Proceeding of The International Conference of Inovation, Science, Technology, Education, Children, and Health

E-ISSN: 2776-9062

Research Article

The Effect of Giving Additional Food to Pregnant Women with Chronic Energy Deficiency at Ribang Community Health Center

Erdi Yani[1], Sulistiyah[2]*, Retno Dewi Prisusanti [3]

[1-3] Department of Midwifery, Health Science Faculty, Institut Sains dan Teknologi Kesehatan RS dr. Soepraoen, Indonesia ; e-mail: sulistiyah364@gmail.com

*Corresponding Author : Sulistiyah

Abstract: Chronic Energy Deficiency (CHD) is a condition resulting from an imbalance in the intake of energy and protein nutrients needed by pregnant women. The impact of CHD during pregnancy can lead to severe complications, including an increased risk of maternal and infant mortality. To address this, the Supplementary Feeding Program (PMT) is often implemented to improve the nutritional intake of pregnant women. The aim of this study was to determine the effect of PMT on pregnant women with SEZ (Chronic Energy Deficiency) at the Ribang Health Center. The sample consisted of 15 respondents. Data collection involved measuring the upper arm circumference (LILA) of pregnant women using a LILA tape and an observation sheet to track PMT participation. The research employed a non-equivalent quasi-experimental design, utilizing a quantitative approach with a one-group pretest-posttest design. Data analysis was conducted using the Wilcoxon statistical test to assess changes in the participants' LILA before and after the intervention. The results showed a notable improvement in the size of the upper arm circumference (LILA) in the respondents after receiving the PMT intervention. Before the intervention, 100% of the respondents had a LILA measurement of less than 23.5 cm, indicating chronic energy deficiency. After the intervention, 40% of respondents still had a LILA measurement of less than 23.5 cm, but 60% of the respondents showed a significant improvement with a LILA greater than 23.5 cm. The statistical analysis revealed a significant difference in LILA measurements before and after the intervention, with a p-value of 0.000. In conclusion, the provision of PMT has a significant positive effect on improving the nutritional status of pregnant women with chronic energy deficiency, as evidenced by the increase in their LILA measurements.

Keywords: CED; Pregnant Women; Supplementary Nutrition

1. Introduction

Chronic Energy Deficiency (CED) in pregnant women refers to a situation where pregnant women face a deficiency of energy and protein in their food intake, leading to their body's needs not being met. Malnutrition in pregnant women not only threatens the mother's health but may also hinder the growth and evolution of the embryo. Sufficient nutrient levels for pregnant women can be observed from parameters such as Mid-Upper Arm Circumference (MUAC) (Fathony & Nuriaty, 2021). To prevent the risk of CED, it's vital to maintain the nutritional status of pregnant women by ensuring that their MUAC is at least 23.5 cm.

The incidence of CED in pregnant women can increase the threat of miscarriage, hemorrhage, prolonged labor, infection, low birth weight (LBW) babies, premature birth, birth defects, and can indirectly contribute to maternal mortality (Andiyani & Susilawati, 2019). To prevent the risk of CED, it's vital to maintain the nutritional status of pregnant women by ensuring that their Mid-Upper Arm Circumference (MUAC) is not less than 23.5 cm (Puspitasari et al., 2021).

Received: 17, May 2025
Revised: 31, May 2025
Accepted: 16, June 2025
Published: 30, June 2025
Curr. Ver.: 30, June 2025

Supplementary Food (SF) is another option to ensure that pregnant women continue to receive adequate nutrition. In the first trimester, pregnant women should consume 2 pieces per day, while in the second and third trimesters, it is recommended to consume 3 pieces every day (Kemenkes RI, 2022).

The World Health Organization (WHO) 2021 report indicated that 45% of all pregnancies worldwide experienced anemia in pregnant women due to factors of chronic energy deficiency (CED), referring to a condition where pregnant women suffer from a long-term deficit in energy intake, which impacts their nutritional status (Florida et al., 2023).

