The Impact of Nutritional Counseling Using Flyers on Knowledge of Chronic Energy Deficiency (CED) Among Pregnant Women

Desidarius Bela Dhesa[1], Asran[1], Jenny Qlifianti Demmalewa[1]

[1]Program Studi S1 Gizi, Sekolah Tinggi Ilmu Kesehatan Karya Kesehatan, Kendari, Sulawesi Tenggara, Indonesia

Email correspondence: deddy.bela@yahoo.com

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Abstract

Chronic energy deficiency (CED) is one of the nutritional problems of pregnant women that can be prevented through counseling. The prevalence of CED at Waara Community Health Center increased from 2022 (20.9%), in 2023 (29.8%), and in 2024 (32.2%). The purpose of this study was to determine the effect of nutritional counseling using flyers on pregnant women's knowledge of CED. This research is a pre-experimental study with a one-group pre-test and post-test design. This study was conducted in the working area of the Waara Community Health Center in Muna Regency from Juny 6 to November 10, 2025. The sample comprised 27 pregnant women in the working area of the Waara Community Health Center in 2025, during the October to November period, selected through total sampling. Data were collected using a questionnaire to measure knowledge about CED and tested using a paired t-test. The results of the study on 27 samples, the average score of knowledge of pregnant women increased from 7.00 to 10.00. The results of the paired t-test obtained a $p < 0.001$. The conclusion is that nutritional counseling using flyers resulted in a significant increase in knowledge about CED among pregnant women in the Waara Community Health Center, Muna Regency

Keywords: Counseling, Flyer, Knowledge, Nutrition, Pregnant women

INTRODUCTION

Nutritional issues in pregnant women are a serious concern that requires urgent attention. One such issue is Chronic Energy Deficiency (CED), a condition marked by an imbalance in energy and protein intake, leading to insufficient nutrient supply for the body's needs (Eli, 2025; Fibrila et al., 2024). CED in pregnant women can disrupt fetal growth and development, affecting physical growth, brain function, and metabolism, which may result in non-communicable diseases in adulthood (Septrierly et al., 2024). It also increases the risk of prolonged labor, postpartum hemorrhage, and even maternal mortality (Angraini et al., 2024). For infants, the risks include fetal death, prematurity, birth defects, low birth weight (LBW), and neonatal mortality (Indonesian Ministry of Health, 2023).

The World Health Organization (WHO) reported in 2024 that the global prevalence of Chronic Energy Deficiency (CED) among pregnant women stands at 36.8% (WHO, 2024). Meanwhile, in Indonesia, according to the latest data from the 2023 Indonesia Health Survey (SKI), the prevalence of CED among pregnant women is 16.9%. This figure shows a decline compared to the 2018 Basic Health Research (Riskesdas), which recorded a CED prevalence

of 17.3% (Indonesian Ministry of Health, 2023). The CED prevalence in the Muna District Health Office was 15.2% in 2022, rising to 16.9% in 2023 (Muna District Health Office, 2023). The highest number of CED cases was recorded at Waara Community Health Center, with a rate of 20.9% in 2022, increasing to 29.8% in 2023, and further rising to 32.2% in 2024. The CED prevalence at Waara Community Health Center exceeds the target achievement rate of 15% (Waara Community Health Center, 2024). Chronic energy deficiency at Waara Health Center is increasing and becoming more serious, and can have an impact on increasing maternal and infant mortality rates if not immediately prevented and handled. One of the causes of the increase in CED cases at Waara Community Health Center is the lack of education, particularly nutritional counseling, provided to pregnant women, resulting in insufficient knowledge about proper nutrition during pregnancy.

Based on the theory put forward by Mastuti in 2023, an indirect contributing factor to pregnant women being at risk of Chronic Energy Deficiency (CED) is their lack of nutritional knowledge. One intervention strategy involves providing nutritional education through various media, such as flyers (Indonesian Ministry of Health, 2023). Adequate nutritional knowledge among pregnant women is crucial to ensure balanced dietary intake during pregnancy. Maternal understanding of proper food consumption plays a vital role in preventing CED cases, making nutritional counseling particularly important. Insufficient knowledge can lead to inappropriate maternal attitudes and behaviors toward nutrition, ultimately affecting dietary intake. This situation stems from persistently low levels of nutritional awareness (Sari & Sapitri, 2021).

