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Literature Review: The Relationship Between Chronic Energy Deficiency (CED) and The Incidence of Anemia in Pregnant Women

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ABSTRACT

Chronic Energy Deficiency (CED) is a condition caused by a lack of energy and protein intake over a long period of time. Globally, the prevalence of CED in pregnant women reaches 35-37%. In Indonesia, the prevalence of CED increased to 17.3% in 2018 compared to previous years. Pregnant women with CED are at risk of various complications, such as anemia, bleeding, abnormal weight gain, and susceptibility to infection. The purpose of this literature review is to determine the relationship between CED and the incidence of anemia in pregnant women. The method used was a literature study by reviewing articles from national and international journals. Searches were conducted through Google Scholar, Semantic Scholar, and PubMed using the keywords: "Anemia in pregnancy, cause of anemia, CED pregnant women, impact of CED, anemia in pregnancy, cause of anemia in pregnant women, chronic energy deficiency in pregnant women" with a time span of 2018-2023. Of the 125 articles found, they were screened based on the inclusion and exclusion criteria, and 12 articles were reviewed. The results showed that there is a significant relationship between CED and increased risk of anemia in pregnant women, where macro and micronutrient deficiencies have a direct impact on hemoglobin production. This review is expected to increase knowledge in the field of midwifery, especially in the prevention and treatment of anemia in pregnant women with Chronic Energy Deficiency (CED), and help health workers provide better services to pregnant women.

Keywords: Anemia, Chronic Energy Deficiency, Pregnant Women

1. INTRODUCTION

Chronic Energy Deficiency (CED) is a condition due to prolonged lack of energy and protein intake, or an imbalance of energy and protein intake to meet body needs. Chronic Energy Deficiency is a state of malnutrition that can cause maternal health problems related to one or more nutrients. Pregnant women are at risk of developing CED if they have an Upper Arm Circumference (LILA) < 23.5 cm. (Utami and Puspita, 2020).

Based on WHO data, the global prevalence of CED in 2016 was 35- 37%, with the highest incidence occurring in the third trimester compared to the first and second trimesters. WHO notes that 40% of maternal deaths in developing countries are most cases related to CED due to malnutrition (Erlinawati and Masturo, 2018).

Basic Health Research (Riskesdas) in 2018 showed that the prevalence of risk of CED in pregnant women (15-49 years) is still quite high at 17.3%, this figure shows an improvement in the percentage of pregnant women with CED

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which is expected to decrease by 1.5% each year in order to reach the target of 10% by 2024. (Directorate General of Public Health, Ministry of Health, 2021).

Based on the source of periodic reporting data in 2020 from 34 provinces, it is known that around 451,350 out of 4,656,382 pregnant women who have had upper arm circumference (LILA) measurements have upper arm circumference (LILA) less than 23.5 cm (risk of CED). From this calculation, it can be concluded that the proportion of pregnant women at risk of CED in 2020 is 9.7%, while the 2020 target is 16%. This situation shows that the achievement of the target of pregnant women with CED this year exceeds the target of the Ministry of Health Strategic Plan in 2020. When compared to the WHO threshold, the proportion of pregnant women with CED in Indonesia is categorized as a mild public health problem (less than 10%) (Indonesian Ministry of Health, 2020).

Pregnant women with CED are at risk of experiencing muscle weakness that can help the labor process, causing prolonged labor, postpartum hemorrhage, and even maternal death. The risk to the baby can cause fetal death (miscarriage), premature birth, birth defects, low birth weight (LBW), and even infant death. Pregnant women at risk of CED will have abnormalities in fetal growth and development, especially physical growth (stunting), brain, and metabolism which can trigger non-communicable diseases in adulthood. (Indonesian Ministry of Health, 2019).

In general, pregnant women with SEVERITY are more likely to suffer from anemia than pregnant women without SEVERITY. This is because CED is caused by long-term malnutrition (calories and protein). One way to prevent anemia is by consuming foods that contain micronutrients and macronutrients and taking iron (Fe) supplements. (Utami and Puspita, 2020).