Based on the latest information from the Ministry of Health of the Republic of Indonesia in 2021, the incidence rate of pregnant women experiencing chronic energy deficiency (CED) was 13.8%. Data from the Basic Health Research (Riskesdas) indicates that the percentage of pregnant women (in the 15-49 age range) experiencing chronic energy deficiency (CED) was 17.3%. Government efforts to address the risk of CED in pregnant women are carried out through integrated special nutritional interventions across various programs, primarily through the implementation of quality integrated antenatal services and focusing actions on providing extra food for pregnant women with chronic energy deficiency. The number of pregnant women experiencing chronic energy deficiency who received supplementary food has exceeded the set target, reaching 86.8% of the initial target of 80% (Ditjen Kesehatan Masyarakat Kemenkes, 2021).

In pregnant women, chronic energy deficiency (CED) is caused by direct and indirect factors. Direct factors include malnutrition, while indirect factors include CED and anemia (Silfia et al., 2022). The government is taking steps to improve nutrition in pregnant women with chronic energy deficiency (CED) through the supplementary food program (PMT). (Directorate General of Public Health, Ministry of Health, 2021). The supplementary food provided to pregnant women experiencing chronic energy deficiency is in a form that can help overcome the condition over a period of 90 days, which is also monitored by authorized personnel (Pastuty & Herawati, 2018).

Research conducted by Puspitasari and colleagues in 2021, titled "Provision of Food Supplements to Pregnant Women with Chronic Energy Deficiency at Karya Wanita Public Health Center Pekanbaru," showed that pregnant women need husband's support for PMT consumption patterns, pregnant women's attitudes towards PMT, and compliance of pregnant women with chronic energy deficiency with PMT consumption patterns, acceptance of PMT consumption behavior by CED pregnant women, support from health workers for PMT consumption patterns, and PMT distribution impacts the knowledge of pregnant women with chronic energy deficiency regarding the duration and amount of PMT consumption. There is still a lack of knowledge among pregnant women with chronic energy deficiency regarding the duration and amount of PMT consumption, indicating that many of them do not know how long and how much PMT should be consumed daily.

Based on the data found during the initial data collection, 48 pregnant women diagnosed with CED and receiving subjective PMT were included in the short term. One pregnant woman interviewed by the researcher reported that she experienced CED during a pregnancy check-up at the Posyandu and village midwife, and the nutrition officer immediately dispatched personnel on that day.

2. Research Methods

This research is a quantitative study, and the research design uses a quasi-experimental approach. The research design is a one-group pretest-posttest model. Before the intervention, the researcher will first conduct examinations related to the Mid-Upper Arm Circumference (MUAC) measurement in pregnant women to determine whether they fall into the Chronic Energy Deficiency (CED) category. The researcher will then take a sample of CED pregnant women and provide them with Supplementary Food (SF) intervention. After the intervention, the researcher will re-measure the pregnant women's MUAC.

The population in this study consists of all pregnant women identified as experiencing Chronic Energy Deficiency (CED) at Ribang Public Health Center, totaling 15 pregnant women. The sample for this study will be drawn from the previously mentioned population. The sample comprises 15 pregnant women experiencing Chronic Energy Deficiency (CED). These individuals, representing a portion of the total number and characteristics of the population, will be selected using a total sampling method.

Data collection will utilize MUAC tape and observation sheets for the Local Supplementary Food Consumption Monitoring Card for Pregnant Women with Chronic Energy Deficiency (CED). For data analysis, the Wilcoxon test will be used.

3. Results and Discussion

3.1 Responden karakteristik

Table 1. Responden karakteristik

Variabel	f	%
Age		
< 20 year	2	13,3
20 – 30 year	11	73,4
< 30 year	2	13,3
Total	15	100
Education		
failed elementary school	1	6,7
failed elementary school	3	20
junior high school	2	13,3
Senior High school	7	46,6
Diploma-III	1	6,7
Bachelor S-1	1	6,7
Total	15	100
Work		
Haousewife	14	93,3
Swasta	1	6,7

Total	15	100
Income		
<Rp. 1.000.000	6	40
Rp. 1.000.000-2.000.000	7	46,7
>Rp. 2.000.000	2	13,3
Total	15	100
IMT		
<18,49 (not enough)	4	26,7
18,5-24,9 (Normal)	11	73,3
Total	15	100

This describes the characteristics of the study participants, including factors such as age, education level, occupation, income, and Body Mass Index (BMI).

