Promotif
Jurnal Kesehatan Masyarakat
Promotive: Journal of Public Health
Online ISSN : 2503-1139
Research Articles
Open Access

# Evaluation of Nutritional Interventions in Overcoming Chronic Energy Deficiency in Pregnant Women: A Case Study

**Yuni Feprina[1], Anto J. Hadi[2*], Haslinah Ahmad[3]**
[1]Student of Public Health Study Program, Master's Program, Faculty of Health, Aufa Royhan University, Padangsidimpuan, North Sumatra, Indonesia
[2]Department of Public Health, Faculty of Health, Aufa Royhan University, Padangsidimpuan, North Sumatera, Indonesia
[3]Department of Public Health, Faculty of Health, Aufa Royhan University, Padangsidimpuan, North Sumatera, Indonesia

***Corresponding Author**: E-mail: antojhadi@unar.ac.id

**ARTICLE INFO**

**Manuscript Received:** 26 Oct, 2024
**Revised:** 9 Dec, 2024
**Accepted:** 16 Dec, 2024
**Date of Publication:** 27 Dec, 2024
**Volume:** 14
**Issue:** 2
**DOI:** 10.56338/promotif.v14i2.6627

**KEYWORDS**

Chronic Energy Deficiency;
Nutritional Intervention;
Pregnant Women;
Case Studies;
Nutritional Status

**ABSTRACT**

**Background:** Chronic Energy Deficiency in pregnant women is one of the public health problems that can hurt the health of the mother and fetus. This study aims to evaluate the effectiveness of nutritional interventions in overcoming Chronic Energy Deficiency in pregnant women through a case study in one of the health centres in the Padangsidimpuan City area.
**Methods:** A qualitative study with a case study design involving pregnant women with nutritional status with Chronic Energy Deficiency who received nutritional interventions over three months. This data was collected at the Padangmatinggi Health Center through in-depth interviews involving four primary informants and seven triangulation informants, which included document analysis and data analysis.
**Results:** This study proves that the input aspects, namely sources of funds, infrastructure, forms of services, and supplementary feeding materials, are by the instructions, while the goals and human resources are not by the Supplementary Feeding Guidelines. It is appropriate for the planning, implementation, and recording process, but there are obstacles due to the uncertain dropping from the centre. The increase in the size of the upper arm circumference is an output of the supplementary feeding program for pregnant women, but in reality, the cases of Chronic Energy Deficiency are still high.
**Conclusion:** It can be concluded that the administration of supplementary feeding can only be monitored until distribution to pregnant women with Chronic Energy Deficiency, but consumption monitoring has not been carried out. This study suggests the importance of nutrition intervention programs integrated with health services at the health centre level to reduce the prevalence of chronic energy deficiency in pregnant women and encourage healthier diets.

**Publisher:** Fakultas Kesehatan Masyarakat Universitas Muhammadiyah Palu

## INTRODUCTION

Chronic Energy Deficiency in pregnant women is a significant nutritional problem and can adversely affect the health of the mother and fetus (1). Based on data from the World Health Organization, Chronic Energy Deficiency in pregnant women is closely related to an increased risk of obstetric complications, including prematurity, low birth weight, and increased maternal and infant mortality. Globally, chronic energy deficiency is estimated to affect nearly 20% of pregnant women in developing countries, especially in areas with limited access to nutritious food and adequate health services (2,3). In Indonesia, the prevalence of Chronic Energy Deficiency in pregnant women is still

high, with data from the Ministry of Health showing that around 17% of pregnant women in Indonesia experienced Chronic Energy Deficiency in 2021 (4).

The prevalence of chronic energy deficiency in pregnant women globally reaches 41%, based on data from 55,629 pregnant women. In Asia, the proportion of pregnant women with Chronic Energy Deficiency in Thailand was recorded at around 15.3% of 23,621 pregnant women, while in Tanzania, the prevalence of Chronic Energy Deficiency in pregnant women aged 15-19 years reached 19% of 12,921 pregnant women (5–8). In Indonesia, according to the results of Riskesdas 2018, the prevalence of Chronic Energy Deficiency in pregnant women was recorded at 17.3%, while based on the Indonesian Health Profile in 2019, the incidence of Chronic Energy Deficiency in pregnant women increased to 17.9%(9). From these data, it can be concluded that there is an increase in the prevalence of Chronic Energy Deficiency in pregnant women in Indonesia (10).

Nutrition interventions, including nutritious feeding, supplements, and dietary education, effectively address Chronic Energy Deficiency. Some studies show that supplementing foods with high energy and protein content can help improve the nutritional status of pregnant women and prevent serious complications. However, the effectiveness of nutrition intervention programs in local contexts, especially in areas with high levels of Chronic Energy Deficiency, still needs further evaluation. This is important to understand more optimal ways to target high-risk pregnant women (11–14). Although nutritional interventions involving supplementation and dietary changes have been implemented in various countries, data on their impact on pregnant women in Indonesia, particularly in groups with Chronic Energy Deficiency, are still limited. Therefore, it is important to conduct a thorough evaluation of this intervention, given the need to improve the nutritional status of pregnant women to reduce maternal and infant mortality rates (15).