Iron deficiency anemia in pregnant women is a condition where the number of red blood cells or oxygen-carrying capacity is less than 11 g/dL. Anemia during pregnancy is bad for the health of the mother and child. It affects the growth and development of the fetus during and after pregnancy, increases the risk of premature birth, maternal and child mortality, and infectious diseases that become the background of morbidity and mortality. (Indonesian Ministry of Health, 2019).

According to the World Health Organization (WHO), the global prevalence of anemia in women of childbearing age in 2019 was 29.9%, affecting more than 500 million women aged 15 to 49 years. The prevalence was 29.6% in non-pregnant women of childbearing age and 36.5% in pregnant women. (WHO, 2021).

Based on the Basic Health Research (Riskesdas) in 2018, it states that in Indonesia pregnant women experienced anemia in 2013 of 37.1% while in 2018 the proportion of anemia in pregnant women increased by 48.9% and by 84.6% the highest anemia in pregnant women occurred in the age group 15 - 24 years. This number exceeds the anemia prevalence threshold of 40% which is a serious public health problem. (Indonesian Ministry of Health, 2019).

Common symptoms experienced by people with anemia are 5 L (Lethargic, Weak, Weak, Tired, Inattentive), accompanied by headaches and dizziness, foggy eyes, drowsiness, fatigue, and difficulty concentrating. Clinically, anemia patients are characterized by "pallor" of the face, eyelids, lips, skin, nails, and palms. (Nasus et al., 2023).

Anemia accounts for 20% of maternal deaths worldwide and is the most common risk factor for antenatal and postpartum hemorrhage as a direct cause of maternal death in Indonesia (Ministry of Health of the Republic of Indonesia, 2016). While indirect causes of maternal deaths include 37% suffering from CED during pregnancy and 40% experiencing anemia during pregnancy. (Stephanie & Kartika, 2016) in (Hayati, Al Fatih and Cahyati, 2020).

Management of pregnant women with CED is carried out through special nutritional interventions in all programs, especially in the implementation of comprehensive antenatal care. One of the efforts made by the government based on the Minister of Health Regulation No. 51/2016 is the provision of additional food (PMT) to pregnant women who are identified as

being at risk of developing CED. Supplementary food (MT) provided can be in the form of home-cooked food made from local food or factory- produced supplementary food (biscuits). The currently available supplementary food is industrially produced supplementary food (biscuits). PMT biscuits are formulated to meet the additional needs of macro and micronutrients compared to local food. In addition, PMT biscuits with a small amount of local PMT are able to get optimal nutritional value, and are ready to eat in safe and secure packaging. (Indonesian Ministry of Health, 2019).

Although there are various studies that discuss Chronic Energy Deficiency (CED) and anemia in pregnant women separately, there are limited studies that specifically examine the relationship between the two systematically based on current scientific evidence. In fact, understanding the relationship between CED and anemia is essential for formulating targeted nutrition and health policy interventions. This gap is the basis for this literature review, which not only summarizes the existing scientific evidence, but also provides a comprehensive picture of how CED may contribute to the incidence of anemia in pregnant women. Thus, the results of this review are expected to strengthen the scientific basis in midwifery services, especially in promotive and preventive efforts against two conditions that greatly affect maternal and fetal health.

The research method used was a literature review conducted by collecting several national and international journal articles. The search was conducted using electronic databases namely Google Scholar, Semantic Scholar, and PubMed with the keywords: "anemia in pregnancy, cause of anemia, CED pregnant women, impact of CED, anemia in pregnancy, cause of anemia in pregnant women, chronic energy deficiency in pregnant women". Journals found were screened based on inclusion criteria, namely articles published between 2018-2023, in Indonesian or English, using observational study designs (cross-sectional and case-control), and discussing the relationship between Chronic Energy Deficiency (CED) and the incidence of anemia in pregnant women. Exclusion criteria were all articles that did not meet the inclusion criteria.

Based on the above background, the researcher wants to get an overview of the relationship between chronic energy deficiency and the incidence of anemia in pregnant women through a literature review.