Regarding the age of respondents, 11 respondents (73.4%) were in the 20-30 year age range, while the number of respondents below 20 years old and above 30 years old were both 2 respondents (13.33%) respectively.

Respondents' education levels varied, with the majority having a high school education (46.6%), followed by elementary school (20%) and junior high school (13.3%).

The primary occupation of respondents was predominantly Housewives (IRT) with a percentage of 93.3%, while the remainder worked in the private sector (6.7%).

In the context of income, 40% of respondents had an income of less than Rp. 1,000,000, 46.7% had an income between Rp. 1,000,000 and Rp. 2,000,000, and 13.3% had an income above Rp. 2,000,000.

Meanwhile, BMI analysis showed that 73.33% of respondents had a BMI in the normal category (18.5-24.9), while 26.67% were in the underweight category (< 18.49).

Overall, this table provides detailed information about the demographic and socioeconomic characteristics of the respondents, which is relevant for further analysis in the study on providing food supplements to pregnant women experiencing chronic energy deficiency.

Table 2. Pre- and Post-Intervention MUAC Measurements

LILA	Pre test		LILA	Post test	
	f	%		f	%
≤ 23,5	15	100	≤ 23,5	6	40
>23,5	0	0	>23,5	9	60
Total	15	100	Total	15	100
10 day next giving PMT					
LILA	Pre test		LILA	Post test	
	f	%		f	%
≤ 23,5	15	100	≤ 23,5	4	26,6
>23,5	0	0	>23,5	11	73,4
Total	15	100	Total	15	100

This shows the changes in Mid-Upper Arm Circumference (MUAC) measurements before and after the intervention.

At pretest, all respondents had a MUAC value of ⩽ 23.5 cm, indicating the presence of malnutrition. However, after the intervention, only 40% of respondents still had a MUAC

value of ⩽ 23.5 cm, while 60% successfully achieved a better MUAC value (>23.5 cm) within the first 10 days.

Subsequently, after an additional 10-day supplementary feeding (PMT) intervention, there was a further increase in MUAC for 2 more respondents. It can be concluded that only 4 respondents (26.6%) remained in the abnormal MUAC category, while 73.4% successfully achieved a change to a MUAC value of >23.5 cm.

Table 3. Change in Mid-Upper Arm Circumference (MUAC) Before and After Intervention

LILA		
	(Mean±SD)	(Min-Max)
Before	22.50±0,824	20-23
After	23.65±0.757	22-25
P-vslue	0,000	

This presents the difference in Mid-Upper Arm Circumference (MUAC) measurements before and after the intervention. The average MUAC measurement before the intervention was 22.50 cm with a standard deviation of ±0.824 cm, and the range from minimum to maximum values was 20 cm to 23 cm.

The statistical analysis results show a significant difference in MUAC measurements before and after the intervention, with a p-value of 0.000.

Findings from the research on the characteristics of participants under 20 years old who underwent two measurements of supplementary feeding (PMT) intervention showed results. Despite the intervention, there was no increase to a normal condition in the majority of respondents.

When categorizing by education level, it was found that there was 1 respondent who did not complete elementary school, and the final result of the PMT intervention in pregnant women measuring MUAC showed a significant change to normal, which was 23.5 cm. Meanwhile, among the 3 respondents who completed elementary school, an improvement in nutritional status to normal occurred in 2 individuals, while 1 individual still experienced CED. For junior high school education, out of 2 respondents, 1 experienced an improvement to normal condition and 1 remained with CED. At the high school education level, out of 7 respondents, 5 successfully achieved normal nutritional status after the intervention, while 2 still experienced CED. Furthermore, for DIII educated respondents, one person successfully achieved normal nutritional status. Similarly, for respondents with S1 education, one person also successfully achieved normal nutritional status after the intervention.

