by an

odds ratio (OR) of 2.52 (95% CI: 1.12–5.64), suggesting that poor knowledge more than doubles the odds of CED after controlling for confounders, highlighting a modifiable risk factor through targeted education.

Table 2
Pregnant Women's Knowledge on th Incidence of CED

Independent Variables	CED				*p-value*	*OR (95%CI)*
	CED		Normal			
	n	**%**	**n**	**%**	**0.024**	2,52 (1,12-5,64)
Knowledge						
Good	55	51.9	51	48.1		
Fair	28	29.7	66	70.3		

Source : Primary Data, 2025

DISCUSSION

The present study identified a statistically significant relationship between maternal knowledge and the incidence of chronic energy deficiency (CED). Pregnant women with inadequate nutritional knowledge were found to have a 2.52-fold higher likelihood of experiencing CED compared to those with adequate knowledge. This finding suggests that limited comprehension of nutritional concepts may negatively influence maternal behavior, particularly in aspects related to food selection, dietary management, and the utilization of maternal health services.

Unlike previous studies that primarily examined CED prevalence or isolated risk factors like age and parity in pregnant women, this research uniquely establishes poor maternal knowledge as a statistically significant, modifiable predictor (OR 2.52, 95% CI: 1.12–5.64), advocating for targeted nutritional education interventions. It is well established that knowledge serves as a cognitive determinant of health behavior, shaping decisions that affect nutritional intake. Insufficient knowledge often leads to inappropriate

dietary practices, such as irregular meal frequency, low consumption of nutrient-rich foods, and poor dietary diversity (9). Pregnant women who fail to appreciate the importance of balanced nutrition are consequently more vulnerable to both energy deficiency and insufficiency of macro- and micronutrients, conditions that may compromise fetal growth and increase the risk of adverse maternal outcomes (10).

These findings are consistent with the health behavior theory, which emphasizes that knowledge forms the foundation for shaping health-related attitudes and practices. The results are also in agreement with the study conducted by (11) which demonstrated that maternal nutritional knowledge exerts a significant influence on the nutritional status of pregnant women. The alignment of these findings underscores the pivotal role of nutrition education and counseling interventions in improving maternal awareness and consequently reducing the prevalence of CED. Strengthening maternal nutrition literacy should therefore be considered a strategic component of public health initiatives aimed at optimizing pregnancy outcomes (12).

Furthermore, the influence of maternal knowledge must be interpreted within a broader socio-environmental context. Education level, socioeconomic status, and access to health information may act as mediating variables that shape the extent to which knowledge translates into practice (13). Therefore, integrated strategies involving community-based nutrition education, improved access to antenatal counseling, and collaboration between health workers and community leaders are essential to enhance the effectiveness of nutrition interventions (14).

Cultural beliefs and traditional dietary restrictions during pregnancy may also impede the adoption of healthy nutritional practices despite adequate knowledge. Future interventions should therefore consider culturally sensitive approaches that respect local traditions while promoting evidence-based nutrition messages. This cultural adaptation

can foster better community acceptance and long-term behavioral change among pregnant women (14).

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, maternal knowledge was shown to be a significant determinant of chronic energy deficiency among pregnant women. Poor nutritional understanding increases the likelihood of inadequate dietary behavior, leading to energy and nutrient deficiencies that negatively impact both maternal and fetal health outcomes. Strengthening maternal knowledge is therefore a key strategy in preventing CED and improving pregnancy outcomes. Integrate nutrition modules into routine antenatal visits, delivering 30-minute sessions on CED risks using visual aids and local foods, starting at the first trimester. Train midwives via quarterly workshops to conduct personalized counseling, tracking maternal knowledge pre- and post-intervention with validated 10-item quizzes. Launch community campaigns through Posyandu centers, featuring monthly cooking demos and reminders on balanced diets, targeting high-risk pregnant women.

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