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The Effect Of Supplementary Feeding (PMT) Of Red Bean Extract On The Body Weight Of Pregnant Women With Chronic Energy Deficiency (CED) In The Working Area Of Way Urang Health Center, South Lampung Regency

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ABSTRACT
Chronic Energy Deficiency (CED) in pregnant women increases the risk of delivery complications, maternal mortality, and fetal health problems such as LBW, prematurity, and birth defects. The prevalence of CED in Lampung Province for ages 15-49 years was 5142 cases, with cases in South Lampung Regency totaling 746 cases or 14.5%, ranking third highest among 15 Regencies in Lampung Province. To improve the nutritional status of pregnant women with CED, Supplementary Food Provision (PMT) needs to be given to pregnant women. Red bean extract is rich in protein, iron, and fiber which helps improve the nutritional status of pregnant women with CED. This study aims to determine the effect of Supplementary Food (PMT) red bean extract on the body weight of pregnant women with CED. This is a quantitative research with pre-experimental design with one group pretest-posttest design. A sample of 20 people was taken by Total sampling with the method of giving red bean extract 2x1 in the morning and afternoon for 14 days. This research was conducted in the working area of Way Urang Health Center. Data collection used observation sheets, and analysis used paired T-test. Based on the research results, the average body weight of pregnant women with CED before being given red bean extract was 48.62 kg and after being given red bean extract became 49.45 kg. Thus showing there is an effect of supplementary feeding of red bean extract on weight gain in pregnant women with CED in the working area of Way Urang Health Center, South Lampung Regency with p-value = 0.000. Pregnant women are expected to consume red bean extract regularly as a source of protein and iron to increase body weight and nutritional status of mothers with CED.

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INTRODUCTION

Pregnant women are one of the groups vulnerable to nutritional problems. Nutritional problems are closely related to fetal growth processes and the growth of various body organs

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that support the pregnancy process. Nutritional status is a measure of success in meeting nutrition for pregnant women (Nurahmawati et al., 2023). The nutritional status of pregnant women can be measured based on BMI, with normal adult Body Mass Index (BMI) ranging between 18.5 - 24.9. If an adult woman has a BMI of less than 18.8, she is categorized as having Chronic Energy Deficiency (CED) (Suparni et al., 2020).

According to the results of Indonesia's Basic Health Research (Riskesdas) in 2018, the risk of chronic energy deficiency in pregnant women based on ages 15-19 years was 33.5%, at reproductive age the incidence of chronic energy deficiency in pregnant women was 12.3%, and at age >35 years was 8.5% (Ministry of Health RI, 2019). In Lampung Province, the prevalence of CED in pregnant women aged 15-49 years was 5142 cases, with cases in South Lampung Regency totaling 746 cases or 14.5%, ranking third highest among 15 Regencies in Lampung Province (Lampung Health Office, 2023). In South Lampung Regency, cases of pregnant women with CED increased, from 11.6% cases in 2013 to 14.5% in 2018 (South Lampung District Health Office, 2023).

Pregnant women with nutritional and health problems impact the health and safety of mothers and babies as well as the quality of babies born. The condition of pregnant women with Chronic Energy Deficiency (CED) risks reducing muscle strength that helps the delivery process, which can result in prolonged labor and postpartum hemorrhage, even maternal death. Risks to babies can result in fetal death (miscarriage), prematurity, birth defects, Low Birth Weight (LBW), and even infant death (Ministry of Health RI, 2022).

Technically in the field, in an effort to address malnutrition and severe malnutrition, particularly CED in pregnant women, the government has issued policies in the form of supplementary feeding programs (PMT) for pregnant women, but in reality, the implementation of the program and its success in reducing nutritional problems is still not optimal. CED prevention measures related to energy consumption include consuming varied foods that contain sufficient calories and protein such as rice, sweet potatoes, potatoes, fish, eggs, legumes, and milk at least once a day. Three types of food as main protein sources in Indonesia are grains, legumes, and fish (Puspitasari et al., 2021).

Types of products in the form of red bean, peanut, and soybean drinks and milk contain relatively similar nutritional compositions; these three formulas and milk only differ in taste (Yenrina and Muchtadi, 2023). The Red Bean Extract formula in treating CED in pregnant women, unlike peanuts and soybeans, contains on average energy of 300 kcal; protein 17 g; iron (Fe) 13 mg; calcium (Ca) 150 mg; magnesium (Mg) 30 mg; folic acid 200 mg; vitamin A 300 RE; vitamin B12 0.2 mg; and vitamin C 10 mg in 300 ml (Khomsan and Eddy SM, 2019).

