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Antenatal Care (ANC) History Related To Chronic Energy Deficiency (CED) In Pregnant Women

Monica Dara Delia Suja[1], Indah Budiarti*[2] , Lely Sulistianingrum[3]

1 Department of Midwifery, Poltekkes Kemenkes Tanjungkarang
2 Department of Midwifery, Poltekkes Kemenkes Tanjungkarang
3 Department of Dental Technique, Poltekkes Kemenkes Tanjungkarang

Author's Email Correspondence (*): indahbudiarti78@gmail.com (082186886168)

ABSTRACT

Introduction: Low body weight, decreased energy stores, and possibly impaired physical performance are all symptoms of chronic energy deficit (CED), a condition brought on by an prolonged absence of energy and protein intake. This kind of malnutrition can have serious health effects, particularly for teenagers and pregnant women. According to government regulations, pregnant women must have their pregnancy checked according to standards and routinely consume iron tablets. Aims: The purpose of this study was to identify the relationship between ANC history and iron tablet consumption level with the incidence of CED in pregnant women in the Way Kandis Public Health Center area in Bandar Lampung City. Methods: This study was conducted using a cross-sectional approach, with a total respondent of 48 pregnant women. Purposive sampling was used to choose participants, and in-person interviews were used to gather data. The statistical analysis used in this study was bivariate analysis using chi-square. Results: Antenatal care history and the incidence of CED was significantly related to the incidence of CED in pregnant women with p-value <0.05 and for the iron consumption was significantly related to the incidence of CED in pregnant women consumption and the incidence of CED with p-value <0.05 Conclusion: Adequate antenatal check-ups and regular consumption of iron tablets can prevent CED in pregnant women.

Keywords *: chronic energi deficiency; pregnant women; antenatal care*

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INTRODUCTION

Chronic energy deficiency and anemia in pregnancy are related to suboptimal nutritional intake during pregnancy and play an important role in fetal growth and development. Low body weight, decreased energy stores, and possibly impaired physical performance are all symptoms of Chronic Energy Deficiency (CED), a condition brought on by an prolonged absence of energy and protein intake (1). This kind of malnutrition can have serious health effects, particularly for teenagers and pregnant women. Chronic energy deficiency and anemia in pregnancy are related to suboptimal nutritional intake during pregnancy and play an important role in fetal growth and development. Mid Upper Arm Circumference (MUAC) is one way to determine a person's nutritional status. Measuring upper arm circumference can be used to detect the risk of chronic energy deficiency (CED) in women of childbearing age and pregnant women (2).

The health condition of the mother during pregnancy is worsened by the occurrence of anemia which can have a negative effect on the health of the mother and her fetus, both during pregnancy, childbirth and postpartum, which can increase maternal and child morbidity and mortality. In addition, compliance with Fe consumption is also very important to prevent anemia during pregnancy (3). According to the World Health Organization (WHO), antenatal care to detect early high-risk pregnancy and childbirth can also reduce maternal mortality and monitor fetal conditions. Antenatal Care (ANC) is one of the early prevention efforts of pregnancy risk factors.

In 2023, the data from Indonesia Ministry of Health, antenatal care utilization for pregnant women in Indonesia were 74.4%, not reaching the 2023 target of 80% in 2023 (4). The source of routine report data in 2022 collected from 34 provinces, it is known that there are 283,833 pregnant women with MUAC <23.5 cm (risk of CED) from 3,249,503 pregnant women whose Muac was measured, so it is known that the achievement of

pregnant women with CED risk is 8.7%. Based on Indonesian Health Survey in 2023, the prevalence of CED risk in pregnant women aged 15-49 years, in Lampung Province is 14% (5). Meanwhile, the prevalence of CED risk in Bandar Lampung city in pregnant women is 17.36% and non-pregnant women 17.02%. One of the health centers in Bandar Lampung City, namely Way Kandis Health Center in 2022, had 48 pregnant women with CED (6). The purpose of this study was to identify the relationship between ANC history and iron tablet consumption level with the incidence of CED in pregnant women in the Way Kandis Public Health Center area in Bandar Lampung City.

METHODS

This study is a quantitative study using a cross-sectional approach. The independent variables in this study are the history of antenatal care (ANC) visits and the level of Fe tablet consumption, while the dependent variable is Chronic Energy Deficiency (CED). This study conducted in July – August 2024. The population in this study were pregnant women in the Way Kandis Health Center area, Bandar Lampung City. The sample to be used in this study were pregnant women in the Way Kandis Health Center area selected by purposive sampling with a minimum sample size of 50 pregnant women. The inclusion criteria in this study were pregnant women who resided in the Way Kandis Health Center working area and were willing to participate in the study. Data collection was carried out by filling out questionnaires that were distributed directly through integrated health posts and home visits. Data analysis was carried out using univariate analysis using tables and percentages, while bivariate analysis used the chi-square statistical test.