The proposed solution is providing nutritional interventions through nutritional supplements and more targeted dietary education. This study will assess how providing energy and protein supplements and education about a good diet can improve the nutritional status of pregnant women who experience Chronic Energy Deficiency. This will help identify the most effective approach to addressing the problem of Chronic Energy Shortage in Indonesia, focusing on the sustainability and affordability of such interventions (16,17).

Previous studies have shown that nutritional interventions that include energy and protein supplements can improve the nutritional status of pregnant women with Chronic Energy Deficiency. A study conducted by Lipoeto found that energy supplementation given for 12 weeks can significantly increase the weight of pregnant women and reduce the risk of premature birth. This study shows that proper supplementation can increase the mother's body's energy reserves, directly affecting the fetus's health. In addition, a study by Xiao (12) also showed that supplemental protein supplementation in pregnant women can improve fetal growth and reduce the incidence of low birth weight. In addition to supplementation, the nutrition education approach also has a crucial role in dealing with Chronic Energy Deficiency (19). Dietary education that teaches pregnant women how to choose nutritious foods and manage a balanced diet can increase maternal knowledge and awareness about the importance of nutrition during pregnancy. A study by Hasriantirisna (20) found that nutrition education programs involving direct interaction with health workers increased mothers' understanding of good diets, which contributed to a decrease in the prevalence of Chronic Energy Deficiency (21).

However, although many studies have shown the success of nutritional interventions in addressing Chronic Energy Deficiency, their effectiveness often depends on other factors, such as the mother's level of education, access to health services, and socioeconomic status. Therefore, more specific and contextual research is needed to assess the factors influencing the success of nutrition interventions in Indonesia, especially in areas with significant nutrition and health access challenges (22). A more in-depth literature review reveals that although many studies have been conducted to evaluate nutritional interventions in pregnant women, some gaps in the literature related to the local context in Indonesia still exist. Most existing studies focused on countries with lower levels of Chronic Energy Deficiency or with more homogeneous interventions (3). In Indonesia, differences in socioeconomic conditions, culture, and access to health resources can affect the outcomes of these interventions (23). Therefore, more focused research on Indonesia's local conditions, which include geographical and demographic variations, is needed to identify the most effective approach (6).

In addition, although several studies have examined the impact of nutritional supplementation and dietary education on pregnant women, more in-depth research on combining these two approaches and long-term evaluations of maternal and infant health is limited. The success of nutritional interventions is also not necessarily reflected in long-term outcomes, such as improved maternal health postpartum or future child nutritional status (24,25). This

suggests a need to further explore the effectiveness of comprehensive interventions, considering all relevant health determinants. Data from the Padangmatinggi Health Center in Padangsidimpuan City shows that the number of pregnant women with Chronic Energy Deficiency from December 2023 is 55 and have received additional food in biscuits for 1 month.

This study aims to evaluate the effectiveness of nutritional interventions in overcoming Chronic Energy Deficiency in pregnant women in regions with a high prevalence of Chronic Energy Deficiency in Indonesia. The novelty of this study lies in its focus on local conditions in Indonesia, taking into account socioeconomic factors and access to health that affect the success of the intervention. The study had limited coverage of pregnant women in certain areas with a high prevalence of Chronic Energy Deficiency, focusing on implementing community-based nutrition interventions.

## METHOD

### Research Design

This research is qualitative research using a case study approach. The case study research method examines a particular case or social phenomenon to study the background, circumstances, and interactions.

### Data Source

The data is sourced from data collection in the form of interviews.

### Research Objectives

The population of this study is as many as five informants, namely the head of the health centre, the person in charge of the health program, the person in charge of immunization, the village midwife and cadres. The sample in this study consisted of 11 informants, namely the Head of Health Services, Head of Health Center, Coordinator Midwife, Nutritionist, and seven pregnant women with chronic energy deficiency who received additional feeding.

### Development of Data Collection Instruments and Techniques

Research Administrative Procedure: a. The author researches after the proposal is declared passed; b. The author submitted a research permit to the head of the Pdangmatinggi Health Center of Padangsidimpuan City, who was researching; c. The author disseminated the research plan to the Padang Matinggi Health Center respondents. Research Technical Procedure: a. Determine the sample to be studied; b. Ask prospective respondents to be willing to become respondents after conducting an approach and explaining the research's purpose, benefits, and procedures. Respondents who are willing are then asked to sign an informed consent sheet. After that, an interview with the informant will be conducted.

### Data Analysis Techniques

Data analysis is carried out qualitatively with a thematic model.