The study by Panjaitan et al. (2022) found that low knowledge levels are significantly associated with the occurrence of chronic energy deficiency (CED) in pregnant women (Auranissa et al., 2025). One effective approach is through Communication, Information, and Education (CIE), which is expected to enhance knowledge, skills, and motivation among expectant mothers (UNICEF, 2021). Nutritional counseling serves as a method in dietary care to help individuals gain a better understanding of their challenges (Cornelia et al., 2024). Based on the results of an initial survey in several references, it was shown that pregnant women's knowledge of CED is still low, and there is still a lack of previous interventions that attempt to increase pregnant women's knowledge about CED.

This research opted for flyers and counseling for pregnant women because flyers are a relatively inexpensive and easily distributable health promotion tool. By evaluating the effectiveness of flyers in this context, this study can provide insights into how this print medium can be optimally utilized in public health programs (Alfina et al., 2024). The findings may be used to refine and optimize other health promotion strategies (Kustandi, 2023). As a

health promotion tool, flyers deliver concise information that's easily accessible to the public (Mastuti, 2023; Nadimin and Asikin, 2025). A preliminary survey conducted among 5 pregnant women in the Waara Community Health Center area found that 100% reported never having received flyers related to Chronic Energy Deficiency. The gap in this research is that there is still a lack of research in this field, and there has been no specific testing of flyer media.

Deficiency (CED), while 80% of pregnant women had limited knowledge about CED. Additionally, no research has been conducted in the Waara Community Health Center's working area on the effect of nutritional counseling on pregnant women's knowledge. Therefore, the author is interested in conducting a study titled "The Effect of Nutritional Counseling Using Flyer Media on Knowledge About CED Among Pregnant Women in the Working Area of Waara Community Health Center, Muna Regency. This study aims to determine the effect of nutritional counseling using flyer media on the knowledge of Chronic Energy Deficiency (CED) among pregnant women in the working area of Waara Community Health Center, Muna Regency. The novelty of this research lies in the flyer media used, which is a new media applied to pregnant women at the Waara Community Health Center.

METHODS

The study employed a quantitative research method with a pre-experimental design. The research framework followed a pre-test post-test design. This study used a pre-experimental design with a one-group pre-test post-test design because the researchers wanted to determine the effect of the intervention on the research variables through pre- and post-treatment measurements on the same group. This design was chosen because it aligns with the research objectives and takes into account field conditions that preclude the use of a control group. The difference in measurement results before and after the intervention is used as an indicator of changes resulting from the treatment.

This study was conducted within the operational area of Waara Community Health Center in Muna Regency from Juny 6 to November 10, 2025. The study population comprised all pregnant women CED in Waara Community Health Center's coverage area during the October to November 2025 period, totaling 27 individuals. The sample for this research consisted of 27 pregnant women CED within Waara Community Health Center's operational area during the October to November 2025 period. The sampling technique utilized total sampling, where the entire population served as the sample. Intervention procedures in this study, using flyers, were given every week for 1 month of intervention. The intervention lasted approximately 45 minutes per session. Counseling was provided using a face-to-face

discussion method for pregnant women with CED. After one month of intervention, a post-test was conducted to measure post-intervention knowledge.

The research instrument employed in this study was a questionnaire used for data collection. This research questionnaire consisted of 10 questions with true and false answer options. Knowledge of CED in this study encompassed all information known to pregnant women regarding the definition, causes, symptoms, impacts, and prevention methods for CED. This study used ratio data with assessment criteria of pre-test: the average knowledge score before receiving nutrition counseling, and post-test: the average knowledge score after receiving nutrition counseling. The validity test results from 10 respondents showed an average calculated r-value above 0.444, confirming that all questionnaire items were valid. The reliability test results from the same 10 respondents yielded a Cronbach's alpha value of 0.85 (>0.6), indicating all questionnaire items were reliable.

