

Analysis of the effectiveness of supplementary feeding programs for pregnant women with chronic energy deficiency

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Abstract

Background: chronic energy deficiency (CED) is a nutritional problem in pregnant women that is still common in Indonesia. CED in pregnant women can cause disorders in the mother's immune system, increase the risk of infection, and affect the body's ability to recover after childbirth. **Objective:** This study aims to analyze the effectiveness of a supplementary feeding program (SFM) for pregnant women with CED at the Kenali Besar Community Health Center, Jambi City. **Methods:** This was a quantitative study with a quasi-experimental design. The study was conducted on 17 pregnant women with CED who received the supplementary feeding program from the Community Health Center for 3 months. Data analysis was performed using the Wilcoxon test. **Results:** Based on the results of the study, it is known that the supplementary feeding program is effective in overcoming CED in pregnant women (p-value: 0.001). **Conclusion:** Supplementary feeding program is effective in overcoming CED in pregnant women. Therefore, it is recommended that the supplementary feeding program by the health center continue. In addition, supplementary feeding program provided should be based on local foods so that pregnant women can independently prepare healthy meals at home.

Keywords: Chronic energy deficiency; pregnant women; supplementary feeding.

Cite This Article

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INTRODUCTION

Chronic energy deficiency (CED) is a form of malnutrition caused by a prolonged lack of food intake, even lasting for years, which results in health problems. If the upper arm circumference (UAC) is below 23.5 cm, then the woman is suffering from CED and is likely to give birth to a baby with low birth weight. In addition, malnutrition can cause various health problems such as morbidity, mortality, and disability, as well as reduce the quality of a nation's human resources. From a broader perspective, malnutrition can be a threat to the resilience and survival of a country [1].

Globally, according to the World Health Organization (WHO), the prevalence of Chronic Energy Deficiency (CED) in pregnant women ranges from 35-75%. In addition, the WHO also notes that around 40% of maternal deaths are related to CED [2]. Based on the results of the 2023 Indonesian Health Survey (SKI), the prevalence of CED in pregnant women reached 16.9%. However, this figure is still below the target set by the Ministry of Health of the Republic of Indonesia, which aims to reduce the prevalence of CED in pregnant women to 10% by 2024 [3]. Furthermore, the number of pregnant women with chronic energy deficiency (CED) in Jambi Province, based on data from the Jambi City Health Office, was 597 in 2021, 542 in 2022, and 414 in 2023 [4].

Chronic energy deficiency (CED) in pregnant women can have a significant negative impact on the health and development of both the mother and fetus. CED in pregnant women can also increase the risk of anemia. Anemia in pregnant women can negatively impact the health of the mother and fetus by increasing the risk of premature birth, low birth weight, and maternal and infant mortality [5]. There are various factors that can cause Chronic Energy Deficiency (CED) in pregnant women, namely direct factors (food intake or consumption patterns and infections) and indirect factors (socioeconomic factors including family income, maternal education, maternal knowledge, biological factors including the mother's age, pregnancy spacing, and behavioral factors) [6]. Based on the results of a study by Utama, et al. (2022), it is known that the determinants of CED in pregnant women are age, parity, education level, and the mother's anemia status [7]. Furthermore, the results of a study conducted by Dewi, et.al (2024) found that there is a significant relationship between knowledge and economic status with the incidence of CED in pregnant women [8]. Similarly, a study conducted by Lorenza, et.al. (2025) found that parity, anemia, attitudes, and the role of health workers have a significant relationship with the incidence of CED in pregnant women [9].

The number of cases of CED in pregnant women in Jambi Province in the last 3 years was 3,083 cases (2021), 4,290 cases (2022), and 3,752 cases (2023) [10]. This shows that there are still many cases of CED in pregnant women in Jambi Province in general and in Jambi City in particular. In an effort to overcome CED in pregnant women, there is a Supplementary Feeding Program to meet the nutritional needs of mothers during pregnancy. The coverage of supplementary feeding for pregnant women with KEK in 2022 was 96.81%. There are six districts with the highest coverage of supplementary food provision for pregnant women with CED: Bungo, Tanjung Jabung Timur, Muaro Jambi, Tanjung Jabung Barat, Sungai Penuh, and Sarolangun, all at 100.0%. Meanwhile, the district/city with the lowest achievement is the city of Jambi at 88.67% [11-12].

The coverage of PMT for pregnant women with CED has not reached 100% in the city. Therefore, in-depth research is needed to examine the effectiveness of nutritional interventions Supplementary Feeding Program for pregnant women with CED through a mixed method study, following preliminary research on the determinants of CED in pregnant women in the city of Jambi. The research will be conducted at the Kenali

Besar Community Health Center because it is one of the community health centers in Jambi City where many cases of CED in pregnant women have been found. Based on initial observations, it is known that at the end of 2024, there were 27 pregnant women with KEK. Additionally, the Kenali Besar Community Health Center in Jambi City has implemented nutritional interventions through Supplementary Feeding Program. However, the effectiveness of this intervention program in addressing KEK in pregnant women remains unknown.

METHODS

This study is a quantitative study with a quasi-experimental design. The population in this study of pregnant women with chronic energy deficiency in 2025 at the Kenali Besar Community Health Center in Jambi City consisted of 81 people. However, there were 17 pregnant women with chronic energy deficiency who received a supplementary feeding program from the Community Health Center from July to September 2025, so the sample in this study consisted of 17 people. Respondent characteristic data were obtained through interviews using questionnaires, followed by initial upper arm circumference (UAC) measurements. Subsequently, an intervention in the form of supplementary feeding was provided for 3 months by the health center, followed by final UAC measurements on the research respondents. Data analysis was performed using the Wilcoxon test with SPSS software by the research team.