## RESULTS

**Table 1.** Characteristics of Informants at the Padangmatinggi Health Center, Padangsidimpuan City

| No | Initial informant | Age | Gender | Education | Position |
|---|---|---|---|---|---|
| 1 | One reported | 50 | Woman | S2 Public Health | Head of Health Services |
| 2 | Two reported | 39 | Man | S1 Nursing | Kepala Puskemas |

| | | | | | |
|---|---|---|---|---|---|
| 3 | Three reported | 50 | Woman | Bachelor of Public Health | Coordinator Midwife |
| 4 | Four reported | 42 | Woman | Diploma 3 Nutrition | Nutritionist |

**Table 2.** Characteristics of Triangulation Informants

| No | Initial informant | Age | Education | Position |
|---|---|---|---|---|
| 1 | One reported | 35 | Junior High School | Pregnant women in SEZ recipients of PMT |
| 2 | Two reported | 28 | Public High School | Pregnant women in SEZ recipients of PMT |
| 3 | Three reported | 22 | Public High School | Pregnant women in SEZ recipients of PMT |
| 4 | Four reported | 24 | Public High School | Pregnant women in SEZ recipients of PMT |
| 5 | Five reported | 31 | Public High School | Pregnant women in SEZ recipients of PMT |
| 6 | Six reported | 35 | Public High School | Pregnant women in SEZ recipients of PMT |
| 7 | Seven reported | 26 | Public High School | Pregnant women in SEZ recipients of PMT |

**Description of Input Aspects**

**Human Resources (HR)**

This is based on the results of in-depth interviews with the primary informants about the human resources involved and the role of these human resources in the PMT program for pregnant women as follows:

*"PMT usually has nutrition officers and midwives from the health centre; if the cadres are not, PMT pregnant women we give immediately to the target.... (I 3)". "Come, yes, I have entered the warehouse directly. Later, I will get the minutes of the handover of goods; I photocopied this to KIA, so KIA already knows that there are these goods, so he wants to stock" how much is he roomed..... (I 4)."*

The statement of the main informant is supported by the statement of the triangulation informant that the one who provides PMT for pregnant women is the midwife as follows:

"*I used to be the one who gave it, Mrs Midwife...." (R 1, R3) "If the one who comes to the house is the midwife, who gives PMT to the midwife at the Health Center..... ( R 2, R4)."*

Based on the statement from the main informant, the workload distribution is by the officers' capacity, but for monitoring the use of PMT, the health centre does not have cadres or special officers. This is based on the results of interviews with the following interviews.

*"It is appropriate, yes there are additional midwives as well. I think it is just that the KIA program is widespread, yes, from pre-marriage and children from the unborn, but they have shared the workload..... (I 2) "If it is just for the giving, it is enough, but if it is for monitoring whether PMT is eaten, we cannot do it yet..... (I 3).".*

**Source of Funds**

The source of funds is to support a program so that the program is successful and achieves its goals. The funds available at the Padangmatinggi Health Center are only in the form of PMT obtained from the Padangsidimpuan

City Health Office, which is dropped directly from the centre, namely the Ministry of Health and sourced from the State Budget and Regional Budget.

*"According to the State Budget, there is no budgeting process because the PMT is given directly by the province, and budgeting is only in the form of SPPD. (I 1) "No, if we manage it ourselves, there is none, because it is from dropping..... (I 2) ". "If the source of funds from the health centre does not exist, the source of funds from the State Budget and Regional Budget, we dropping, we accept, the purchase itself does not exist..... (I 3) "*

*"Yes, those biscuits are sis....(R 1, R6)". "Strawberry jam biscuits....(R 2, R7)".*

The statement of the triangulation informant supports this statement. Based on the statement from the main informant, there are no obstacles related to funds in the undernutrition control program. If there are obstacles, PMT from the health office is usually unavailable.

*"There is no need for PMT; it is not routine every month what is dropped, depending on how much the centre gives to DKK, when and how much, what month it is here, we cannot determine..... (I 4) "*

**Facilities and Infrastructure**

The facilities and infrastructure available in quantity and quality will support achieving a program's goals. Based on interviews with the leading info man about the facilities and infrastructure available in the PMT program for pregnant women, namely tools for checking or measuring weight and LILA, guidebooks for implementing the PMT program, counselling and counselling, and classes for pregnant women, The following are the results of the interview with the main informant.

"*...Counseling is the same as counselling..... (I 2)*". "*Yes, most counselling, or counselling. As with the scales, LiLA measuring tape is like that the most." (I 4)."*

These infrastructure facilities are considered sufficient for pregnant women in SEZs, with the following statement:

*"It is enough, ma'am..... (R 1, R5)". Enough..... (R2, R3) ".*

**Target Recipients of PMT (Pregnant Women KEK)**

The target characteristics of KEK pregnant women were obtained from the reports on the PMT monitoring program for KEK pregnant women and data on the cohort of pregnant women at the health centre. The following are the results of the interview with the main informant.