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RESULTS

Based on Table 1, it is known that most of the respondents' ages are not at risk as many as 37 people (74%). For education, there are 25 people (50%) with college graduate education, the majority of respondents' jobs are working 34 people (68%). There are 38 people (76%) mothers with multiparity parity. Respondents with a complete ANC history are 35 people (70%). The level of complete Fe consumption (90 tablets) is 38 respondents (76%) and the incidence of CED in mothers is 12 people (24%).

Table 1
Characteristics of Respondent pregnant women
at Way Kandis Health Center, Bandar Lampung in 2024

Characteristics	Frequency	Percentage (%)
Mother's Age		
Risk	13	26
No Risk	37	74
Education		
Junior High School	5	10
Senior High School	20	40
College	25	50
Work		
Work	34	68
Unemployed	16	32
Parity		
Primipara	12	24
Multipara	38	76
ANC History		
Complete	35	70
Incomplete	15	30
Fe Consumption Level		
Complete	38	76
Incomplete	12	24
CED		
CED	12	24
Normal	38	76

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Based on table 2, it can be seen that the results of the bivariate analysis for the relationship between ANC History and CED Incidents show a p-value (p-value = 0.003) (<0.05) .

Table 2
History of Antenatal Care (ANC) with the incidence of CED in pregnant women at Way Kandis Health Center, Bandar Lampung in 2024

Independent Variables	CED Events				*p-value*
	CED		No CED		
	n	%	n	%	
ANC History					
Complete (K6)	4	33.3	31	81.5	0.003
Incomplete (<K6)	8	66.7	7		

DISCUSSION

The findings of this study indicate that maternal characteristics such as age, education, employment, and parity have varied profiles among the respondents, with most mothers falling into the non-risk age group, having higher education, being employed, and experiencing multiparity. These characteristics are essential as they may indirectly influence maternal nutritional status and access to health services during pregnancy. Higher education and employment status can reflect better health literacy and the ability to utilize available maternal health services more effectively, including regular ANC visits and consumption of iron supplements.

Antenatal Care (ANC) history shows a significant association with the incidence of Chronic Energy Deficiency (CED) in pregnant women with p-value <0,005. Mothers who did not complete the recommended minimum number of ANC visits were found to be more vulnerable to experiencing CED. Mothers who has completed ANC history turns out to less have CED in their pregnancy. This reinforces the concept that routine and complete ANC visits are critical not only for monitoring fetal development but also for ensuring maternal nutritional well-being. ANC visits provide opportunities for early detection of nutritional

issues and timely intervention. This finding is supported by another results , which also identified a statistically significant link between ANC completeness and maternal nutritional outcomes with p-value <0,005 (7).

The results of this study are in line with another study, showing a ρ-value of 0.008, which means that the ρ-value <0.05, so it can be concluded that there is a significant relationship between the regularity of ANC and the incidence of CED in pregnant women in the third trimester. The OR (Odd Ratio) value of 4.988 means that pregnant women who are irregular in carrying out ANC have a 4.988 times risk of experiencing CED compared to pregnant women who carry out ANC regularly (8). One of the problems that can occur in pregnant women, especially those related to nutritional status, is Chronic Energy Deficiency (CED) where CED is one of the non-obstetric pregnancy complications that occurs in the long term. The diagnosis of chronic energy deficiency can be determined by examining the upper arm circumference of pregnant women who are less than 23.5 cm and look thin (9).

One of the factors that influences Chronic Energy Deficiency (CED) in pregnant women is the regularity of Ante Natal Care (ANC) examinations. The purpose of Antenatal Care is that pregnant women receive care during pregnancy including pregnancy check-ups, education and high-risk detection so that if there are findings, preventive and curative efforts can be taken immediately to prevent morbidity and mortality (10) . MUAC measurement is carried out at the first contact to detect pregnant women at risk of chronic energy deficiency (CED). Chronic energy deficiency here means pregnant women who experience malnutrition and have been going on for a long time, because pregnant women with CED can give birth to low birth weight (LBW) babies (11) . The normal value of Muac is 23.5 cm. The latest Antenatal Care examination is in accordance with service standards, namely a minimum of 6 examinations during pregnancy, and a minimum of 2 examinations by a doctor in the first and third trimesters. 2 times in the first trimester (pregnancy up to

12 weeks), 1 time in the second trimester (pregnancy above 12 weeks to 26 weeks), 3 times in the third trimester (pregnancy above 24 weeks to 40 weeks) (12) .