2. METHODS

The research method used was a literature review conducted by collecting several national and international journal articles. The search was conducted using electronic databases namely Google Scholar, Semantic Scholar, and PubMed with the keywords: "anemia in pregnancy, cause of anemia, CED pregnant women, impact of CED, anemia in pregnancy, cause of anemia in pregnant women, chronic energy deficiency in pregnant women". Journals found were screened based on inclusion criteria, namely articles published between 2018-2023, in Indonesian or English, using observational study designs (crosssectional and case-control), and discussing the relationship between Chronic Energy Deficiency (CED) and the incidence of anemia in pregnant women. Exclusion criteria were all articles that did not meet the inclusion criteria. The article selection process followed the PRISMA (Preferred Reporting Items for Systematic Reviews and MetaAnalyses) flow which consists of four stages: identification, screening, eligibility assessment, and inclusion. From a total of 125 articles obtained, 53 articles were eliminated at the initial stage due to duplication or irrelevance. A total of 60 articles were screened based on abstract and content, leaving 22 articles. After eligibility assessment and quality review using the Joanna Briggs Institute (JBI) critical appraisal tool for observational studies, the final 12 articles met the criteria and were further reviewed in this review.

3. RESULT AND DISCUSSION

A literature review was conducted on 12 articles or journals that examined the relationship between chronic energy deficiency and the incidence of anemia in pregnant

women. The review revealed the following findings:

1. The research designs used in the journals included nine journals with a cross sectional method, one journal with a retrospective approach, and two journals with a case control design.
2. The research subjects in the analyzed journals were pregnant women residing in 12 regions in Indonesia such as Kendal District (Puskesmas Cepiring), Makassar City (RSKDIA Siti Fatimah), Depok (El 'Mozza Clinic), Bandar Lampung City (Puskesmas Kemiling), Makassar City (Puskesmas Mangasa), Jambi City (Puseksmas Putri Ayu), Badegan District, Palu (Puseksmas Singgani & Puskesmas Tipo), Aceh (Puskesmas Singgani & Puskesmas Tipo). Puskesmas Tipo), Aceh (Puskesmas Kuala Simpang City), West Lampung District (Puskesmas Srimulyo Suoh), Parigi Moutang District (Puskesmas Siniu), Makassar City (Puskesmas Jongaya), Lhokseumawe.
3. The number of samples in each journal varied, ranging from 31 to 199 pregnant women.
4. The results of the review of 12 articles found that there was a relationship between chronic energy deficiency and the incidence of anemia in pregnant women.

The results and discussion are written clearly and fulfill the aspects of scientific merit (what/how, why, what else). If the research subject is human, there must be information about ethical clearance and informed consent. The results and discussion section includes a presentation of the analysis results related to the research questions. Each research result must be discussed. The discussion section includes the interpretation of the results and comparisons with theory and/or similar research results. The length of the results presentation and discussion section should be 40-60% of the total article length.

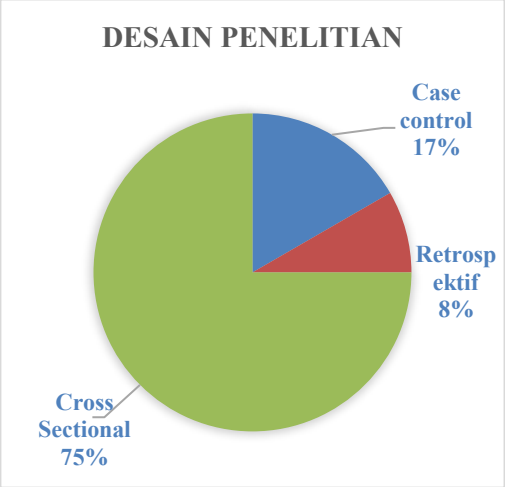

Figure 1. Diagram of the Research Design

Table 1. Review Literatur

No.	Author	Title	Sample	Method	Result
1.	Shinta Ika Sandhi , Desi Wijayanti E.D.	The Effect of Chronic Energy Deficiency (CED) on the Incidence of Anemia in Pregnant Women at the Cepiring Health Center, Kendal Regency	The number of respondents in this study were 48 pregnant women	This type of research is descriptive analytic correlation with cross sectional research design.	The results of statistical tests obtained p value = 0.0002 (p≤0.05), which means there is a relationship between KEK to the occurrence of anemia in pregnant women at Puskesmas Cepiring Kendal Regency, pregnant women with KEK have a 39 times chance of experiencing anemia compared to pregnant women who are not KEK.