"*Pregnant women whose LiLA SEZ is less than 23.5 cm..... (I 3). "The target can be all pregnant women, PMT counselling to all pregnant women, but the target now is only for KEK pregnant women..... (I 1) ".*

The obstacle related to the PMT material is that not all mothers want to consume it regularly, and this is because the taste of the biscuits is not very good. Moreover, some mothers share the biscuits with their children and husbands. This was obtained from the statement of the main informant.

*"The pregnant woman has a toddler; the PMT is not eaten by the pregnant woman only. The pregnant woman was bored, stopped in the middle of the road..... (I 3) ". "Sometimes I also tell him that he eats, but he is not good, I share it with the child; my husband also asks if the first one is still delicious and not yet good, so if it is frequent, yes, it is shared..... (I 4) "*

**Description of Process Aspects**

**Preparation/ Planning**

Preparation determines the running of an activity or program. If an activity is well prepared, it will provide an opportunity for its success. And counselling.

*"The flow of program planning from our existing data is from the data of pregnant women in the SEZ. From the bottom of the health centre, we plan how much data for pregnant women in KEK was obtained from each health centre last year. How much PMT do we need? It will be sent to the centre..... (I 1) ". "Yes, we have a target for the number of people; there will be a target for pregnant women in a year. So indeed, the planning coordination after that is handed over to the allocation office, and the dropping is still given to us....(I 2)".*

**Implementation**

Distribution is carried out from the centre in the form of drops from the Padangsidimpuan City Health Office itself; if there is PMT from the centre, it will be sent directly to the Health Center in Padangsidimpuan according to the predetermined amount. It is not stockpiled in the storage of the Padangsidimpuan City Health Office because there are many of them. If there is still more, it will only be stored in the storage warehouse of the Padangsidimpuan City Health Office. The main informant explained this as follows:

"*If the PMT SEZ is like this, we usually go directly to the health centre; if there is still leftover, we put it in the warehouse and immediately drop it off at the health centre. From the centre, it will continue directly to the health centre..... (I 1) "*

There is a unique storage room for PMT storage at the Health Center. After the nutrition department receives it, it is immediately reported to the KIA section and handed over to the KIA division. The following is an explanation from the main informant.

*"Come, yes, I will go straight into the warehouse later, and I will get the minutes of the handover of goods; I will photocopy it without pity KIA so KIA already knows that there are these goods, now he wants to see how much it is..... (I 4)".*

**Supervision**

One of the Community Empowerment and Nutrition Section staff conducted the evaluation. To determine whether the PMT is consumed by pregnant women or not, the Health Office and the Health Center cannot be sure. As explained by the following main informant:

"*The monitoring and evaluation process, so indeed the monitoring has just given, that we have distributed the PMT to the health centre by the distribution from the centre, now the health centre is evaluated whether this PMT is exhausted or not, now it is just that we still have not. However, the giving is indeed following the existing juknis; it is just that we have never evaluated whether or not the KEK that we give PMT is still a SEZ pregnancy or not, now that is what we have never done, but yes, most of them are still SEZ mothers." (Informant 1)*

**Logging and Reporting**

Some records are still manual, but some are already online with the application, so they can directly connect to the centre. The following are the results of the interview with the informant:

*"The reporting system, we have an online system, it is like with the SIP, the monthly reporting SIP exists, now if you evaluate malnutrition problems, it is empty. However, if it is specifically PMT, it is usually recorded using a total manual. Nevertheless, if the report of the health centre system to us is related to the survey, it is with the monthly report that uses SIP, a kind of health centre information system is the same, yes, with empty, online, I opened an integrated nutrition information system, there will be data on pregnant women, the provision of PMT, it will be there. It will reach the centre, later we will print the minutes, and later at the centre, we will understand. All health centres have used it. This system is centralized from the centre of the integrated information system using all of this. So this is still progressing, so in addition to this, the health centre information system..... (I 1).*

**Description of Output Aspects**

**Achievement of Supplementary Feeding**

Based on the document review results regarding the achievement of providing additional food in the work area of the Padang Matinggi Health Center, the scope of additional food provision will be carried out in 2023. So far, the indicators are only in the form of whether PMT in the health centre is exhausted and whether it is eaten. However, the Service and the Puskesmas can only confirm whether the PMT in the Puskesmas is exhausted but do not know whether the PMT is consumed by pregnant women in the SEZ or given to their children and husbands. As stated by the following main informant:

*"Well, that's related to the routine of giving PMT, not to mention monitoring the food, not just giving it. It could be that pregnant women are given it but it turns out that the pregnant women don't eat it, it's given to their children, because PMT for pregnant women is tastier, my friends also said, this is delicious bread. My*

*child even got it, where did you get it from, it turns out it was given. Well, we can't evaluate that far, like PMO, people who have TB, they are given medicine and monitored, that's very difficult here. Our weakness is in terms of evaluating the progress of giving PMT to what extent... (I 1).*

**Improving the Nutritional Status of Pregnant Women in SEZs**

Another factor is that PMT, only as a snack, is the leading food. This was explained by the main informant as follows:

"*Now that is related to the routine of giving PMT, not to mention monitoring the feeding, not just giving. It could be that the pregnant woman was given, but it turned out that she was not eaten with the pregnant woman, the child was pitied because the PMT of the pregnant woman was better, said the friends also enka you know this is the bread. My son also got it, you know where you got it from, it is loved. Now, we cannot evaluate that far; it is like PMO, people who get tuberculosis, it is because the drug is monitored, it is challenging here. Our weakness is evaluating the progress of PMT provision, to what extent..... (I 1)".* Strengthened by the statement of triangulation as follows: *Yes, sometimes when I am hungry, I want to eat, yes, eat. Pregnant people are usually hungry, so I eat, but if not, no..... (R 1)". "Suppose you want to have a snack or something, I have my snack, it feels good, it is like that, the jam is not good.... (R 2)".*

## DISCUSSION

The discussion section interprets the findings of this study within the context of existing research, explores their practical implications, evaluates the strengths and limitations, and provides recommendations for future research.

**Input Aspect**

According to the Decree of the Minister of Health of the Republic of Indonesia No. 369 of 2007 concerning the professional standards of midwives in intervention for pregnant women with Chronic Energy Deficiency (KEK), the actions taken include referring pregnant women to nutrition officers to collaborate in monitoring and evaluating nutritional intake and weight gain (26). Based on interviews with nutrition officers, Heads of Health Centers, and Midwives at the Padang Matinggi Health Center, human resources involved in the Supplementary Feeding (PMT) program for pregnant women with SEZs include nutrition officers and midwives as Maternal and Child Health (KIA) officers. According to the PMT technical guidelines (2019), an officer or cadre must be appointed to monitor the use of PMT in pregnant women with SEZs. However, at the Padang Matinggi Health Center, the human resources involved in monitoring the use of PMT are still limited; there are only officers for distribution, not for monitoring (27).

However, the budget received in the form of ready-to-eat products (biscuits) is dropped directly from the Ministry of Health, and the Health Center and the Health Office do not provide funds to purchase these products. If there is a stock vacancy, the Health Center can only provide counselling and counselling as a substitute. The distribution of PMT is also irregular; even in 2019, there has been no product dropping from the centre, so PMT cannot be given to pregnant women with SEZs in need (28). This shows that the budget used by the Padangmatinggi Health Center is following the PMT technical instructions from the Ministry of Health.

The availability of facilities and infrastructure is essential in supporting the success of health programs because facilities and infrastructure are tools to achieve program goals. According to Noor (29), health facilities include health service facilities, counselling rooms, and information centres for the community. Based on interviews, the facilities and infrastructure at the Padangmatinggi Health Center are sufficient to support the implementation of the PMT program for pregnant women with SEZs, such as manual scales, measuring tapes, tables, chairs, ANC (Antenatal Care) rooms, pregnant women's classes, and counselling systems. Each officer also has a computer or laptop to input data into the nutrition system (30). Based on this study, it can be concluded that the facilities and infrastructure at the Padangmatinggi Health Center are complete and meet the standards to support the implementation of the PMT program.

The KEK pregnant women's PMT program at the Padangmatinggi Health Center is intended for all pregnant women who experience KEK based on LiLA size <23.5 cm or anaemia. Monitoring is carried out through routine checks that are carried out every month. If the stock of PMT runs out, pregnant women still receive counselling and

counselling, as well as routine measurements every month (31.32). According to Juknis PMT (2019), supplementary food or special nutritional supplementation is given to improve the nutritional status of pregnant women who experience KEK, accompanied by education and counselling to support the program's success.

**Process Aspects**

The supplementary feeding program (PMT) planning process for pregnant women with SEZs must begin by assessing the goals and targets to be achieved. This includes determining the volume of additional food procurement based on the prevalence of pregnant women with SEZs and other data sourced from nutrition surveillance. After the plan is determined, the data that has been collected is sent to the Health Office and the Ministry of Health to determine the number of PMTs received. At the Padang Matinggi Health Center, planning is carried out by identifying the number of pregnant women and newborns targeted every year, and then this data is sent to the authorities to get the allocation of PMT (21,33). Implementing the supplementary feeding program can run well if it begins with careful preparation. The program consists of two main components: distribution and counselling. The distribution of PMT is carried out by providing additional food packages directly to pregnant women who come to the Health Center. The process of sending PMT from the centre is not always regular, but after being received by the Health Office, PMT is immediately distributed to the Health Center. If the stock is still available, the goods will be stored in the warehouse for distribution at a later date. In addition to providing PMT, pregnant women receive nutrition education to help them understand the importance of fulfilling good nutrition during pregnancy (34).

Monitoring and supervising the PMT program is important in ensuring the distribution and utilization of additional food on target. The health centre monitors by asking whether PMT has been consumed by pregnant women and providing counselling regarding its use (25,35,36). However, further monitoring of PMT consumption is not carried out thoroughly because no special officers or cadres supervise PMT consumption by pregnant women. This affects the effectiveness of monitoring and requires more attention in its implementation. Systematic and integrated recording and reporting are integral to PMT program management. Through this process, the evaluation of the program's success can be carried out and used as input for improving the program's implementation in the future. A sound record-keeping system will support transparency and ensure that PMT programs can achieve their desired goals effectively (6).