In the respondent's occupation category, there were 14 respondents, and the intervention results showed that out of this number, 10 respondents successfully changed their nutritional status from CED (Chronic Energy Deficiency) to normal after undergoing the 20-day PMT intervention. However, there were still 4 other respondents who remained in CED despite receiving the same intervention. Interestingly, for one housewife respondent who also worked in the private sector, the results showed a positive change. After receiving the intervention, her nutritional status successfully improved to normal. This indicates that the

intervention successfully had a significant impact on the nutritional status of respondents, even in different work environments.

Based on the income category, for incomes less than 1 million, there were 6 subjects in the study. Of these, 3 respondents experienced a change in nutritional status from CED to normal after the intervention, while the other 3 respondents remained in CED despite receiving the intervention. Subsequently, in the income category between 1 million and 2 million, there were 7 respondents who were the focus of the study. Of these respondents, 5 successfully experienced a change in nutritional status from CED to normal after the intervention. Meanwhile, the other 2 did not experience CED at all. For respondents with an income of more than 2 million, there were only 2 individuals. However, both successfully experienced an improvement in nutritional status after the intervention. This indicates that an income above the average of 2 million Rupiah is capable of adequately meeting the mother's nutritional needs. These findings illustrate that income plays an important role in the nutritional well-being of respondents, with higher incomes tending to have a positive impact on nutritional status. Nevertheless, it should be noted that other factors such as eating patterns and access to nutritional sources can also influence the intervention outcomes. The research results described a low Body Mass Index (BMI) condition in 4 respondents. Of these, 3 respondents successfully experienced a change in nutritional status from CED to normal after the intervention. However, one other respondent did not experience a significant change; this was because they were found to be in the age category of less than 20 years, which affects the BMI of pregnant women.

Research findings indicate that after the intervention, some respondents experienced changes in MUAC measurements, with a number of respondents experiencing an increase in MUAC exceeding the 23.5 cm threshold. Therefore, a deeper analysis is needed to understand the factors influencing this change, and whether the MUAC increase can be linked to the effectiveness of the intervention. In the research conducted by (Puspitasari et al., 2021), the results of in-depth interviews regarding the intake of supplementary food provided to pregnant women with Chronic Energy Deficiency (CED) showed that the majority of them, namely 3 out of 5 respondents, stated that they regularly consumed the Supplementary Food Program (PMT) provided and never forgot to do so. However, there was a challenge for 2 out of five pregnant women with Chronic Energy Deficiency (CED) who stated that the main problem they faced in consuming PMT was forgetting. In addition, the interview results also showed that out of five pregnant women interviewed, 3 of them revealed that the supplementary food provided was always consumed completely without leftovers. This information provides an overview of the extent to which pregnant women with Chronic Energy Deficiency (CED) are involved in taking the provided food supplements, where most of them appear consistent in their consumption routine. Nevertheless, the existence of obstacles such as forgetting in a small portion of respondents can be an important

consideration in planning nutrition programs for pregnant women with chronic energy deficiency (CED).

The impact of supplementary feeding (PMT) on Mid-Upper Arm Circumference (MUAC) before and after the intervention shows that the intervention significantly affected the respondents' MUAC measurements. The difference in mean values and its significance indicate that the intervention had a real effect on these measurement parameters. These results provide a positive indication regarding the impact of the intervention on MUAC measurements in the studied population. Further analysis is needed to understand the factors that might influence this change and confirm the effectiveness of the intervention in improving the nutritional status of respondents. This is consistent with findings in research by (Utami et al., 2018): The average body weight of pregnant women experiencing Chronic Energy Deficiency (CED) significantly increased after receiving the Supplementary Food Program (PMT) for three months. Similarly, nutritional status, measured through the average Mid-Upper Arm Circumference (MUAC), significantly increased after receiving PMT for 3 months. In addition, there was an increase in the average daily food intake of pregnant women outside of the provision of Supplementary Food (PMT-P), where the highest intake occurred at the end of the third month, except for carbohydrate intake. This increase includes energy and fat intake. However, nutrient intake from PMT tended to fluctuate from the first month to the third month, with a visible decrease at the end of the treatment period (energy, protein, fat, carbohydrates). The effectiveness of providing Supplementary Food (PMT-P) during the recovery period for three months on the improvement of nutritional status of pregnant women experiencing Chronic Energy Deficiency (CED) is also supported by significant changes in Mid-Upper Arm Circumference (MUAC) measurements ($p=0.000$). Overall, the research results confirm the positive impact of the PMT intervention on improving the nutritional status and body weight of pregnant women experiencing CED.