Normal pregnant women need additional energy of 180-300 kcal and protein reaching 30 grams per day. To obtain weight gain of 0.5 kg/week, including for pregnant women with CED, additional energy intake of 200-450 kcal/day is needed from their daily energy intake, where less than 25% of the energy content in supplementary food comes from protein (Ministry of Health, 2020). Supplementary feeding with energy 300-800 kcal/day with energy derived from protein <25% can increase weight gain in pregnant women suffering from CED, increase fetal growth and size of babies born. Conversely, high protein feeding (>25% of total

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calories) can give the opposite effect, namely weight loss and lower birth weight (Iskandar, 2022).

Based on a preliminary study in the working area of UPTD in the working area of Wayurang Health Center, South Lampung Regency, it was known that in 2020 there were 75 cases (6.8%) of pregnant women with CED from a target below 6.5% of 1100 pregnant women, in 2021 there were 75 cases (6.8%) of pregnant women with CED from a target of 6.5% of 1101 pregnant women, and in 2022 there were 71 cases (6.3%) of pregnant women with CED from a target of 5% of 1114 pregnant women. In 2023, there were 85 cases (6.9%) of pregnant women with CED from 1222 pregnant women from a target of 4%. In addition, in an effort to improve the nutritional status of pregnant women to prevent complications that can be caused by CED, earlier intervention efforts need to be made in addressing CED.

Based on the description of the problems above, the researcher intends to conduct research titled The Effect of Supplementary Food (PMT) Red Bean Extract on Body Weight of Pregnant Women with CED in the working area of Wayurang Health Center, South Lampung Regency.

METHODS

This is a quantitative research with pre-experimental design using one group pretest-posttest design. The population in this study was all pregnant women with CED in the working area of Wayurang Health Center, South Lampung Regency, totaling 20 people. The sampling technique in this study used Total sampling. The research instrument used observation sheets and bivariate analysis used paired T-test.

RESULTS

Univariate Analysis

Table 1. Frequency Distribution of Characteristics of Pregnant Women with CED in the Working Area of Way Urang Health Center

Characteristics	N	%
Age		
<20 Years	2	10%
20-35 Years	14	70%
>35 Years	4	20%
Education		
Junior High School	5	25%
Senior High School	13	65%
Higher Education	2	10%
Gestational Age		
First Trimester	0	0%

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Characteristics	N	%
Second Trimester	16	80%
Third Trimester	4	20%
Total	20	100%

Based on Table 1, the majority of respondents were in the age range of 20-35 years, totaling 14 people (70%). For education level, most respondents had completed Senior High School, totaling 13 people (65%). Most respondents were in their Second Trimester (14 weeks - 27 weeks) of pregnancy, totaling 16 people (80%) out of 20 respondents.

Table 2. Average Body Weight of Pregnant Women with CED Before Being Given Red Bean Extract Supplementary Food in the Working Area of Wayurang Health Center, South Lampung Regency

Variable	N	Min-Max	Mean	SD
Before given red bean extract	20	44 - 57	48,62	3.557

Table 2 shows that the average body weight of pregnant women with CED before being given red bean extract supplementary food was 48.62 kg, with minimum weight of 44 kg and maximum of 57 kg, and standard deviation of 3.557.

Table 3. Average Body Weight of Pregnant Women with CED After Being Given Red Bean Extract Supplementary Food in the Working Area of Wayurang Health Center, South Lampung Regency

Variable	N	Min-Max	Mean	SD
After given red bean extract	20	44 - 58	49,45	3,666

Table 3 shows that the average body weight of pregnant women with CED after being given red bean extract supplementary food was 49.45 kg, with minimum weight of 44 kg and maximum of 58 kg, and standard deviation of 3.666.

Bivariate Analysis

Table 4. Effect of Red Bean Extract Supplementary Food on Weight Gain in Pregnant Women with CED

Variable	Mean	SD	SE	t	*p-value*
Pretest-Postest	-,825	0,382	0,085	-9.650	0,000

Based on the paired T-test, statistical test results showed p-value = 0.000 (p-value<0.05), which means there is an effect of red bean extract supplementary food on weight gain in pregnant women with CED in the working area of Way Urang Health Center, South Lampung Regency.