Primary data collection was conducted directly from respondents using questionnaires. The collected data included respondent identity information such as age, education level, occupation, and knowledge about Chronic Energy Deficiency (CED). Data collection procedures are 1) Pre-test, 2) Providing intervention (counseling using flyers), and 3) Post-test. Intervention is given every week using flyer media and is carried out face-to-face with pregnant women with chronic energy deficiency.

This study applies ethical research principles by respecting respondents' rights, maintaining data confidentiality, and ensuring no harm is done to respondents. Prior to the study, respondents were provided with an explanation of the study's purpose and procedures and were asked to provide voluntary informed consent. All respondent data will be kept confidential and used solely for research purposes.

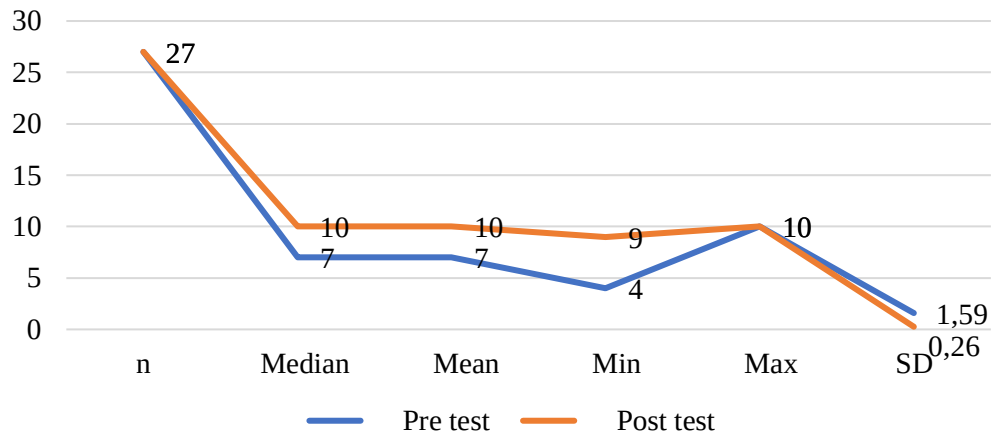
This study uses descriptive analysis on research variables by analyzing the average, minimum, maximum, and standard deviation values, and to analyze the relationship between the dependent and independent variables, a Shapiro-Wilk normality test is first conducted. If the data is normally distributed, a paired t-test is performed. If the data is not normally distributed, the alternative Wilcoxon signed-rank test is used instead. The significance level in this study was set at $\alpha = 0.05$ (95% confidence level) (Sugiyono, 2021).

RESULTS

Table 1. Characteristics of Respondents

Variable	Category	Total (n=27)	Percentage (%)
Age (Years)	20-35	22	81
	> 35	5	19
Gestational Age (Month)	1-3	5	19
	4-6	9	33
	7-9	13	48
Education	Elementary school	2	7
	Junior high school	3	11
	Senior High School	16	59
	Diploma/ Bachelor's Degree (D3/S1)	6	23
Occupation	Housewife	21	78
	Honorary	1	4
	Self-employed	2	7
	State Civil Apparatus	3	11

Table 1 shows that of the 27 samples, the majority of the age characteristics were between 20 until 35 years, 22 (81%). The majority of the gestational age of the samples was in the third trimester (7-9 months), 13 (48%). The education level of the pregnant women was mostly senior high school graduates, as many as 16 people (59%), and the occupation of the pregnant women was mostly housewives, as many as 21 people (78%). The descriptive analysis of variables includes the results of processing data on pregnant women's knowledge before and after nutritional counseling using flyers. For further details, please refer to picture 1 below:



Picture 1 . Knowledge Distribution on Chronic Energy Deficiency (CED) Before and After Nutrition Counseling Using Flyer Media Regarding CED Knowledge Among Pregnant Women

Picture 1 shows that out of 27 samples, the average knowledge score of pregnant women before counseling using flyers was 7, with a minimum score of 4 and a maximum of 10, and a standard deviation (SD) of 1.59. The average knowledge score after counseling using flyers was 10, with a minimum score of 9 and a maximum of 10, and a standard deviation (SD) of 0.26.