The findings of my research and previous research show similarity in the effect of intervention on increasing Mid-Upper Arm Circumference (MUAC). Nevertheless, the main difference lies in the sample studied and the duration of the research. It can be observed from the available results that my research, with a duration of 20 days, was able to produce changes in MUAC. Meanwhile, previous research required a three-month period to achieve optimal results. This difference indicates that sample factors and research duration can influence the speed of response to the intervention, illustrating variability in the time required to achieve changes in certain parameters.

4. Conclusions

There were changes in Mid-Upper Arm Circumference (MUAC) measurements in participants before and after the intervention. At pretest, 100% of respondents had a MUAC $\leqslant$ 23.5 cm. After the intervention, the percentage of respondents with MUAC $\leqslant$ 23.5 cm decreased to 40%, and 60% of respondents had a MUAC > 23.5 cm. A significant difference

was found in MUAC measurements before and after the intervention, with a p-value of 0.000. This indicates that the intervention significantly affected the changes in respondents' MUAC measurements.

References

Agustina, W., & Sri, S. (2018). Management of pregnant women with hyperemesis gravidarum at Wonogiri Hospital. *Jurnal Ilmiah*, Universitas Bhakti Mulia Sukoharjo.

Direktorat Jenderal Kesehatan Masyarakat Kementerian Kesehatan. (2021). *Laporan Kuntabilitas Kinerja Instansi Pemerintah (LAKIP) Ditjen Kesehatan Masyarakat Tahun 2021* (pp. 1-68). Kementerian Kesehatan Republik Indonesia. [Link to PDF: ploald/dir_60248a365b4ce1e/files/ Laporan-Kinerja-Ditjen-KesmasTahun- 2017_edit-29-jan-18_1025.pdf]

Farahdiba, I. (2021). The relationship of chronic energy deficiency (CED) with the incidence of anemia in primigravida pregnant women at Jongaya Public Health Center Makassar in 2021. *Jurnal Kesehatan Delima Pelamonia, 5*(1), 24-29. https://doi.org/10.37337/jkdp.v5i1.213

Fathony, Z., & Nuriaty, R. S. (2021). Pregnant women at Pekaluman Public Health Center Banjarmasin: Overview of chronic energy deficiency in pregnant women. *Journal of Midwifery and Reproduction, 5*(1), 54-57.

Fitri, S. R., Lestari, B. C., Indriana, N. P. R. K., Meiranny, A., Hasyim, D. I., Saputri, N., & Prisusanti, R. D. (2024). *Asuhan kebidanan neonatus: Bayi balita dan anak prasekolah berbasis evidence-based practice*. PT. Sonpedia Publishing Indonesia.