2.	Desy Qomarasari, Lusy Pratiwi	The Relationship between Pregnancy Age, Parity, Kek Status, and Maternal Education Level with the Incidence of Anemia in Pregnant Women at El'mozza Clinic, Depok City	The sample of this study amounted to 52 respondents	Quantitative research methods with a cross sectional approach and analytically studied.	The results of the study were anemia in pregnant women 21 respondents (40.4%), pregnancy age Trimester 1 and 3 as many as 34 respondents (65.4%), parity ≤3 44 respondents (84.6%), CED status 26 respondents (50.0%), and secondary education 27 respondents (51.9%). The results of the chi square statistical test showed no relationship between gestational age and anemia in pregnant women (0.873). There is a relationship between parity (0.030), KEK status (0.002) and education level (0.001) with the incidence of anemia in pregnant women.
3.	Marani, Ketut Resmaniasih, Linda Puji Astuti	The Relationship of Chronic Energy Deficiency (CED) with Anemia in Pregnant Women in the Kia Blud Room Upt Puskesmas Pahandut Kota Palangka Raya	The sample size was 66 samples.	This research method is analytic observational with a cross sectional approach.	The results showed that most of the pregnant women who did not have SEVERITY (LILA ≥ 23.5) did not experience anemia (92.3%). While most pregnant women who experienced CED also experienced anemia (87.5%). The p-value = 0.000 (<0.05) can be concluded that there is a relationship between Chronic Energy Deficiency (CED) and the incidence of anemia in pregnant women.
4.	Subriah, Inka Dewi Safitri, Syaniah Umar, Djuhadiah Saadong	Chronic Energy Deficiency is Associated with the Incidence of Anemia in Pregnant WomenHamil	The sampling technique was purposive sampling with 78 respondents.	The type of research used is an analytical survey with a cross sectional design.	The results of statistical tests with the chi-square test, namely the known significance value of p (0.005) < α (0,05, meaning that the p value is smaller than the α value at a confidence level of 95% with 1 degree of freedom, it can be concluded that the null hypothesis is rejected and the alternative hypothesis is accepted, this means that there is a relationship between chronic energy deficiency and the incidence of anemia in pregnant women at the Mangasa Health Center, Makassar City.
5.	Iin Prima Fitriah, Faridah BD, Yuliva, Vivi Oknalia, Lita	Anemia with Chronic Energy Deficiency (CED) in Pregnant Women	The sample size was 179 people.	This study used descriptive analytic research methods by conducting a Cross	The results showed that 60 people (33.5%) of respondents experienced anemia, 36 people (20.1%) of respondents experienced CED and there was a relationship between anemia and the incidence of CED in the Working Area of Puskesmas Pasar

	Angelina Saputri, Mardiani Bebasari, Yussie Ater Merry, Neni Fitra Hayati			Sectional Study approach.	Kouk, South Coastal Regency in 2021 with a value of (p<0,05).
6.	Setria Dewi Sulastri, Reni Hariyanti, Silvia Mariana, Rahmah	The Relationship of Chronic Energy Deficiency (CED) and Education Level with the Incidence of Anemia in Pregnant Women at the Putri Ayu Health Center, Jambi City	The sample in this study were 176 people.	The research method used an analytical survey with a retrospectiv e approach.	The results of statistical tests showed that there was a significant relationship between chronic energy deficiency (CEC) (p-value 0.004) with the incidence of anemia in pregnant women at the Putri Ayu Health Center in Jambi City, and there was no relationship between education level (p-value 0.452) with the incidence of anemia in pregnant women at the Putri Ayu Health Center in Jambi City.
7.	Idha Farahdiba Institut Ilmu Kesehatan Pelamonia Makassar	The Relationship between Chronic Energy Deficiency (Kek) and the Incidence of Anemia in Primigravida Pregnant Women at Jongaya Makassar Health Center in 2021	The sample used in this study was 93 people.	This research is a quantitative study using analytical methods with a Cross Sectional Study approach.	The results of statistical tests using the Chi-Square test (pearson chisquare) obtained a value of p = 0,02 < α=0,05 so there is a relationship between Chronic Energy Deficiency (CED) and the incidence of anemia in primigravida pregnant women.
8.	Kurniasih, Iis Tri Utami, Fitriana, Linda Puspita	The Correlation Of Chronic Energy Deficiency (Ced) With The Genesis Of Anemia On Pregnant Women At The Work Area Of Community	Sample numbered 78 respondents.	The research type is quantitative with Case Control research design.	The research results are there is correlation of chronic energy deficiency (CED) with the genesis of anemia on pregnant women at the work area of community health center in srimulyosuoh of West Lampung Regency 2020 with (P value 0.041 and OR 2.86).