Before analyzing the relationship between independent and dependent variables, a normality test was first conducted using the Shapiro-Wilk test. The normality test results for the difference in knowledge scores before and after counseling showed a p-value of 0.136 > 0.05, indicating normally distributed data. Therefore, the data were analyzed using a paired t-test. For details, see Table 2 below:

Table 2. The Effect of Nutrition Counseling Using Flyer Media on Knowledge of Chronic Energy Deficiency Among Pregnant Women in the Working Area of Waara Community Health Center, Muna Regency

Knowledge Variables	n	Mean difference	SD difference	95% CI	t value	df	*p value*
Pre Test -Post Test	27	-2.593	1.551	LL (3.026) UL (1.979)	-8.688	26	0.000

Based on the results of a paired t-test on the knowledge variables between pre-test and post-test scores, a significant difference was found after the intervention. The analysis was conducted on 27 respondents, with a mean difference of -2.593 and a standard deviation of 1.551. A negative difference indicates an increase in knowledge scores at the post-test compared to the pre-test, with an average increase of 2.593 points. The statistical test results showed a t-value of -8.688 with 26 degrees of freedom (df) and a p-value < 0.001, indicating a statistically significant difference between knowledge levels before and after the intervention. The 95% confidence interval for the difference in scores ranged from 1.979 to 3.026, indicating that the increase in knowledge after the intervention fell within this range. Therefore, it can be concluded that nutritional counseling using flyer media resulted in a significant increase in knowledge about Chronic Energy Deficiency (CED) among pregnant women in the working area of Waara Community Health Center, Muna District.

DISCUSSION

The results of this research show that there was an increase in knowledge scores after counseling using the flyer. The research findings indicate that the average nutritional knowledge score among pregnant women prior to receiving counseling using flyer media was 7, with a minimum score of 4, a maximum of 10, and a standard deviation (SD) of 1.59, reflecting existing variations in knowledge levels among respondents. Following the counseling intervention, a significant improvement was observed; the average knowledge score rose to 10, with minimum and maximum scores of 9 and 10, respectively, and an SD of 0.26. This demonstrates that nearly all participants achieved uniformly high knowledge levels. The study results indicate an increase in pregnant women's knowledge about Chronic Energy Deficiency (CED) after receiving nutritional counseling using flyers.

These results confirm that flyers effectively deliver nutritional information in a simple, clear, and easily understandable format for pregnant women. The marked improvement also highlights how print-based nutrition education interventions can enhance mothers' understanding of chronic energy deficiency (CED) prevention during pregnancy. Consequently, this approach holds potential to positively influence dietary behaviors, thereby supporting maternal and fetal health. This aligns with the theory of Cornelia that visual media like flyers can help convey health information in a simpler, more engaging, and easily understandable manner, particularly for pregnant women who may face limitations in accessing nutritional information. Specifically, the use of images, colors, and illustrations can capture the attention of pregnant women, making health messages easier to understand than verbal explanations alone. For example, images about pregnancy danger signs, healthy eating patterns, or prenatal checkup schedules can help mothers understand the information more quickly and clearly (Cornelia, 2024).

The study results indicate an increase in pregnant women's knowledge about Chronic Energy Deficiency (CED) after receiving nutritional counseling using flyers, with a p-value < 0.001, signifying a significant difference between pre- and post-intervention. This aligns with the theory that visual media like flyers can help convey health information in a simpler, more engaging, and easily understandable manner, particularly for pregnant women who may face limitations in accessing nutritional information. Good knowledge among pregnant women is the foundation for developing a positive attitude towards the importance of adequate nutrition during pregnancy, especially for pregnant women with Chronic Energy Deficiency (CED). Mothers who understand the impact of CED on maternal and fetal health will have a higher awareness and concern for maintaining a healthy diet and meeting nutritional needs. This positive attitude then encourages the development of better health behaviors, such as consuming a balanced diet, regularly taking iron supplements, and actively attending prenatal checkups. Consistent behavioral changes will impact the nutritional status of pregnant women, marked by increased nutritional intake, weight gain, and maternal health during pregnancy (Gregg, 2025).