Florida, R., Ekasari, T., & Zakiyah, M. (2023). The relationship between nutritional status and the incidence of anemia in pregnant women at Labruk Public Health Center Sumbersuko District Lumajang Regency. *Jurnal Nursing Update, 14*(3), 407-413. https://stikes-nhm.e-journal.id/NU/index

Frijanto, A. (2022). Direktorat Jenderal Pelayanan Kesehatan. *In Kementerian Kesehatan RI*. https://yankes.kemkes.go.id/view_artikel/1222/gula-si-manis-yang-menyebabkan-ketergantungan

Ghazali, P. L., & Maulida, F. (2019). Breastfeeding behavior in mothers with HIV-AIDS in Yogyakarta City. *Media Kesehatan Masyarakat Indonesia, 15*(4), 376. https://doi.org/10.30597/mkmi.v15i4.7931

Iskandar, I., Rachmawati, R., Ichsan, I., & Khazanah, W. (2022). Nutritional improvement in pregnant women with chronic energy deficiency (CED) through mentoring for supplementary food provision in the Lambisang Public Health Center working area, Aceh Besar. *Jurnal PADE: Pengabdian & Edukasi, 4*(1), 34. https://doi.org/10.30867/pade.v4i1.900

Kemenkes RI. (2021). *Buku saku merencanakan kehamilan sehat*.

Kemenkes RI. (2022). *Petunjuk teknis pemberian makanan tambahan (PMT) berbahan pangan lokal untuk balita dan ibu hamil* (pp. 78-81). Kemenkes. https://kesmas.kemkes.go.id/assets/uploads/contents/others/20230516_Juknis_Tatalaksana_Gizi_V18.pdf

Medika, R. K. (2019). Gizi seimbang bagi ibu hamil. *In RS Krakatau Medika*. https://krakataumedika.com/info-media/artikel/gizi-seimbang-bagi-ibu-hamil

Nurherliyany, M., Ariani, D., Asmarani, S. U., Anggit Herdiani, D., & Maharani, A. P. (2023). The importance of laboratory examinations in pregnant women. *Daarul Ilmi: Jurnal Pengabdian Kepada Masyarakat, 1*(1), 1-7. https://doi.org/10.52221/dalipkm.v1i1.233

Pastuty, R., & Herawati, T. (2018). Effectiveness of the recovery program of food supplement towards pregnancy women with chronic energy deficiency in Palembang city introduction. *9*(November), 179-188. https://doi.org/10.26553/jikm.v9i3.310

Pertiwi, H. W., Martini, T., Handayani, M., Program, S1, S., Stikes, K., & Utomo, E. (2020). Chronic energy (CED). *Jurnal Kebidanan, XII*(01), 1-128.

Prisusanti, R. D. (2021). *Metodologi penelitian di berbagai bidang*.

Prisusanti, R. D., Dewi, C., Kiriwenno, E., Prastiwi, R. S., & Epid, M. (2022). *Kesehatan reproduksi dan kesehatan wanita*. Yayasan Penerbit Muhammad Zaini.

Puspitasari, M., Mitra, M., Gustina, T., Rany, N., & Zulfayeni, Z. (2021). Supplementary food provision for CED pregnant women at Karya Wanita Public Health Center Pekanbaru. *Jurnal Kesehatan Manarang, 7*(2), 141. https://doi.org/10.33490/jkm.v7i2.325

R, N. U., Mustamin, M., & Ipal, A. (2019). Family income with less chronic energy (LCE) in pregnant women. *Media Gizi Pangan, 25*(2), 57. https://doi.org/10.32382/mgp.v25i2.391

Rahmadhanti, I., et al. (2023). Asuhan kebidanan kehamilan. *In Paper Knowledge Toward a Media History of Documents* (Vol. 135, Issue 4).

Sastri, N. (2023). Risk of chronic energy deficiency (CED) in pregnant women at Siring Alam village posyandu, Ogan Ilir. *Khidmah, 5*(2), 155-162. https://doi.org/10.52523/khidmah.v5i2.454

Silfia, N. N., Malinai, A., & Yustika, Y. (2022). Factors for chronic energy deficiency (CED) in pregnant women. *Napande: Jurnal Bidan, 1*(1), 40-48. https://doi.org/10.33860/njb.v1i1.1047

Utami, R., Gunawan, I. M. A., & Aritonang, I. (2018). The effect of recovery supplementary food provision (PMT) on nutritional status in pregnant women in Sleman Regency. *Jurnal Nutrisia, 20*(1), 19-26. https://doi.org/10.29238/jnutri.v20i1.115