		Health Center In Srimulyo Suoh Of West Lampung Regency 2020			
9.	Arum Diah Pusporini, Andi Ummu Salmah, Atjo Wahyu, Arifin Seweng, Apik Indarty, Suriah, Rosmala Nur, Aminuddin Syam, Mahfudz	Risk Factors Of Anemia Among Pregnant Women In Community Health Center (Puskesmas) Singgani And Puskesmas Tipo Palu	The sample size in this study is 138 samples.	We used an observational analytic study with a matched case-control study design.	Nutritional status is a risk factor of anemia among pregnant women in Community Health Center (Puskesmas) Singgani and Puskesmas Tipo. The risk of pregnant women with chronic energy deficiency (CED) developing anemia is higher in Puskesmas Singgani compared to in Puskesmas Tipo.
10.	Lina, Arbaiyah, Meliani Sukmadewi Harahap	Relationship Between Chronic Energy Deficiency And Compliance With Taking Fe Tablets With The Incidence Of Anemia In Pregnant Women At Kuala Simpang City Health Center Aceh Tamiang	The sample size of this study was 56 respondents.	The design of this study was analytical with a cross-sectional design.	The results showed that the majority of respondents with Chronic Energy Deficiency experienced anemia as many as 14 (93.3%) and respondents who did not have Chronic Energy Deficiencymajority did not experience anemia as many as 30 (73.2%) respondents. The results of the Chi–Square statistic test, p Value = 0.000
11.	Anggrawati Wulandari, Rosmiati, Faculty Of Nursing And Midwifery, Institute Of Health Sciences STRADA Indonesia,	The Incidence Of Anemia In Terms Of Gestational Age And History Of Chronic Energy Deficiency In Pregnant Women	Total sample 31 respondent.	The research design used in this study is correlational analytic with a cross sectional time approach.	Of the total 40 respondents (100%) of gestational age at the Siniu Public Health Center, Parigi Moutong Regency, Central Sulawesi Most were in the first trimester (40%), Most of them did not have KEK 31 respondents (77.5%) and most were not anemic 31 (77.5) %). The analysis test using Chi Square shows that the significance level is 0.000 < = 0.05 it means H0 is rejected and H1 is accepted. Thus, there is a

	Kediri - Indonesia				relationship between gestational age and Chronic Energy Deficiency in pregnant women with the incidence of anemia at the Siniu Public Health Center, Parigi Moutong Regency, Central Sulawesi.
12.	Rahayu Nurul Reski, Veni Hadju, Rahayu Indriasari, Masyita Muis	Anemia, chronic energy deficiency and their relationship in preconceptio n women	A total of 300 pregnant mothers were selected for this study.	This was a cross-sectional study.	This study found the prevalence of anemia and chronic energy deficiency (CED) of 23% and 18%, respectively. In addition, there was a significant relationship between anemia and CED with a P value of 0.018, after other variables were controlled, women with anemia were twice as likely to experience CED compared to those without anemia.

The results of this study indicate a significant association between Chronic Energy Deficiency (CED) and the incidence of anemia in pregnant women, in line with previous studies. Research (Sandhi and E.D., 2021) found that there was a significant relationship between chronic energy deficiency (CED) and the incidence of anemia with statistical test results p value=0.0002 ($p \leq 0.05$). Pregnant women who do not experience CED tend to have a lower risk of anemia, because they generally maintain a balanced nutritional intake during pregnancy, including consumption of micronutrients, macronutrients, and vitamin C. In contrast, pregnant women who experience CED tend to have a lower risk of anemia. In contrast, pregnant women who experience CED are more prone to anemia, which can be caused by unbalanced consumption patterns and suboptimal absorption of nutrients.