This knowledge improvement is crucial because a proper understanding of CED can influence mothers' attitudes and behaviors in meeting nutritional needs during pregnancy, thereby helping prevent complications, low birth weight, and future stunting risks. These findings support prior research stating that print media-based nutritional counseling effectively enhances pregnant women's knowledge and awareness regarding reproductive health and nutritional status. This research is consistent with research of UNICEF, which highlights that

one viable approach is through Communication, Information, and Education (KIE), aimed at enhancing knowledge, skills, and motivation among pregnant women (Gregg, 2025; UNICEF, 2021). Consistent with Cornelia et al. (2024), suggest that nutritional counseling serves as a method within dietary care to help individuals gain a better understanding of the challenges they face. This research is also in line with Ariendha et al showed that there was an effect of CED education through booklets on knowledge among pregnant women in the third trimester at the Gunungsari Community Health Center, with a p-value <0.05. Educational interventions related to dietary patterns and adherence to consuming nutritious foods are needed, especially for pregnant women aged <20 years and >35 years and unemployed mothers (Ariendha et al., 2026).

Flyers are a relatively low-cost and easily distributable health promotion tool (Rosadi et al., 2025). By assessing their effectiveness in this context, the study can provide insights into how this print medium can be optimally utilized in public health programs. The findings may also contribute to refining and optimizing other health promotion strategies (Kustandi, 2023). As a health promotion medium, flyers deliver concise and easily accessible information to the public (Mastuti, 2023). This study is supported by the statement that adequate nutritional knowledge among pregnant women is crucial to ensure balanced and nutritious food consumption during pregnancy. A mother's understanding of dietary intake can help prevent chronic energy deficiency (CED), making counseling highly essential. Lack of knowledge may lead to inappropriate maternal attitudes and behaviors toward nutrition, ultimately affecting dietary intake. This issue arises due to persistently low awareness levels (Istiqomah et al., 2025; Sari & Sapitri, 2021).

A limitation of this study is its design without a control group, meaning that changes in respondents' knowledge cannot be compared with those of a group that did not receive the intervention. This situation allows for the influence of factors other than the provision of nutrition counseling using flyers, such as information from health workers, social media, or respondents' personal experiences. Furthermore, this study used a relatively small sample size, limiting the generalizability of the results to a broader population. Bias is also possible, particularly information bias and respondent bias, as knowledge measurement was conducted using a questionnaire that relies on respondents' honesty and understanding in answering questions.

CONCLUSIONS

The conclusion of this study is that there is a significant difference in knowledge about Chronic Energy Deficiency (CED) before and after nutrition counseling using flyers among pregnant women in the working area of Waara Community Health Center, Muna Regency, with a p-value <0,001. Recommendations for Waara Community Health Center, Muna Regency, to continue optimizing nutrition counseling activities by utilizing flyers, as they have proven effective in increasing pregnant women's knowledge about CED. The health center should also conduct regular monitoring and evaluation, not only on knowledge aspects but also on attitudes and nutritional behaviors of pregnant women, to ensure the educational impact is comprehensively measurable in CED prevention. Practical implications for health care practice include that brochure-based counseling can be implemented as an effective health promotion strategy in primary health care settings.

For Future Researchers to expand the assessment beyond knowledge to include changes in attitudes and nutritional behaviors of pregnant women post-intervention. This will help determine the extent to which knowledge influences actual CED prevention actions. Additionally, compare the effectiveness of various educational media (e.g., flyers, leaflets, videos, digital applications, or a combination of media) to identify the most optimal medium for enhancing pregnant women's understanding.

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