Research by Triatmadja in 2018 showed that there was a relationship between antenatal care (ANC) and the incidence of CED in pregnant women at the Warung Jambu Health Center in Bogor City. There was also a significant relationship between pregnancy examinations and the incidence of CED in pregnant women in Kediri Subdisrict (13). According to researchers, based theories and related research results, ANC examinations in addition to aiming to detect early high-risk pregnancy and childbirth can also reduce maternal mortality rates and monitor fetal conditions. ANC is also something new for some pregnant women so that pregnant women have high motivation in doing ANC so that it is safe for themselves and the baby in their womb. On the other hand, mothers who have given birth more than once assume that they already have experience so they are not motivated to check their pregnancy. By routinely doing ANC, the mother's pregnancy will be well controlled so that it can prevent CED in pregnant women (14).

On the other hand, another study also explained that the incidence of KEK in pregnant women is not only influenced by the antenatal history but also the history of nutritional status before pregnancy, the presence of a history of chronic diseases and others because usually in pregnant women there is an increase in appetite so that it can prevent KEK but does not guarantee that it can prevent anemia even though consuming Fe, unless the pregnant woman's level of animal protein consumption and vitamin C are adequate so that it can help the absorption of Fe in the body (15).

Antenatal Care (ANC) plays a crucial role in preventing Chronic Energy Deficiency (CED) among pregnant women. Regular and appropriate ANC visits provide essential opportunities for health professionals to conduct nutritional assessments, including monitoring maternal weight gain and Mid-Upper Arm Circumference (MUAC), and to offer

vital nutrition education, counseling, and supplementary feeding when needed. Studies consistently show a significant association between the frequency and quality of ANC services and a lower incidence of CED, highlighting ANC as a key intervention point for improving maternal nutritional status and ultimately, maternal and fetal health outcomes (16).

Inadequate or infrequent ANC attendance, however, can leave pregnant women vulnerable to CED due to missed opportunities for early detection and intervention of nutritional deficiencies. Without proper guidance on balanced diets, iron-folic acid supplementation, and timely identification of risk factors like pre-existing malnutrition or high parity, the risk of developing or exacerbating CED increases significantly. Therefore, strengthening ANC programs to ensure comprehensive coverage and adherence is paramount in reducing the burden of CED, particularly in regions where access to nutritious food and healthcare resources may be limited (17).

Chronic Energy Deficiency (CED) in pregnant women influences the incidence of anemia. This is in accordance with the theory that explains that KEK pregnant women is one of the indicators in measuring the nutritional status of the community. If the nutritional intake for pregnant women from food is not balanced with the body's needs, there will be a nutritional deficiency. Pregnancy causes increased energy metabolism. Therefore, the need for energy and other nutrients increases during pregnancy. The increase in energy and nutrients is needed for the growth and development of the fetus, the increase in the size of the reproductive organs, and changes in the composition and metabolism of the mother's body. So that the lack of certain nutrients needed during pregnancy can cause the fetus to grow imperfectly (18).

The nutritional status of pregnant women will affect both the mother and the fetus. Malnutrition in pregnant women can cause risks and complications in the mother, such as

anemia, bleeding and the mother's weight does not increase normally and is exposed to infectious diseases. Mothers who have experienced chronic energy deficiency from the beginning will be at greater risk of giving birth to babies with low birth weight (LBW), namely the baby's weight <2500 gr.

CONCLUSIONS AND RECOMMENDATIONS

The results of this study indicate that ANC History is significantly related to CED incidents in pregnant women. Health facilities should proactively encourage pregnant women to attend ANC visits according to standards (at least 6 times, including 2 times with a doctor) and ensure that each visit includes comprehensive nutritional assessment (MUAC and weight measurement), individualized nutritional counseling, and regular provision of iron-folic acid supplements. Adequate antenatal check-ups can prevent chronic energi deficiency in pregnant women, also involving cadres and community leaders in outreach and mentoring efforts for pregnant women at the community level, to raise awareness of the importance of ANC and adherence to nutritional recommendations.