RESULTS

Based on the analysis results, the distribution of pregnant women with chronic energy deficiency (CED) at the Kenali Besar Community Health Center is described in the following frequency distribution table:

Table 1. Frequency distribution of research variables

Variable	n	%
Age		
- Low risk (20 - 35)	76	93,8
- High risk (<20 and >35)	5	6,2
Parity		
- Multipara (>1 child)	19	23,5
- Primipara (1 child)	25	30,9
- Nulipara (0 child)	37	45,7
Body Mass Index		
- Normal	51	63
- Underweight	30	37
Hemoglobin		
- Normal	75	92,6
- Abnormal	6	7,4

Table 1 shows that of the 81 pregnant women with CED, 76 (93.8%) were in the 20–35 age group (healthy reproductive age). Meanwhile, pregnant women in the high-risk age groups (<20 years and >35 years) numbered only 5 (6.2%). This indicates that the majority of pregnant women are in the safe age group for pregnancy, so the risk of complications due to age is relatively low. The distribution of parity shows that the majority of respondents were nulliparous or mothers who had not yet had children (45.7%). Meanwhile, the primipara group (mothers with one child) ranked second

(30.9%), and multipara (>1 child) was the smallest group (23.5%). This means that most respondents in this study were still in the early stages of parity.

The results of the analysis show that the majority of pregnant women have normal nutritional status, namely 51 people (63%), while 30 people (37%) are underweight. This condition indicates that there is still a significant proportion of pregnant women with poor nutritional status, which can increase the risk to the health of the mother and fetus, such as babies born with low birth weight (LBW). Furthermore, it was also found that most pregnant women had normal Hb levels, namely 75 women (92.6%), while only 6 women (7.4%) had abnormal Hb levels (anemia). This shows that the majority of pregnant women do not experience anemia, but attention still needs to be paid to the small group at risk because anemia during pregnancy can affect the health of the mother and fetus. The analysis of changes in initial upper arm circumference and final upper arm circumference of CED pregnant women who have received a supplementary feeding program for ≥ 3 months can be seen in Table 2 below:

Table 2. Changes in upper arm circumference pregnant women with CED.

Variable	N	Mean	Standard Deviation (SD)	95% CI		T	df	P-value
				Lower	Upper			
Upper Arm Circumference	17	-1,5882	1,5107	-2,3650	-0,8115	-4,335	16	0,001

Table 2 shows that for the variables initial upper arm circumference and final upper arm circumference, the average difference was -1.5882. The significance value (Sig. 2-tailed) was 0.001 (< 0.05). This indicates that there was a significant difference between the initial upper arm circumference and the final upper arm circumference. The negative mean value indicates that the final upper arm circumference is higher than the initial upper arm circumference, thus showing the effect of nutritional intervention in the form of a supplementary feeding program on pregnant women diagnosed with CED. The mean difference is -1.5882. This result shows an increase in the mean upper arm circumference of pregnant women by 1.5882 cm after consuming the supplementary feeding program. This increase reflects an increase in the energy and protein reserves of mothers, which is the main objective of the supplementary feeding program.

DISCUSSION

Based on the results of the study, it is known that the supplementary feeding program for pregnant women suffering from chronic energy deficiency (CED) at the Community Health Center is significantly (p-value: 0.001) effective in overcoming chronic energy deficiency. This is evidenced by an increase in upper arm circumference after intervention in the form of supplementary feeding with an average value of 1.5882. This increase was due to pregnant women with chronic energy deficiency receiving supplementary feeding from the health center for 3 months.

This study found that supplementary feeding was effective in overcoming chronic energy deficiency in pregnant women. The results of this study were in line with the study by Aryani (2025), which found a positive relationship between supplementary feeding using local foods and changes in upper arm circumference in pregnant women at the Kepi Community Health Center, with a p-value of 0.001.1 Research conducted

by Nurjanah (2025) also showed similar results, namely that there was a difference between upper arm circumference before and after the provision of supplementary food to pregnant women with CED in the working area of the Kemurang Wetan Community Health Center with a p-value = 0.001.22 Similar results were also found in a study by Yani, et al (2025), which showed a significant change in upper arm circumference before and after receiving intervention with a p-value of 0.000. The study results stated that 60% of pregnant women experienced an increase in upper arm circumference to >23.5 cm.³ Therefore, the supplementary feeding program nutritional intervention program needs to be continued for more mothers as one of the programs to address the problem of pregnant women with CED so that pregnant women's nutritional needs are met and the fetus in the womb can grow and develop optimally [13-25].

CONCLUSIONS

Based on the results of the study, it was found that nutritional intervention in the form of supplementary feeding for pregnant women conducted by the Kenali Besar Community Health Center in Jambi City for approximately 3 months significantly improved the health of pregnant women with CED. Therefore, it is recommended that the supplementary feeding program by the health center continue. In addition, supplementary feeding program provided should be based on local foods so that pregnant women can independently prepare healthy meals at home.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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DECLARATION OF ARTIFICIAL INTELLIGENCE USE

We hereby confirm that no artificial intelligence (AI) tools or methodologies were utilized at any stage of this study, including during data collection, analysis, visualization or manuscript preparation. All work presented in this study was conducted manually by the authors without the assistance of AI-based tools or systems

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