This is in line with research conducted (Qomarasari and Pratiwi, 2023) with the results of the chi square test analysis obtained the results of ρ value of 0.002 which means that there is a relationship between the status of CED with anemia status in pregnant women at El'mozza Clinic. Pregnant women with CED have a greater potential to develop anemia than pregnant women without this condition. Because it can be caused by consumption patterns and absorption of food that is less balanced during pregnancy. The risk of nutritional disorders and chronic energy deficiency (CED) can cause anemia in mothers during pregnancy and this will increase if the mother does not consume foods rich in micronutrients and macronutrients during her pregnancy.

Research (Fitriah et al., 2023) showed that of the total respondents, 60 people (33.5%) experienced anemia and 36 people (20.1%) experienced chronic energy deficiency (CED). There was a significant relationship between the incidence of anemia and CED in the Working Area of Puskesmas Pasar Kouk, Pesisir Selatan Regency, with a p value< 0.05. The majority of pregnant women who experienced anemia were also identified as having CED, while most pregnant women who were not anemic also did not experience CED. The condition anemia can be affected by hemoglobin levels that are constantly below the threshold, which increases the likelihood of developing CED. When nutritional needs, especially minerals

such as iron, are not met, the risk of anemia increases.

In a study conducted (Subriah et al., 2021) also obtained results in accordance with the hypothesis compiled in this study, namely there is a relationship between chronic energy deficiency with the incidence of anemia in pregnant women, with a p value = 0.005 which is < than α 0.05 so that Ha is accepted and Ho is rejected Nutritional problems that are often faced by pregnant women are CED and anemia while anemia in pregnant women is closely related to the nutritional status of pregnant women because anemia is one of the signs that the mother suffers from malnutrition. Anemia in pregnant women has a bad impact, both on the mother and the fetus.

The results of this study are supported by research conducted by (Marani, Ketut Resmaniasih and Astutik', 2024) with the results of statistical tests showing a p value = 0.000 <0.05 which means there is a relationship between chronic energy deficiency (CEC) with anemia. The study, which was conducted in the KIA Room of the BLUD UPT Puskesmas Pahandut Kota Palangka Raya, concluded that pregnant women who experience the risk of CED have the potential to face various complications, both for themselves and the fetus, such as anemia, bleeding, non-optimal weight gain, and increased risk of infection.

In a study conducted (Sulastri et al., 2023) at the Putri Ayu Community Health Center in Jambi City showed a relationship between chronic energy deficiency (CED) and the incidence of anemia in pregnant women, with the results of the bivariate test showing a significance value of p = 0.004 (p < 0.05). This finding supports the theory that CED is a condition of malnutrition due to a lack of calorie and protein intake over a long period of time, which is generally characterized by substandard Upper Arm Circumference (LiLA) measurements.

In line with research (Farahdiba, 2021) shows the results of statistical tests using the Chi-Square test (pearson chi-square) obtained a value of p = 0.02 < α = 0.05, it can be concluded that there is a relationship between Chronic Energy Deficiency (CED) and the incidence of anemia in primigravida pregnant women.

Research (Utami and Puspita, 2020) also shows the relationship between Chronic Energy Deficiency (CED) and the incidence of anemia in pregnant women in the working area of the Srimulyo Suoh Health Center, West Lampung Regency in 2020. Based on data obtained from the results of the study, the incidence of anemia in pregnant women in the case group with anemic pregnant women who experienced CED was 24 mothers (61.5%), greater than the control group, which was 14 mothers (35.9%). The results of statistical test analysis using chi square obtained a significant value of p value 0.041 thus the p value is smaller than 0.05 so that Ho is rejected, meaning that there is a relationship between CED and the incidence of anemia in pregnant women. From the results of data analysis obtained OR value = 2.86 (95% CI = 1.14 - 7.16), meaning that pregnant women with CED have a risk of 2.86 times greater to experience anemia.

This is also in line with research from (Pusporini et al., 2021)Chronic energy deficiency (CED) is a condition where the body lacks macronutrients (carbohydrates, protein, and fat) for a long period of time, which is characterized by an upper arm circumference of less than 23.5 cm. Based on the results of the bivariate test, it is known that nutritional status is a risk factor for anemia in pregnant women at Puskesmas Singgani and Puskesmas Tipo. Pregnant women with chronic energy deficiency conditions at Puskesmas Singgani have a 24-fold risk of experiencing anemia compared to

pregnant women who do not experience CED. Meanwhile, pregnant women who experience CED at Puskesmas Tipo have a risk of 12.75 times to experience anemia in their pregnancy.