**Output Aspect**

The nutritional status of pregnant women is significant because it is directly related to the health of the baby to be born. The 1000 Days of Life program starts when pregnant women or babies are still in the womb, and pregnant women, especially those with chronic energy deficiency (KEK), are very vulnerable to malnutrition. At the Padang Matinggi Health Center, one of the steps to improve the nutritional status of pregnant women is to provide supplementary food (PMT) (22). According to research conducted by Xiao (12), the success of PMT delivery is influenced by careful planning, exemplary implementation, accurate record-keeping, and structured assessment and reporting. At the Padang Matinggi Health Center, the provision of PMT is carried out following existing procedures, although some aspects, such as monitoring PMT consumption, have not been carried out optimally (37).

The PMT program at the Padangmatinggi Health Center still faces various challenges, including the measurement of Upper Arm Circumference, which is sometimes not done regularly. In addition, the food consumed by pregnant women is also not recorded. Based on existing documents, data on the scope of PMT provision is only available for 2022 because PMT stock was not yet available that year, and there were no deliveries from the centre. However, in 2023, PMT distribution has already started. However, the achievement of the PMT program for pregnant women at the Padangmatinggi Health Center is still relatively low and not optimal due to obstacles in implementation and several parts that have not thoroughly followed the guidelines set by the Ministry of Health (38). At the Padang Matinggi Health Center, even though PMT has been implemented, the incidence rate of KEK in pregnant women is still relatively high, with 55 cases recorded. The results of interviews and document review show that pregnant women with KEK who receive PMT are still giving birth to babies with BBLR. This indicates that there has been no significant increase in nutritional status among pregnant KEK women at the Padang Matinggi Health Center.

Nonetheless, some studies reveal that PMT can help prevent oversized baby growth if PMT consumption is done for more than three months. The main focus of the current PMT program is to ensure the baby's healthy development, although the LiLA size of pregnant women has not increased significantly (10). It is important to note

that the nutritional status of pregnant women in SEZs can be an important indicator in assessing the success of the PMT program. The improvement in the nutritional status of pregnant women can be seen from the normal birth weight of the baby and not experiencing BBLR. Therefore, although there are several obstacles in the implementation of the PMT program at the Padang Matinggi Health Center, it is important to continue to monitor the development of the nutritional status of pregnant women and ensure that this program can be optimized so that better results can be achieved in the future (3,39,40).

**Research Limitations**

This research has several limitations that need to be considered. The data used is limited to the annual report from the Padang Matinggi Health Center, so it does not cover long-term trends. In addition, uncertainty in the distribution and quality of additional feeding stocks from the central government also has the potential to affect results. Therefore, these limitations must be considered when interpreting the research results.

**Recommendations for Future Research**

By addressing these aspects, future research can provide valuable data that can guide improvements in the design, implementation, and impact of maternal nutrition interventions, particularly in addressing chronic energy deficiency and improving maternal and neonatal health outcomes

## CONCLUSION

The study concludes that the supplementary feeding program for pregnant women with chronic low-energy nutritional status at the Padangmatinggi Health Center faces several challenges that affect its effectiveness. While the program follows guidelines, inadequate monitoring, limited human resources, and erratic distribution hinder its success. Although there was some improvement in nutritional status, such as increased upper arm circumference, overall nutritional status showed limited progress. These findings suggest that the program needs improvements in planning, implementation, and supervision for better results.

## AUTHOR'S CONTRIBUTION STATEMENT

The author conceptualized and designed the study, conducted data collection and analysis, and interpreted the results. The author was also responsible for drafting the manuscript, reviewing the literature, and providing final approval for publishing the manuscript version. The author took full responsibility for the integrity and accuracy of the data.

## CONFLICTS OF INTEREST

The author declares no conflicts of interest about the research and publication of this study. There are no financial or personal relationships with other people or organizations that could inappropriately influence the content of this manuscript.

## SOURCE OF FUNDING STATEMENTS

The author self-funded this research and received no external funding or grants. The study was conducted independently, without financial support from public or private organizations.

## ACKNOWLEDGMENTS

The author would like to thank the Puskesmas Padangmatinggi and all participants for cooperating in the study. Special thanks are also extended to the healthcare staff, including the nutritionists and midwives, who provided valuable insights and assistance throughout the data collection process. Additionally, the author appreciates the constructive feedback from the peer reviewers, which significantly improved the quality of the manuscript.

## BIBLIOGRAPHY

1. Widasari L, Hadi AJ, Ahmad H, Setyalaksana W, Damayanti L, Sutrisni E. Structural Model for Preparing Safe and Hygienic Complementary Food in Indonesia. J Public Heal Pharm. 2024;4(2):189–98.