Discussion

Respondent Characteristics

1. Age

Based on Table 4.1, most respondents were in the age range of 20-35 years (14 people, 70%), followed by <20 years (2 people, 10%), and >35 years (4 people, 20%). Age affects the

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nutritional status of pregnant women. A very young pregnant woman (less than 20 years) is still experiencing growth and development. During pregnancy, the fetus competes with the mother for nutrients as both are undergoing growth and development. This competition results in chronic energy deficiency. Meanwhile, pregnant women at an advanced age also require substantial energy to support their weakening organ functions. In this case, competition for nutrients will occur. Therefore, the ideal age for pregnancy is between 20 to 35 years (Khasanah et al., 2020).

This aligns with Ernawati's (2019) research, which found that most pregnant women with CED were in the age range of 20-35 years (107 people, 81.1%), while respondents aged <20 years or >35 years numbered 25 people (18.9%).

The researcher assumes that age influences pregnant women's nutritional status, where the ideal age for pregnancy is 20-35 years as women's bodies are in optimal condition to support both maternal and fetal needs. Respondents in this age range dominated (70%), while pregnant women <20 years risk developing Chronic Energy Deficiency (CED) due to nutritional competition between mother and fetus, considering the mother's body is still growing. Pregnant women >35 years also risk CED as weakening organ functions require additional energy to support pregnancy. However, research shows that CED occurs more frequently in the 20-35 age group because most pregnant women fall within this age range. Additionally, at ages 20-25, factors such as lack of nutritional knowledge, unbalanced diet, and high physical activity without adequate nutritional intake can contribute to high CED rates even within the ideal pregnancy age range.

2. Education

Based on the analysis results, most respondents had completed Senior High School education (13 people, 65%), followed by Junior High School (5 people, 25%), and higher education (2 people, 10%). Women with higher education are expected to have better knowledge regarding proper eating patterns, enabling them to implement good dietary habits in daily life. Good eating patterns will support the achievement of proper nutritional status. Nutritional knowledge is not only obtained through formal education but can be acquired through other media, such as electronic media, counseling, and so forth (Sri Lestari et al., 2023).

This aligns with research by Syakur et al. (2020), which found that 2 people (6.7%) with higher education experienced chronic energy deficiency while 28 people (93.3%) did not. Among those with lower education, 28 people (73.7%) experienced chronic energy deficiency while 10 people (26.3%) did not.

According to the researcher's assumption, education level does not correlate with CED incidence in pregnant women. While education makes it easier for someone to receive new information and knowledge, in today's advanced era, information and new knowledge can be easily obtained from various sources without requiring higher education, for example through the internet where everyone can easily access any information.

3. Gestational Age

Based on the analysis of respondents' gestational age, most were in the Second Trimester (14-27 weeks) totaling 16 people (80%), while 4 people (20%) were in the Third Trimester from

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20 respondents. Gestational age significantly influences nutrient absorption and weight gain in pregnant women. During the second trimester (14-27 weeks), energy and nutritional needs increase significantly to support rapid fetal growth. This is often accompanied by increased appetite and nutrient absorption efficiency, contributing to optimal weight gain. Good eating patterns during the second trimester are closely related to weight gain that aligns with medical recommendations (Daniella et al., 2021). This corresponds with research conducted by Juwita, et al. (2021), which found that increased energy and nutrient intake during the second trimester contributes to adequate weight gain and prevents the risk of low birth weight (LBW).

According to the researcher's assumption, the second trimester of pregnancy is a crucial period for meeting significantly increased energy and nutritional needs due to rapid fetal development and changes in maternal metabolism. At this stage, balanced eating patterns are easier to implement because nausea and vomiting symptoms typically decrease compared to the first trimester, giving pregnant women a greater opportunity to optimize nutrient intake, especially protein, iron, folic acid, and calcium. Meeting these needs not only supports weight gain according to medical recommendations but also contributes to preventing complications such as low birth weight (LBW) and ensuring long-term infant health.

Average Body Weight of Pregnant Women with CED Before Being Given Red Bean Extract Supplementary Food in the Working Area of Wayurang Health Center, South Lampung Regency

Based on the analysis results, the average body weight of pregnant women with CED before being given red bean extract supplementary food was 48.62 kg, with minimum weight of 44 kg and maximum weight of 57 kg, and a standard deviation of 3.557.