This is reinforced by the results of research (Lina, Arbaiyah and Meliani Sukmadewi Harahap, 2022) which shows that respondents who experienced chronic energy deficiency the majority experienced anemia as many as 14 (93.3%) and respondents who did not experience chronic energy deficiency the majority did not experience anemia as many as 30 (73.2%) respondents. ChiSquare statistical test results p Value = 0.000 (p <0.05) there is a relationship between chronic energy deficiency and the incidence of anemia in pregnant women. Pregnant women should apply a good diet during pregnancy so that nutrition and nutritional needs during pregnancy can be met and routinely consume Fe tablets.

Research Reski et al., (2020) which shows that CED is an important factor in the incidence of anemia with a p value of 0.018. CED reflects a condition of iron, folic acid, and vitamin B12 deficiency which are essential in the production of red blood cells. When the body does not obtain enough nutrients, hemoglobin production is impaired. This condition increases the potential for anemia in pregnant women.

The same results were also obtained from research (Wulandari, 2022), The results of data analysis showed a significance level of 0.000 < = 0.05, meaning that H0 was rejected and H1 was accepted, thus there was an association between Chronic Energy Deficiency in pregnant women with the incidence of anemia at Siniu Health Center, Parigi Moutong Regency, Central Sulawesi. A person with a BMI of less than 18 is associated with the condition of being underweight or if it is far below 18 or LILA is associated with a size of less than 23.5 cm with a condition of chronic energy deficiency. This occurs when energy consumption is lower than needs, resulting in some of the body's energy reserves in the form of fat being used. The breakdown of fat tissue will be followed by weight loss as much as the fat is utilized. In general, people who have significant protein energy deficiency with other nutrient deficiencies such as iron deficiency will cause anemia.

By comparing various research results, it can be concluded that the association of SEZ and anemia is consistent across regions, study designs, and groups of respondents. Variations in risk between studies may be due to socioeconomic factors, access to health services, local diets, and adherence to iron supplementation. Therefore, this review not only confirms the relationship between SEZ and anemia, but also opens up room for further research exploring mediating factors and the most effective interventions in reducing these two conditions simultaneously.

The relationship between chronic energy deficiency (CED) and anemia in pregnant women is a real problem, especially in areas with limited access to nutrition and health services. Nutritional status assessments such as upper arm circumference (LILA) measurements are not routinely conducted, and pregnant women's adherence to taking blood supplement tablets is low due to side effects and lack of understanding. Programs such as supplementary feeding (PMT) and iron supplements are not yet running optimally. The findings of this study confirm the importance of regular nutrition screening, continuous health education, and strengthening of nutrition programs for pregnant women at the primary care level.

CONCLUSION

Based on the literature review research presented above, it can be concluded that there is a relationship between chronic energy deficiency (CED) and the incidence of anemia in pregnant women. It is certainly necessary to make efforts to improve the health of pregnant women to prevent anemia by providing knowledge to pregnant women related to nutritional status and compliance with consumption of blood supplement tablets. Good nutritional status is very important for pregnant women because it can affect maternal health and fetal development. Adequate and balanced nutrition can provide the nutrients needed to support the growth and development of the baby in the womb. In addition, the consumption of blood tablets or commonly called iron supplements in pregnant women is also very important. Some of the benefits of consuming blood supplement tablets are helping the fetus grow optimally, preventing the risk of premature birth and low birth weight, preventing the risk of maternal health complications, and as preparation for labor and breastfeeding.

The implication of this literature review is that increasing understanding of the importance of nutritional fulfillment during pregnancy should be a priority in health policy. In addition, stricter monitoring of pregnant women at risk of CED is needed to prevent adverse effects on the mother and fetus.

As for future research, longitudinal studies or more in-depth quantitative research are needed to assess the causal relationship between CED and anemia in pregnant women. Such studies could also evaluate the effectiveness of existing nutrition interventions to provide a stronger basis for more targeted health policies.

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