BIBLIOGRAPHY

1. Lestari CI. Relationship between adherence to consuming Fe (iron) tablets and food intake with the incidence of Chronic Energy Deficiency (CED) in pregnant women in Mataram City in 2018. Midwifery Journal: Jurnal Kebidanan UM Mataram. 2019;4(2):89–94.
2. Mardiatun LAY, Purnamawati D, Zulkifli R. Relationship between Ante Natal Care (ANC) History and Level of Fe (Iron) Consumption with the Incidence of CED in Pregnant Women in West Nusa Tenggara Province and in the Special Region of Yogyakarta (Further Analysis of 2013 Basic Health Research Data). Buletin Penelitian Sistem Kesehatan–Vol. 2015;18(3):221–8.
3. Sulistianingrum L, et al. Analysis Of Factors Related To The Incident Of Chronic Energy Deficiency (CED) In Pregnant Women. JKM (Jurnal Kebidanan Malahayati). 2024 Aug;10(8):765-70.

4. Kementerian Kesehatan Republik Indonesia. Profil Kesehatan Indonesia 2023. Jakarta: Kementerian Kesehatan Republik Indonesia; 2024. Tersedia dari: https://kemkes.go.id/id/profil-kesehatan-indonesia-2023
5. Bahriah Y. Adherence to consuming Fe tablets and anemia towards chronic energy deficiency (CED) in pregnant women in 2020 (Literature Study). Jurnal Kebidanan: Jurnal Ilmu Kesehatan Budi Mulia. 2021;11(1):79–91.
6. Ekowati D, Ani LS, Windiani IGAT. High parity and chronic energy deficiency increase risk for low birth weight in Situbondo District. Public Health and Preventive Medicine Archive. 2017 Dec 1;5(1):28–32.
7. Elsera C, Murtana A, Sawitri E, Oktaviani S. Factors Causing Chronic Energy Deficiency (CED) in Pregnant Women: Literature Study. The 13th University Research Colloquium 2021, 985-988. 2021;985–8.
8. Ernawati E, Imelda I. Factors Affecting the Increase of Bilirubin Levels in Newborns at Husada Hospital. Jurnal Kesehatan Holistic. 2017;1(2):78–89.
9. Fikayanti US, Noviyani EP, Sari A. Relationship between Factors of Ante Natal Care Regularity, Fe Intake, and Supplementary Feeding with the Incidence of CED in Third Trimester Pregnant Women at Karangpawitan Community Health Center in 2023. INNOVATIVE: Journal Of Social Science Research. 2024;4(2):8521–34.
10. Hani U, Rosida L. Description of Age and Parity in the Incidence of CED. JHeS (Journal of Health Studies). 2018 Mar 4;2(1):103–9.
11. Husna A, Andika F, Rahmi N. Determinants of Chronic Energy Deficiency (CED) in Pregnant Women at Pustu Lam Hasan, Peukan Bada District, Aceh Besar Regency. Journal of healthcare technology and medicine. 2020;6(1):608–15.
12. Indrasari N, Octaviana A, Sastri IGAMW. Determinants of Chronic Energy Deficiency (CED) and Anemia in Pregnant Women. Jurnal Kesehatan. 2022;13(2):368–75.
13. Triatmaja NT. Factors related to the status of Chronic Energy Deficiency (CED) in pregnant women in Kediri Regency. Jurnal Wiyata: Penelitian Sains dan Kesehatan. 2018;4(2):137–42.
14. Sari AP, Ibrahim R, Jingsung J. Relationship between age and parity with the incidence of chronic energy deficiency in pregnant women at Pondidaha Community Health Center, Konawe Regency. Journal Pelita Sains Kesehatan. 2023;3(4):32–9.
15. Triwahyuningsih RY, Prayugi AN. Analysis of Factors Related to the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women. Jurnal Kebidanan. 2018;8(2):116–21.
16. Rosita U, Rusmimpong R. Relationship between Parity and Age of Pregnant Women with the Incidence of Chronic Energy Deficiency in Simpang Limbur Village, Simpang Limbur Community Health Center Working Area. Nursing Care and Health Technology Journal (NCHAT). 2022 Jul 31;2(2):78–86.

17. Novitasari YD, Wahyudi F, Nugraheni A. Factors Related to Chronic Energy Deficiency (Ced) In Pregnant Women In The Working Area Of Rowosari Health Center Semarang. Jurnal Kedokteran Diponegoro. 2019;8(1):562–71.
18. Jamil AI, Ningtyias FW, Antika RB. Food Consumption and Family Income Associated with Chronic Energy Deficiency in Pregnant Women in Coastal Areas of Indonesia: Systematic Review. Amerta Nutrition. 2024;8(4)