2. Joshi P. Food and nutritional security analysis of farm women in Siwalik region of North Western Himalayan Region. Indian J Agric Sci [Internet]. 2021;91(8):1155–9. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85131640158&origin=inward
3. Bisai S. Traditional food consumption pattern and nutritional status of Oraons: An Asian Indian indigenous community. Front Sustain Food Syst [Internet]. 2023;7. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85151944685&origin=inward
4. Depkes R. Studi Status Gizi Indonesia (SSGI) Tahun 2021. Jakarta, Indonesia; 2021.
5. Purba A. Correlation between Body Mass Index with Anaemia Status of Pregnant women after Intervention Infused Okra Water and Ferrous Sulfate. Res J Pharm Technol [Internet]. 2024;17(2):563–7. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85189973070&origin=inward
6. Angkasa D. Food taboo, dietary diversity and prevalence of chronic energy deficiency in pregnant women living in rural area Indonesia. J Keperawatan Padjadjaran [Internet]. 2024;12(1):12–21. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85190997132&origin=inward
7. Dagne S. Chronic Energy Deficiency and Its Determinant Factors among Adults Aged 18-59 Years in Ethiopia: A Cross-Sectional Study. J Nutr Metab [Internet]. 2021;2021. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85100145929&origin=inward
8. Siedler MR. The Influence of Energy Balance and Availability on Resting Metabolic Rate: Implications for Assessment and Future Research Directions [Internet]. Vol. 53, Sports Medicine. 2023. p. 1507–26. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85160107244&origin=inward
9. Indonesia DKR. Survei Kesehatan Indonesia. Kementerian Kesehatan Republik Indonesia; 2023.
10. Mukaddas H. Factors Related to Chronic Energy Deficiency in Pregnant Mothers in the Konawe District, Indonesia. J Res Dev Nurs Midwifery [Internet]. 2021;18(2):18–20. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85152067556&origin=inward
11. Mauludyani AVR. Determinants of Double Burden of Undernutrition among Women of Reproductive Age in Indonesia [Internet]. Vol. 16, Malaysian Journal of Medicine and Health Sciences. 2020. p. 59–60. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85125709551&origin=inward
12. Xiao G. Gastric emptying of preoperative drinks is slower in adults with chronic energy deficiency: A 2 hour cross-over study among Chinese. Asia Pac J Clin Nutr [Internet]. 2021;30(2):206–12. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85111487384&origin=inward
13. Keshari P. Inter-linkages among socioeconomic deprivation, food insecurity, physical and psychosocial status in urban geriatric subjects: Varanasi, India. Sri Lanka J Soc Sci [Internet]. 2021;44(1):55–69. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85109761599&origin=inward
14. Faradila UN. Fasting habits, sleep duration, energy availability, and chronic energy deficiency (Ced) risk in female students. Food Res [Internet]. 2020;4:92–8. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85089346907&origin=inward
15. Wells JCK. Associations of age at marriage and first pregnancy with maternal nutritional status in Nepal. Evol Med Public Heal [Internet]. 2022;10(1):325–38. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85136161586&origin=inward
16. Mutalazimah M. Energy, protein intake and mid-upper arm circumference in pregnant women in boyolali regency, Indonesia. Malaysian J Med Heal Sci [Internet]. 2020;16:77–83. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85091871603&origin=inward
17. Simanjuntak BY. Enhancing Knowledge and Attitude of Preconception Mother through the First Thousand Days of Life Education: a Quasi-Experimental Study. Media Gizi Indones [Internet]. 2021;16(2):96–105. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85208691723&origin=inward
18. Lipoeto NI. Nutritional contributors to maternal anemia in Indonesia: Chronic energy deficiency and micronutrients. Asia Pac J Clin Nutr [Internet]. 2020;29:9–17. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85099324544&origin=inward
19. Wardani HK. Overview of compliance to taking iron-folic acid supplementation at primary healthcare centre during the Covid-19 pandemic. Pharm Educ [Internet]. 2023;23(4):140–4. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85175573887&origin=inward