Physiologically, pregnant women require more food intake, unlike normal women of the same age. This food intake will determine the nutritional status of pregnant women. When pregnant women do not meet their energy needs, the fetus they carry also experiences nutritional deficiencies. This causes delayed fetal growth and development. Pregnant women need an additional 200 calories each day. A woman's daily caloric needs range from 2000 to 2300 calories per day. Pregnant women need 2300 to 2500 calories each day (Khasanah et al., 2020).

Chronic energy deficiency can be measured by measuring the upper arm circumference. Women with upper arm circumference less than 23.5 cm can be said to experience chronic malnutrition. There are several causes of pregnant women experiencing chronic malnutrition, namely: food intake that does not meet needs, maternal age too young or too old, workload too heavy, infectious diseases (Setiyowati & Ulvie, 2019).

Given the widespread impact of malnutrition, efforts are needed to address nutrition for pregnant women, especially those experiencing CED. Interventions can be done in various forms, one of which is through supplementary feeding. Supplementary Food Provision (PMT) can be given with high energy and protein intake and balanced nutrition (Rahmadyanti, 2024).

Supplementary Food Provision is the activity of providing food in the form of safe and quality snacks along with other supporting activities by preparing aspects of food quality and safety. Energy supplementation can be in the form of Supplementary Food Provision (PMT) for pregnant women with CED. PMT can be local or manufactured food and nutrient-dense

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beverages. Manufactured foods like biscuits, local foods can be made ourselves like fish nuggets, pudding, etc., and nutrient-dense drinks like milk (Rika, 2021). This is consistent with research by Juliasari & Fitria Ana (2022), where research results showed 17.9% were given PMT and 82.1% were not. 98.5% of respondents experienced weight gain and 1.5% did not experience weight gain.

According to the researcher's assumption, CED in pregnant women, with an average weight of 47.85 kg, is caused by insufficient nutritional intake, age that is too young or old, or the presence of infectious diseases. This nutritional deficiency seriously impacts maternal health and fetal growth. One effective effort to address CED is Supplementary Food Provision (PMT), either in the form of local or manufactured food that is high in energy and protein. Research shows that the majority of pregnant women who receive PMT experience weight gain, making this intervention important for improving maternal nutritional status and preventing pregnancy complications.

Average Body Weight of Pregnant Women with CED After Being Given Red Bean Extract Supplementary Food in the Working Area of Wayurang Health Center, South Lampung Regency

Based on the analysis results, the average body weight of pregnant women with CED after being given red bean extract supplementary food was 49.45 kg, with minimum weight of 44 kg and maximum weight of 58 kg, and a standard deviation of 3.666. Red bean extract has great potential in increasing the body weight of pregnant women with Chronic Energy Deficiency (CED) due to its high nutritional content, such as protein, fiber, iron, and B complex vitamins. The protein in red beans plays an important role in repairing body tissues and supporting fetal growth, while iron helps prevent anemia that often occurs in pregnant women with CED. The fiber in red bean extract is also beneficial for improving digestion, making nutrient absorption more optimal (Setiyowati & Ulvie, 2019).

Red bean extract contains various nutrients that can contribute to weight gain if consumed regularly. The main content of complex carbohydrates provides a sustainable energy source, supporting body metabolism and daily activities. Plant-based protein in red beans helps form and repair body tissues, and contributes to muscle mass growth (Umrah & Dahlan, 2019).

The iron contained in red beans is beneficial in preventing anemia by increasing hemoglobin levels, which can improve overall body metabolism. Additionally, fiber in red bean extract supports digestive health, increases nutrient absorption, and helps blood sugar stability. Unsaturated fat content, such as oleic and linoleic acids, provides additional energy without increasing bad cholesterol levels. Other contents such as vitamin B, folate, calcium, and phosphorus also support metabolism function and body tissue growth. These nutrients synergistically support healthy weight gain (Umrah & Dahlan, 2019).

Rahmadyanti's research (2024) mentions that locally-based PMT like red bean extract not only meets energy needs but also increases the sustainability of nutritional interventions because raw materials are easily accessible and affordable. With better nutritional intake, pregnant women with CED not only experience weight gain but also reduce the risk of pregnancy complications and improve fetal health. This aligns with Nursihhah's research

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(2022) which found that the average weight of pregnant women with CED after being given PMT red bean extract increased to 48.94 with a standard deviation of 5.88.

According to the researcher's assumption, red bean extract is believed to increase pregnant women's weight due to its nutritional content including protein, iron, fiber, and B complex vitamins, which support fetal growth, prevent anemia, and improve digestion so nutrients can be better absorbed. The intervention of providing red bean extract, as part of locally-based PMT, is not only effective in significantly increasing weight but also supports the sustainability of nutrition programs due to easily obtained and economical materials, thus able to improve overall maternal and fetal health.