20. Hasriantirisna. Relationship Between Knowledge and the Incidence of Chronic Energy Deficiency in Pregnant Women. J Public Heal Pharm [Internet]. 2023;3(1):1–4. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85182855346&origin=inward
21. Yanti AD. Differences in Nutritional Knowledge Levels, Energy and Protein Consumption Levels between Whatsapp-Based Assistance with E-booklet and E-leaflet Media in Chronically Lacking Energy Pregnant Women (KEK) in the Arjowinangun Health Center Work Area, Malang City. Media Publ Promosi Kesehat Indones [Internet]. 2022;5(11):1363–71. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85209688177&origin=inward
22. Utami NWA. The Association of Family Characteristics with Dietary Diversity among Adolescent Girls in Denpasar City, Bali, Indonesia. Amerta Nutr [Internet]. 2023;7(4):540–5. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85184938769&origin=inward
23. Hasibuan AS, Manggabarani S, Maulana I, Hadi AJ. Determinan Model Karakteristik Budaya Kesehatan pada Pemanfaatan Pelayanan Pencegahan Covid-19 di Puskesmas Padangmatinggi Kota Padangsidimpuan. Media Publ Promosi Kesehat Indones. 2022;5(12):1641–7.
24. Alexander V. Anergy to purified protein derivative and chronic energy deficiency in sputum-positive pulmonary tuberculosis: Dynamic assessment at baseline and treatment completion. Int J mycobacteriology [Internet]. 2023;12(4):436–42. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85180831141&origin=inward
25. Wati EK. Determinants of chronic energy deficiency (CED) incidence in pregnant women: A cross-sectional study in Banyumas, Indonesia. Narra J [Internet]. 2024;4(1). Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85192833968&origin=inward
26. Siregar YA, Ahmad H, Hadi AJ. Faktor yang Berhubungan dengan Kejadian Anemia pada Ibu Hamil di Puskesmas Rawat Inap Batangtoru Kabupaten Tapanuli Selatan. Media Publ Promosi Kesehat Indones. 2023;6(7):1432–8.
27. Mutia F, Hadi AJ. Faktor yang Berpengaruh dengan Perilaku Pemeriksaan ANC Ibu Hamil di Wilayah Kerja Puskesmas Batangtoru Kabupaten Tapanuli Selatan. Media Publ Promosi Kesehat Indones. 2023;6(9):1887–97.
28. Hadi AJ, Harahap A, Ali RSM, Ahmad H. Hubungan Sosial Demografi dan Perilaku Keluarga Sadar Gizi dengan Kejadian Stunting di Wilayah Kerja Puskesmas Perawatan Menawi Kabupaten Kepulauan Yapen. Media Publ Promosi Kesehat Indones. 2023;6(5):972–81.
29. Noor MS. Role of cadre in improving knowledge and attitude of chronic energy deficiency on teenagers in Mali-Mali village, Banjar regency, south Kalimantan, Indonesia. Open Access Maced J Med Sci [Internet]. 2021;9:145–9. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85102622109&origin=inward
30. Citrakesumasari. Culture based educate innovation for nutritional status. Enferm Clin [Internet]. 2020;30:9–12. Available from: https://api.elsevier.com/content/article/eid/1-s2.0-S1130862120301133
31. Arfan I. The Risk Factors for Anemia in Women at Third Trimester of Pregnancy in the Primary Health Center of Tanjung Sekayam: A Case-Control Study. Amerta Nutr [Internet]. 2024;8(1):37–44. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85203463460&origin=inward
32. Ayustaningwarno F. Physicochemical and sensory properties of cookies with cricket powder as an alternative snack to prevents iron deficiency anemia and chronic energy deficiency. Appl Food Res [Internet]. 2024;4(2). Available from: https://api.elsevier.com/content/article/eid/1-s2.0-S2772502224000957
33. Brar APS. Prevalence of Association of Dietary Habits with Chronic Energy Deficiency in Ethnic Adult Punjabi Population. Indian J Community Heal [Internet]. 2024;36(3):412–8. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85201673393&origin=inward
34. Keshari P. Predictors of Chronic Energy Deficiency in Urban Geriatric Population: Findings from Community Based Study. Online J Heal Allied Sci [Internet]. 2024;23(2). Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85202504063&origin=inward
35. Mogi JG. Formative research to understand food beliefs and practices relating to pregnancy on Kei Besar Island, Eastern Indonesia. BMC Nutr [Internet]. 2024;10(1). Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85198100378&origin=inward

36. Yulia C. Reflections of well-being: navigating body image, chronic energy deficiency, and nutritional intake among urban and rural adolescents. Front Nutr [Internet]. 2024;11. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85193041428&origin=inward
37. Tombeg Z, Hadi AJ. Karakteristik Ibu Hamil dengan Konsumsi Tablet Fe: Studi Cross Sectional pada Area Puskesmas Makale Kabupaten Tana Toraja. Media Publ Promosi Kesehat Indones. 2022;5(8):984–9.
38. Putri A, Harahap A, Hadi AJ. Faktor yang Berhubungan dengan Perilaku Ibu Hamil yang Mengikuti Kelas Ibu Prenatal dalam Pencegahan Kehamilan Berisiko Tinggi di Puskesmas Padang Matinggi Kota Padangsidimpuan. Media Publ Promosi Kesehat Indones. 2023;6(8):1678–86.
39. Bose K. Age trends in anthropometric characteristics and nutritional status among adult mahali females of Bankura district, West Bengal, India [Internet]. West Bengal: Economic, Political and Social Issues. 2021. p. 81–97. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85108935034&origin=inward
40. Syafiq A. Milk supplementation increases mid-upper arm circumference and haemoglobin level among pregnant women in Kupang, Indonesia: Evidence from a regression discontinuity design. Malays J Nutr [Internet]. 2022;28(2):191–202. Available from: https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85132689779&origin=inward