Bivariate Analysis

Effect of Red Bean Extract Supplementary Food on Weight Gain in Pregnant Women with CED

Based on the paired T-Test, statistical test results showed p-value = 0.000 (p-value<0.05), indicating that there is an effect of red bean extract supplementary food on weight gain in pregnant women with CED in the working area of Way Urang Health Center, South Lampung Regency.

PMT provision for pregnant women with CED, especially in early pregnancy trimester, is very necessary because mothers and fetuses need more nutrition for maternal and infant health, considering that in some early trimester pregnancies, eating patterns in pregnant women decrease significantly due to nausea and vomiting. Increased energy needs in pregnant women from trimester I-III are 180-300 calories/day, protein 20 g/day, Fat 6-10 g/day, Carbohydrates 25-40 g/day (Kurnianti, 2022).

Red beans are a rich source of nutrition containing energy, protein, fiber, and various important micronutrients such as iron, magnesium, and folate. In 100 grams of raw red beans, there are about 337 kcal of energy, making it an ideal choice for increasing caloric intake in pregnant women with Chronic Energy Deficiency (CED). In packaged red bean extract form, caloric content can vary depending on the formulation, but is generally combined with additives such as sugar and milk to increase its caloric value. With practical serving, packaged red bean extract not only meets energy needs but also makes it easier for pregnant women to access quality nutrition without requiring complicated preparation (Setiawati & Lhatifah, 2023).

Increased energy intake through red bean extract consumption has a direct influence on the body weight of pregnant women with CED. The energy contained in red bean extract helps meet pregnant women's daily caloric needs, which increase by about 300-500 kcal during pregnancy to support fetal growth (Panjaitan et al., 2022).

The protein content in red beans supports body tissue repair and fetal growth, while its complex carbohydrates provide sustained energy. The iron in red beans also helps prevent anemia, which is often experienced by pregnant women with CED. Regular provision of red bean-based food can improve pregnant women's nutritional status, improve upper arm circumference, and support weight gain according to nutritional adequacy rates (Hardinsyah et al., 2021).

Red bean seeds are a source of carbohydrates, minerals, and vitamins. The vitamin content per 100 grams of seeds includes thiamine/vitamin B1 0.5 mg, vitamin A 30 IU, niacin

2.2 mg, and riboflavin/vitamin B2 0.2 mg. Dried red beans have a high protein content reaching 22.3 g per 100 g of dried red beans. This protein content is almost equivalent to mung beans which are more popular as a protein source. The carbohydrate content of red beans is 61 g per 100 g. The carbohydrate components in red beans are dextrin 2.7%; sugar 1.6%; pentose 8.4%; starch 35.2%, pectin 0.7%, and galactan 1.3%. This makes red beans a good energy source, about 348 kcal per 100 g. Red beans are beneficial for supporting fetal nerve and brain development, preventing anemia, preventing and relieving constipation, supporting fetal tissue and organ growth, overcoming fatigue and muscle cramps, and maintaining stable blood pressure (Setiawati & Lhatifah, 2023).

This aligns with research by Juliasari & Fitria (2022) which stated that there is a relationship between PMT red bean extract and weight gain in pregnant women with CED at Putih Doh Health Center in 2020. According to the researcher's assumption, red bean extract administration can be an effective solution in addressing Chronic Energy Deficiency (CED) in pregnant women, considering that CED can interfere with fetal growth and increase the risk of pregnancy complications. Red bean extract, which is rich in complex carbohydrates, plant-based protein, iron, and folate, is believed to meet increased energy and nutritional needs during pregnancy. With regular consumption, red bean extract is expected to help improve the nutritional status of pregnant women with CED, increase weight sustainably, and prevent complications such as anemia and delayed fetal growth. This is particularly important, especially in the first trimester, when pregnant women's eating patterns are often disrupted due to nausea and vomiting.

CONCLUSION

Based on the research results, the following conclusions can be drawn: The average body weight of pregnant women with CED before being given red bean extract supplementary food was 48.62 kg. The average body weight of pregnant women with CED after being given red bean extract supplementary food was 49.45 kg. There is an effect of red bean extract supplementary food on weight gain in pregnant women with CED in the working area of Way Urang Health Center, South Lampung Regency with p-value = 0.000.

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